

### 1.3.2C. Sample project report, field report and documents of internship.

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# PROJECT REPORT

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## Research Proposal Topic

“বেঙ্গল স্ত্রীশিক্ষার উন্নয়নে বিদ্যাসুন্দরী রায়ের অবদান”

[Educational Thoughts of Begum  
Rokeya and her contribution in  
the upliftment of women education  
in Bengal.]

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Introduction Topic Under

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প্রাচীনকালে সমাজ ও শিক্ষাক্ষেত্রে নারীদের পূর্ণ  
অধিকার থাকলেও, মনুষ্য যুগ থেকে নারী ক্ষয়ক্ষতি  
ক্রমক্রমে ঘটে আসে; মধ্যযুগে নারীদের প্রতি  
এই সামাজিক বন্ধন ও অস্বাভাবিক আয়ে তীব্র-  
হয়ে ওঠে; সামাজিক অনুকায়েন, বিধিনিষেধ এবং  
উল্লেখ্য প্রকৃতি বর্ষায়ুদের বৃদ্ধাঙ্কন প্রভৃতি  
মতাদর্শের কারণে, বারংবার প্রাচীন বহন করে  
যে উৎসাহীন যুগে নারীদের সামাজিক ও  
সাংস্কৃতিক কর্মসূচী তৈরিতে এম এম এম এম  
এই শিক্ষার অধিকার থেকে বঞ্চিত হয়ে  
অস্বাভাবিক হয়ে পড়ে, নারীদের মধ্যে  
প্রথম উদ্যোগ আলোর খিনি দেখিয়েছিলেন,  
তিনি হলেন আর্চুটিক বেংগে অস্বাভাবিক  
স্বাভাবিক হয়, বেংগে স্বাভাবিক তিন দিকপাল  
বিদ্যাভাগ, স্বামী চিত্রবন্দন ও স্বামীন্দ্রনাথ  
নারীশিক্ষার জন্য অস্বাভাবিক হলেন ও স্বাভাবিক  
স্বামী সামাজিক চোখের - জন্য নারীদের  
স্বাভাবিক স্বাভাবিক শিক্ষার ছিল এখন  
স্বাভাবিক স্বাভাবিক, স্বাভাবিক স্বাভাবিক  
স্বাভাবিক স্বাভাবিক নারীশিক্ষার উদ্যোগে উদ্বৃত্ত  
হয়নি, স্বাভাবিক স্বাভাবিক স্বাভাবিক স্বাভাবিক  
স্বাভাবিক স্বাভাবিক সামাজিক স্বাভাবিক স্বাভাবিক  
স্বাভাবিক স্বাভাবিক নারীশিক্ষার স্বাভাবিক স্বাভাবিক

স্বল্প সংখ্যক নারীকে সামাজিক অগ্রগতি, তাদের  
 শিক্ষা ও তাদের উন্নয়নকামী করে তোলায়  
 অন্য-বেসাম যোগেয়া ছিলেন

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বেসাম যোগেয়া অনুপ্রেরণা করে  
 ৭৯ ডিসেম্বর মিচাপুরে থানার অন্তর্গত সাম্মিলান  
 গ্রামে এক ~~সম্মিলন~~ সম্মেলন উদ্বোধন করে,  
 তাঁর নিজস্ব নাম উদ্ভিদিত মনোহর আরু  
 আমদান্য করে, তাঁর নিজস্ব ছিলেন মনোহর  
 বুদ্ধিমতী ব্যক্তি, ওকালীন সুমানিত্য সমাজ ব্যবস্থা  
 অনুসারে যোগেয়া ও তাঁর কোনেই বাস্তবে  
 গড়ার সুযোগ হয়নি, তাঁকে বাড়ির অন্তর্ভুক্ত  
 আর্থিক ও উচ্চ কোথায় হয়, তবে তাঁর বড়  
 বেশ স্বাধীনতা তাঁকে প্রবেশে যোগানে যাওয়া  
 ও স্বাধীনতা কোথায়, মনোহর মনোহর সুখিয়ে  
 গড়নে তখন বেসাম যোগেয়া হাত জেগে  
 গড়নোনা করেছেন, ১৯৭৪ খ্রি. মার্চ ১৪ তারিখ  
 যখন বিহারে বেঙ্গালপুর নিগমী উচ্চশিক্ষা  
 ইন্সটিটিউট মাধ্যমিক শ্রেণীর অধিকার  
 বিচার হয়, তাঁর নামী ছিলেন অত্যন্ত  
 উন্নয়নকামী ব্যক্তি, যোগেয়ার নামীই যে  
 তাঁর জীবনে শিক্ষার ক্ষেত্রে ও পরিবর্তন  
 সামাজিক ও নারী শিক্ষার অগ্রনী সংস্থার  
 ইন্সটিটিউট প্রেরণা সুখিয়েছিলেন - তা বলাই  
 অতিরিক্ত হয় না।



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Need of the study - Lipin Bider

প্রকৃতিক কঠোরীতে প্রতিদিন এম ও জোনর  
 বিশ্লেষণের ঘটে চলেছে, বিভিন্ন মোহামোহা  
 ব্যবস্থাকে এতদেই সহজ ও সুন্দর করেছে যে  
 বিজ্ঞের এক প্রান্ত থেকে অন্য প্রান্তে মোহামোহা  
 উদ্ভাসন বহুধরক সুস্বতের বিলম্ব মাত্র, বিভিন্ন  
 শিক্ষা, কিলিম, সাহিত্য ইত্যাদি অঙ্গকে কেহে যে  
 অধুতপূর উন্নয়ন ঘটে চলেছে তার কারিক  
 মানবজাতি, সুস্থ ও নারী উভয়ের মিলিত  
 প্রমাণের মতো সমাজ ও রাষ্ট্রের উন্নতি ঘটে,  
 সমাজকে অসামর্থ্যেরে এটিয়ে নিম্নে হতে  
 মানুষের সুস্থিতার প্রকটন, তবে তা কর্তৃ- সুস্থিতার  
 নয়, নারীজাতিরই মত, আধুনিক যুগে নারীরা  
 যে কর্মতাপনের কার্যে অসিমে চলেছে,  
 তেই তার এতদেই অধুত- ছিল না, বিজ্ঞের  
 সুস্থিতার অঙ্গে নারীর উদ্ভাস ছিল অধুত  
 মোহামোহা, যেমন মোহামোহা প্রথম কাছিনা  
 যিনি নারীশিক্ষার জন্য অধুত- বন, এই  
 গবেষণাকর্মটির কার্যে যেমন মোহামোহা-  
 প্রকৃতিক কঠোরী নারীশিক্ষা আন্দোলনে এম  
 নারীশিক্ষার প্রকটন বহুধরক সাহিত্যিক- তা  
 এতদেই অসিমে কার্যে- বিজ্ঞের  
 বহু প্রমাণকর্মের অধুত, এতদেই

সংবেদনামূলক অর্থাৎ- সংস্কৃত- প্রমোজনামূলক  
 হলে - দ্বিতীয় ধরনের মুসলিম অর্থাৎ  
 নারীশিক্ষা প্রসারের যেসব যোগ্যতা কঠোর  
 অধ্যয়ন প্রচেষ্টা পোষণ করতেন, তাঁর একটি  
 ব্যাখ্যা প্রদান করা; নারীশিক্ষা, ক্রীড়া,  
 কলা, সামাজিক ও আর্থনৈতিক অবস্থানের  
 উন্নয়ন এর কাছাকাছি হিসেবে যেসব যোগ্যতা  
 প্রদান করা বিজ্ঞানসম্মত ভাবে এবং প্রতিবেদন  
 নির্মাণ করা হবে -

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☐ Review of related Literatures :-

- Roy, A.K (2019) যেসব যোগ্যতার শিক্ষা-  
 চিন্তার ওপর সংবেদন রয়েছে, তাঁর সংবেদন-  
 লব্ধ নাম - "Educational Thoughts of  
 Begum Rokeya and her contribution  
 in women Education." এই সংবেদন  
 উল্লেখ্য ছিল নবজাগরণের প্রেক্ষাপটে (scope  
 of Renaissance) বাংলায় কীভাবে যেসব  
 নারীশিক্ষা- সামাজিক অবস্থার উন্নতির মাধ্যমে  
~~এই~~ যেসব যোগ্যতার অর্জন বিজ্ঞানসম্মত  
 করা, মাঝে মাঝে যেসব যোগ্যতা তাঁর  
 নারীশিক্ষা ও দর্শন বিষয়ে মে মে অর্জন  
 করেছে তাঁর চর্চামূলক আলোচনা করা -

উক্ত সারসংক্ষেপ একটি নির্দিষ্ট বস্তুতে সেকেন্ডারি উৎস (Secondary source of data) বৈশিষ্ট্যে, যার মধ্যে সারসংক্ষেপ বিভিন্ন বই, জার্নাল, Articles and periodicals থেকে ১৯৩০-২০ এর মধ্যে সংগ্রহ করা হয়েছে।  
 উক্ত সারসংক্ষেপ বর্ণনামূলক প্রকৃতিতে (Descriptive in nature) এবং সারসংক্ষেপে সারসংক্ষেপের অভিন্নত্ব প্রকাশ করা হয়েছে।  
 সারসংক্ষেপে বিজ্ঞানসম্মত চিন্তা ও মতামত ব্যাখ্যা বৈশিষ্ট্যে, সারসংক্ষেপে প্রাপ্ত বস্তু যোগ্যতায় শিক্ষাদাতার সামাজিক উৎস হলো তাঁর সামাজিক দর্শন ও জীবনযাত্রা, সমাজনির্মিত দায়িত্ব ও পরিবেশের - মোটামুটি প্রয়োজন থেকে নানা পর্যবেক্ষণের আনন্দ সংগ্রহ ছিল যেসব যোগ্যতায় শিক্ষাদাতার লক্ষ্য, তাই বিজ্ঞান মতামতের সামান্য অর্থ সাহায্যের বৈশিষ্ট্যে তাঁর বিদ্যাময় পরিচালনা করা বর্ণিত হয়েছে।  
 উঠলে তিনি নিজের ব্যক্তিগত অর্থ থেকে মোটামুটি শিক্ষাকে অগ্রাহ্য করেছেন।  
 সারসংক্ষেপে সারসংক্ষেপে বিজ্ঞানসম্মত সামান্য উল্লেখ করেছেন যে, যেসব যোগ্যতায় প্রাপ্ত শিক্ষার পরিচালনা ছিলেন না, তবে সারসংক্ষেপে প্রাপ্ত ব্যাখ্যা উঠে তিনি সমাজতাত্ত্বিক ও ঐতিহাসিক ব্যাখ্যা করা করেন। সারসংক্ষেপে সারসংক্ষেপে সারসংক্ষেপে সারসংক্ষেপে সারসংক্ষেপে

কিছুদিনের মধ্যে বলেছেন, তা নাহীনের সমীচী কিস্তি  
 সঠিক শীকার করা ছিল না, তবে কিস্তি করা, যাতে  
 অর্থোপার্জ নাহীনের সঠিক অর্থোপার্জ করা  
 করা হয় অন্যর পরিকল্পিত হয়েছিল, সঠিকভাবে  
 কিস্তি আদায় করে ওকালীন এবং অন্যের মাধ্যমে  
 করেও যেসব যোগ্যের নাহীকিস্তি করে  
 উদ্যোগ বিক্রয় করা।

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• Mahmud. R (2016) সাহেবের করেছেন, যেসব  
 যোগ্যের নাহীকিস্তি করেছেন এবং  
 সাহেবের উদ্যোগ- ছিল যাওনাহেদের নাহী  
 উদ্যোগের ক্ষেত্রে যোগ্যের অর্থোপার্জ  
 করা, তাহলে যোগ্যের ওকালীন করা  
 অন্যের মেথরে নাহীনের অর্থোপার্জ  
 যাওনাহে ও অধিকারের মাধ্যমে যোগ্যের  
 আদায়ের সাথে কিস্তি করেছেন- তা বর্তমান পরিস্থিতি  
 কিস্তি বিবেচনা করা- তবে উদ্যোগের ক্ষেত্রে  
 করে সাহেবের মূলত অর্থোপার্জ বিক্রয়সমিতি-  
 করা করে করেছেন, সাহেবের মাধ্যমে  
 উদ্যোগ কিস্তির যেসব যোগ্যের নাহীকিস্তি  
 নাহীকিস্তি অর্থোপার্জ করে, যেসব - 'শ্রীমতি  
 অর্থোপার্জ', 'অর্থোপার্জসমিতি', 'অর্থোপার্জ মাধ্যমে'  
 উদ্যোগ মাধ্যমে করেছেন, এবং উদ্যোগ উদ্যোগ  
 কিস্তির বিক্রয় করে, উদ্যোগ ও Abstract  
 মাধ্যমে করেছেন।

সাহিত্যসমালোচনা কিতাবের নাম ছিল - "Rokeya Sakhawat Hossain: Tireless fighter of female education and their independence." এখানে সাহিত্যিক পদ্ধতি (Methodology) হিসেবে Descriptive form of Research গ্রহণ করেছেন, সাহিত্যিক প্রধান অনুষ্ঠান করেছেন - যেমন হোকেয়া যে সময়ে নারী স্বাধীনতা ও তাদের অর্থনৈতিক স্বনির্ভরতার কথা বলেছেন, তেজ্জ্বল মতই প্রস্তাব ছিল অপর্যাপ্ত মনোভাৱে - সাহিত্যিকের দ্বারা মুক্ত মুক্ত হয়ে গেলে আমরা নারীদের প্রতি বক্রতা ও অসহন্যতা হোকেয়া নারীদের আন্দোলনের পেরোনা সুসংগঠিত, সাহিত্যিক মনুষ্য হোকেয়ার সাহিত্যিক প্রথম নারীদের চিত্রিত করতে অভিযোজন - তুমি না, সাহিত্যিকের মতে, হোকেয়ার শিক্ষাদর্শন কেবল বই মুদ্রণে নয় বরং অসংস্কৃতিকভাবে উন্নতিতে যোগ্য রাখার মতো - উন্নয়ন ছিল না, এটি বরং শিক্ষা স্বাধীনতা, অধিকাংশ, উন্নত ও মতের অর্জন প্রতিফলিত।

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• Bhattacharya. S. (2006) এর সাহিত্যসমালোচনা করেছেন - "Step towards liberation: Re-visiting the English writing of Begum Rokeya". এর কিতাবের নাম,

সাময়িক অধীনে মূলত হোসেনশাহ আম্রিত্ত সুলতান  
সঙ্গে তাঁর নারীগণী চোগা বিকল্পেইন যোগে  
সেইসেইনা তাঁর সাময়িক উদ্দেশ্য- ছিল-

১) হোসেন হোসেনশাহ নারীগণী আম্রিত্ত সুলতান  
অন্যলোকনামূলক- কল্পিত- যোগ এবং অসম্মিত  
কর্তব্যে তাঁর আম্রিত্ত সুলতান প্রামাণিকতা  
অন্যলোকন যোগ সাময়িক অধীনে হোসেন হোসেনশাহ  
'Sultanas Dream' নামক প্রকৃতিকে নারীগণের  
আসন্ন বলে কল্পিত করেছেন, নারীগণী চোগা  
হোসেন হোসেনশাহ আম্রিত্তের কার্যে নারীগণের  
করেছেন, তাঁর আম্রিত্ত হোসেন কল্পিত নারী-  
স্বাধীনতা যোগ বলা হয়নি, নিরুদ্ভুত ও বহুসংখ্য  
বিভিন্ন অঙ্গের চিহ্নিত প্রকার উপর প্রতিষ্ঠা  
হলেছেন, সাময়িক অধীনে উল্লেখ করেছেন-  
হোসেন হোসেনশাহ প্রকৃত প্রামাণিকতা ও বিধি  
কার্য- অঙ্গের মধ্যেইন অন্য বিধি  
সাময়িক অধীনে, যদিও তা হোসেনশাহ  
অন্যলোকন সাময়িক

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Operational Definition :-

Educational Thoughts :-

শিক্ষা হলো বিভিন্ন দার্শনিক, চিন্তামূলক ও শিক্ষামূলক  
 চিন্তার - শিক্ষাদানের অন্তর্ভুক্ত, শিক্ষার একটি সাংস্কৃতিক  
 কাজ। এভাবে ব্যক্তিগত বিভিন্ন চিন্তামূলক ও শিক্ষামূলক  
 উদ্দেশ্যে চিন্তার মধ্য শিক্ষার একটি  
 সংজ্ঞা দেওয়া হয়েছে, যেখানে বলা হয়েছে যে "Education doesn't mean  
 to follow a particular nation or cultural  
 norms. God has given us many facilities  
 and Education means to cultivate that  
 natural faculty. By hardwork and  
 exercise, God has given us hand, eyes,  
 legs, mind and ability to thought-  
 when we do good works with our  
 hands, observe with eyes, listen with  
 ears and can think reasonably that  
 is called education."

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women education :-

নারীশিক্ষার মূল্য শিক্ষামূলকতার মত একটি মাত্র  
 মাত্র নারীশিক্ষার মাত্রই মূল্য মূল্যমূল্যমূল্য  
 মূল্য, নারী শিক্ষার মূল্য - ও মূল্যমূল্যমূল্য  
 মূল্য মূল্যমূল্য মূল্য, মূল্য, মূল্য, মূল্যমূল্য  
 মূল্যমূল্য মূল্যমূল্য মূল্য মূল্যমূল্য ও মূল্যমূল্য  
 মূল্যমূল্য মূল্য মূল্য মূল্যমূল্য মূল্যমূল্য  
 মূল্যমূল্য মূল্যমূল্য মূল্য

Objective of the study :-

- 1.11 বঙ্গদেশে বঙ্গদেশের শিক্ষাব্যবস্থার পর্যালোচনামূলকভাবে পরিবেশ করা।
- 2.11 উন্নয়নমূলক ভাবে বঙ্গদেশে বঙ্গদেশের শিক্ষাব্যবস্থার উন্নয়ন করা।

Research Question :-

- 1.11 উন্নয়নমূলক ভাবে বঙ্গদেশের শিক্ষাব্যবস্থার উন্নয়নে বঙ্গদেশে বঙ্গদেশের অবদান কি?
- 2.11 উন্নয়নমূলক ভাবে ও বঙ্গদেশের শিক্ষাব্যবস্থা ও ক্ষমতায় বঙ্গদেশে বঙ্গদেশের উন্নয়ন কি?
- 3.11 বঙ্গদেশে বঙ্গদেশের শিক্ষাব্যবস্থার উন্নয়ন- উন্নয়ন- কি হইল?

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Delimitations of the study :-

- 1.11 উক্ত গবেষণাপত্রটিতে বঙ্গদেশে বঙ্গদেশে বঙ্গদেশে শিক্ষাব্যবস্থার উন্নয়ন- উন্নয়ন- করা হইবে।
- 2.11 গবেষণাপত্রটিতে বঙ্গদেশে বঙ্গদেশে বঙ্গদেশে উন্নয়ন- উন্নয়ন- করা হইবে।
- 3.11 বঙ্গদেশে বঙ্গদেশে শিক্ষাব্যবস্থার উন্নয়ন- উন্নয়ন- করা হইবে।

কয়েকদিন সময় উদ্ভাষন করীত অনুশোনা উদ্ভাষন  
প্রধান আলোচনা ইয়াতি,

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Research Design

"Educational thoughts of Begum Rokeya and her Contribution in upliftment on women education in Bengal." - নামক সারসংগ্রহটি  
নির্মিত ইংরেজ ইতিহাসিক সারসংগ্রহ (Historical Research) এর ধাঁচে, শিক্ষা একটি সামাজিক  
কায়দা ইত্যাদি ব্যাপ্তে বিভিন্ন পুরো বিভিন্ন  
দর্শনমতের শিক্ষার নতুন দর্শনের ১০-১২মত  
ঘটিত হয়েছে, যেমন হোমসের সময়ের  
দর্শনিক, শিক্ষাবিদ, ও উদাহ- ১০-১২মত, যাঁরা  
উদ্ভাষণে ঔপনিবেশিক পুরো নারীশিক্ষা এক নতুন  
মাত্রা পেয়েছিল, আলোচনা সারসংগ্রহটি  
বর্তমানের দৃষ্টিতে ইতিহাসিকভাবে যেমন  
হোমসের নারীশিক্ষা পরিচালিত অর্থাৎ বিকশিত  
রূপ ইংরেজ, ইতিহাসিক সারসংগ্রহ ইত্যাদি  
মানব কৃতিত্বের অর্থাৎ ঘটনাবলীর অনুশ্রুতি  
রূপ, ঐতিহাসিক দৃষ্টিতে উদ্ভাষণে সার্থক  
অর্থাৎ ঘটনাবলীর অর্থাৎ উদ্ভাষণে রূপ  
অর্থাৎ উদ্ভাষণে উদ্ভাষণে রূপে উদ্ভাষণে  
বর্তমান ও বিচার- বিকশিত রূপে নামক ইতিহাসিক  
সারসংগ্রহ, ইতিহাসের ব্যবহারিক প্রয়োজনীয়তা  
এবং, অর্থাৎ উদ্ভাষণে উদ্ভাষণে উদ্ভাষণে

বর্তমান বিশ্বে সাতিকীল বিদ্যা এবং মানব-  
 ক্রিয়াক্ষেত্রে ঐতিহাসিক সাক্ষ্যের প্রয়োজন  
 ব্যাপক - অতীতকালের ক্রিয়াক্ষেত্র ইতিহাস, শিক্ষা  
 আন্দোলন, নৃত্য, অক্ষয়বিদ্যা, সাহিত্য, ভাষাতত্ত্ব,  
 প্রযুক্তি ইত্যাদি ঐতিহাসিক সাক্ষ্যের প্রধান  
 উৎস, Borg and Hall (1996),

Tools of Data Collection :-

যে কোন প্রকার সাক্ষ্যের ক্ষেত্রে তথ্য (Data)  
 একটি গুরুত্বপূর্ণ বিষয়। আর তথ্য সংগ্রহের  
 জন্য ব্যবহৃত বিভিন্ন উদ্ভেদগুলি হলো সাক্ষ্যের  
 ইতিহাস, ঐতিহাসিক সাক্ষ্যের তথ্য উদ্ভেদ  
 হিসেবে মূলত দুই উৎস ব্যবহৃত হয়, যথা-

• Primary source :-

এই ধরনের উদ্ভেদগুলি হলো ব্যক্তিগত উদ্ভেদ, রচনা-  
 নিবন্ধন, আবেদন পত্র, দলিল ইত্যাদি, গল্প, ছবি ও  
 বস্তুসমূহে বিভিন্ন ঐতিহাসিক ও কৈশিক নিদর্শন,  
 আলোচ্য সাক্ষ্যের প্রাথমিক  
 উদ্ভেদ হিসেবে যেসব সাক্ষ্যের প্রমাণিক বস্তু,  
 তাঁর প্রাতিষ্ঠিত বিদ্যালয়সমূহ ঐতিহাসিক নথি-  
 সংগ্রহ করেছে, এই উদ্ভেদগুলি থেকে প্রাপ্ত  
 তথ্য নিউক্লিয়ার সত্য এবং ইতিহাসের  
 ব্যবহারিক উপায়সমূহে প্রমাণিত হয়।

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# SAMMILANI MAHAVIDYALAYA



**HISTORY TUTORIAL**

**TROPIC NAME - INDIAN OCEAN TRADE NETWORK**

**NAME - ANISHA KHATUN**

**CU REGISTRATION No. - 513-1214-0014-21**

**CU ROLL No. - 212513-11-0134**

**SUBJECT - HISTORY HOURS**

**SEMESTER - 4th**

**PAPER - CC10**

**YEAR - 2023**

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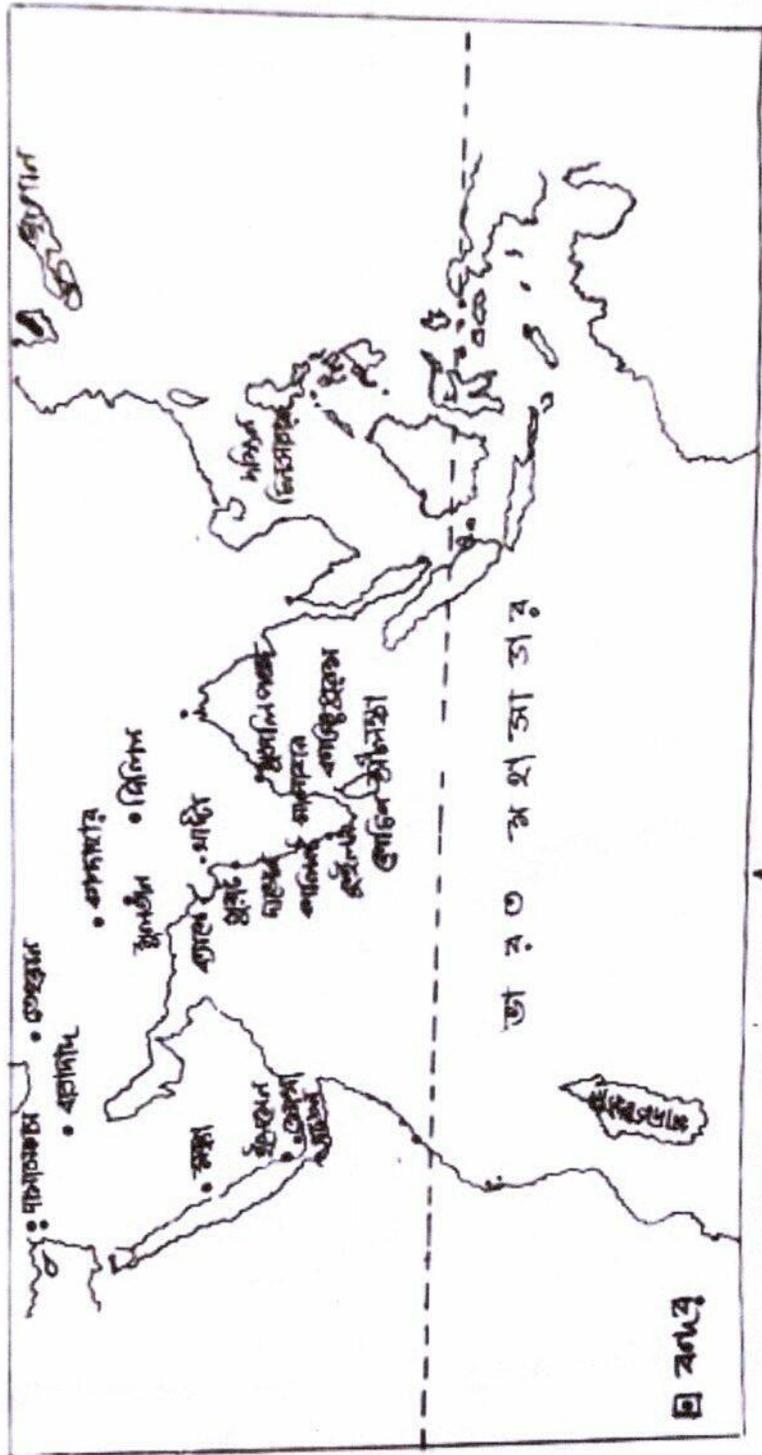
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ପ୍ରାଚୀନ ଓଡ଼ିଶାର ସାମ୍ରାଜ୍ୟଗୁଡ଼ିକର ମାନଚିତ୍ର



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# ভারত মহাসাগরীয় বানিজ্য

## ভূমিকা:-

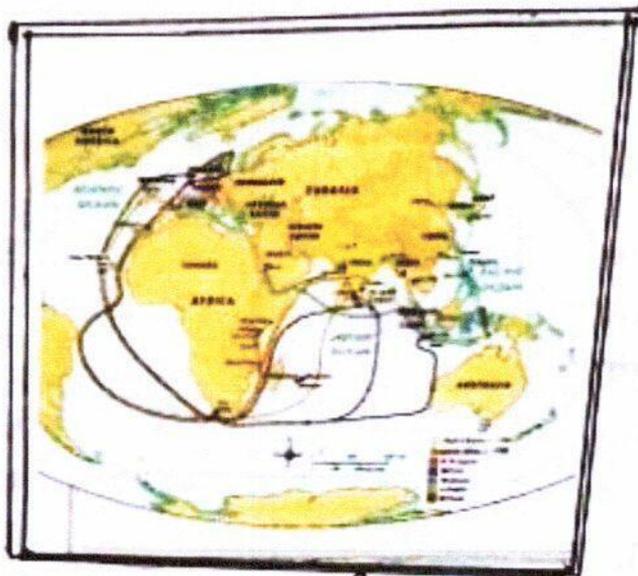
বানিজ্যিক কল্পে ভারতবর্ষের প্রতিষ্ঠা হুসই প্রাচীন, সুজ্ঞান বণিকের মুগাও বানিজ্যের সুসুত্বপূর্ণ বিষয় হিসাবে আছিল যেমন পেলুসে। অরুডাও 'কাতলান ব্রাহ্মণ' এ অসুদ্রমাত্রা বসমা টুলনথ আছে। বানিজ্যিক কল্পে বসুধেই ডাঙে উঠেছে মিলনাত্মক ও বিশোদ্যাত্মক বসু বসু বসুহিনী, আবার দ্বিতীয় প্রথম কাতলান টুলটা 'পেরিপ্লাসে' ভারত দেশ বানিজ্যবীরের এক বিরাট অভিযানের পরিচয় পাওয়া যায়। ঐতিহ্যিক বানিজ্যের বীরা মে ভারতের ছিল তার পরিচয় প্রদানকৃত। স্বাভূমান, কালেক্টা প্রভৃতির বিবরণ থেকে মনেহে পাওয়া যায়, ভারতের মোকিল আমল তমা অসুদ্রমাত্রা কাতল ও প্রথম প্রতিষ্ঠাতা বসুদ্রা বানিজ্য ভারতের ছিল, অর্থাৎ অসুদ্রমাত্রা বানিজ্য ভারতীয় বানিজ্যের পাঠ্যনাথ্য কিছু বিদ্যমান বানিজ্যের ও প্রাচীন লক্ষ্য করা যায় কিছু অসুদ্রমাত্রা ভারতীয় মুসলিম বানিজ্য জামাল হুজুরাম একসুদ্রমাত্রা প্রতিষ্ঠাতা ভারতীয় বানিজ্য বসুদ্রা, আমল - ই-সুদ্রমাত্রা ও বানিজ্যের বিবরণ থেকে হুজুরাম ঐতিহ্যিক বানিজ্যের ও উচ্চীয় বানিজ্যের অসুদ্রমাত্রা অসুদ্রমাত্রা পরিচয় পাওয়া যায়।

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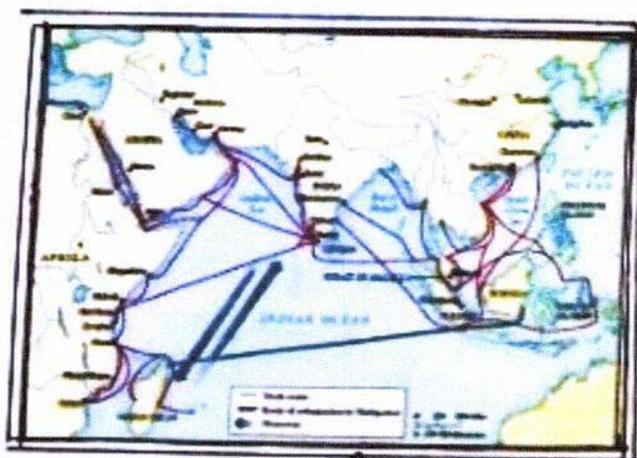
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ভারতমহাসাগরীয় বাণিজ্য-পথ



ভারতমহাসাগরীয় বাণিজ্য-বন্দর

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# বানিজ্যের প্রকার:

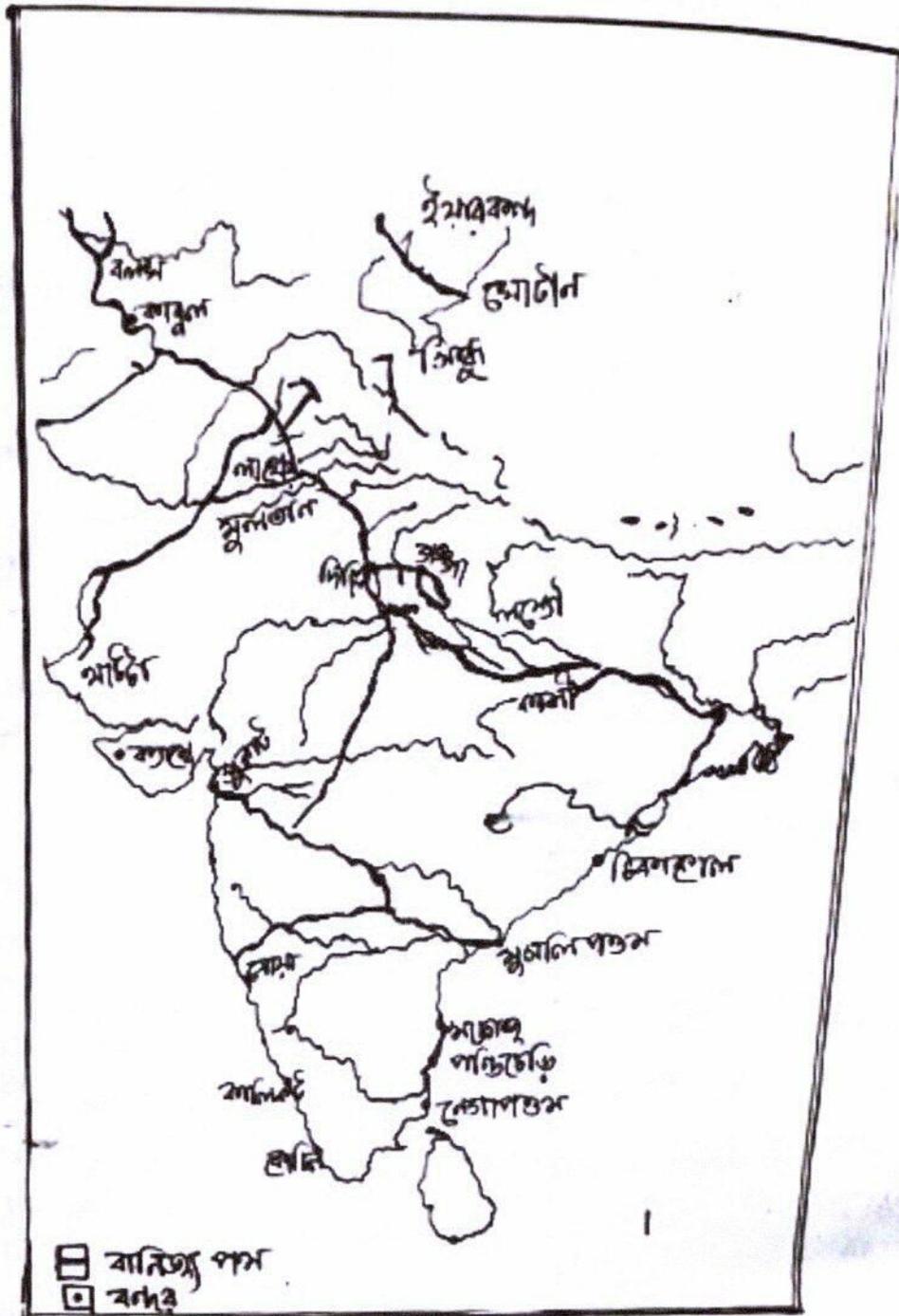
সুখান আমান অন্তর্গত বানিজ্য ও বহিঃবানিজ্য অর্থনীতি  
 লাভ বঞ্চিত। সুখান ভারতে অবশ্যক্রে একটি আনুগত্য প্রাণ  
 বাস করত। অধিক চাহিদা মতো প্রাণ উপলব্ধি হত, তবে  
 কাছের বাণিজ্য ও আনুগত্য প্রাণ থেকে অবশ্যই হত  
 প্রাণ, কাছের বাসি ফলের জোগান, বাণিজ্য, লোভা  
 ও লভন অর্থনীতি, অর্থনীতি ও পৃথিবীর অন্যান্য দেশের  
 অর্থনীতি বিনিময় প্রমাণ প্রচলিত ছিল, প্রচলিত ও অর্থনীতি  
 কাছের বানিজ্য লাভ বঞ্চিত হওয়া মাত্র হে প্রবন্ধে বর্ণিত  
 পণ্য ও বিনিময় আমদানীকে কেন্দ্র করে বানিজ্য চলত। অর্থ  
 প্রমাণে ভারতের বহিঃবানিজ্য অর্থনীতি দিক দিক ভারত  
 মধ্যসাগরীয় বানিজ্য, অর্থ বানিজ্য ইচ্ছাকৃত বিনিময়ের  
 বৃদ্ধি হুমকি ছিল। অর্থনীতির মতো ভারত মধ্যসাগরীয়  
 বানিজ্য ছিল বহু ছাতি, কিন্তু বানিজ্য সুখানমান ইচ্ছা  
 অবশ্যই অর্থ বানিজ্য থেকে অর্থ মুক্তি ছিল।

# আমদানি ও রপ্তানি পণ্য:

অর্থনীতি ভারতের বানিজ্য অর্থনীতি দিক দিক  
 ভারত মধ্যসাগরীয় বানিজ্য, পশ্চিম দিকে ভারতীয়-  
 বানিজ্য ছিল লোভিত সাগর ও পারস্য উপসাগরীয়  
 অর্থনীতি। লোভিত সাগর থেকে ভারতীয় পণ্য আনলক -  
 ছাতিয়া ও বণ্যেরা পৌঁছে যেত, ভারতীয়রা আনলক  
 থেকে লবঙ্গ, জাম্বাং ও জাম্বাং, চীন থেকে প্রচলিত ও  
 পোর্থগালের বাসন হত কিনত, ভারতীয় বৃদ্ধ চাহিদা ছিল  
 অর্থ অর্থনীতি, চীনারা অর্থনীতি থেকে প্রচলিত গোলমরিচ কিনত,  
 অর্থ অর্থনীতি অর্থনীতি আনলক উপলব্ধি পণ্য ছিল, ভারতীয়  
 পণ্য অর্থনীতি, কাছের, চীন বাস, সুখান পণ্য  
 চীনারা কিনত, অর্থনীতি চীনারা আনলক মধ্যসাগরীয়

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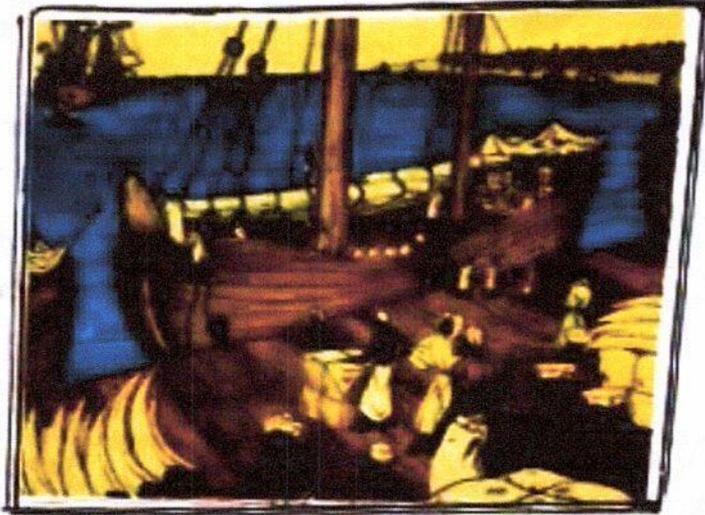


অনুসন্ধানিত বানিজ্য পথ

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शान्तिश्रय वनिकण्डुद्वय द्विभिरण-



वनिकण्डुद्वय शान्तिश्रय वनिकण्डुद्वय अमभु-  
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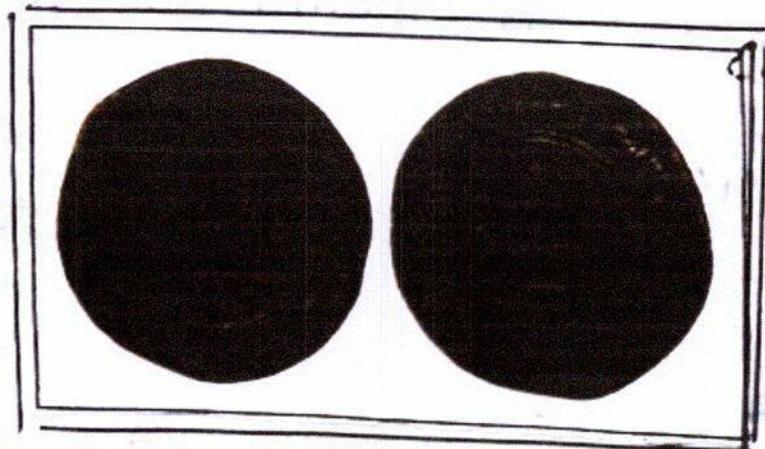
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বানিজ্যিক পণ্য (ছদ্ম)



বানিজ্যিক পণ্য

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# তথ্য সূত্র:

এই প্রকল্পটি রূপায়ন করার ক্ষেত্রে কিছু বর্ষসূত্র অধীনে আধাংশে নিম্নোক্ত। এমন- মুদ্রণব্যয় (মুদ্রণব্যয়) (অন্যভাবে জ্ঞানসম্মত মুদ্রণব্যয়), ভারতীয় ইতিহাস [মুদ্রণ ব্যয় থেকে আধুনিক মুদ্রণ ইতিহাস ১৫২৩-১৮১৮] (অন্যান্য মুদ্রণ), ভারতীয় ইতিহাস (১৫৫৩-১৯৪৭) (মুদ্রণ মুদ্রণব্যয়), মুদ্রণব্যয় থেকে বিদ্রোহ (১৫৫৩-১৮১৮) মুদ্রণব্যয় মুদ্রণব্যয় প্রভৃতি। অসব নানা লেখকের বই থেকে কিছু তথ্য সূত্র বসতে অসম বসেছে এছাড়া বিভিন্ন প্রত্নতাত্ত্বিক গবেষণা থেকে বই সূত্র ও ইন্টারনেটের আধাংশ নানা অনুবাস্যে নানা তথ্য সূত্র বসে প্রকল্পের কাজটি সমাপ্ত বসতে অসম হয়েছে।

# কীটপতঙ্গ প্রকার:

আমি আমার নিজস্ব ও প্রকল্পে ভারতীয় মুদ্রণ-ইতিহাস- অধ্যয়নে ভারতীয় মুদ্রণ, কীটপতঙ্গ ও অসমের ইতিহাসে জ্ঞানার্থে, তিনি এই প্রকল্পটি রূপায়ন করার ক্ষেত্রে অসম অধ্যয়নে বসেছেন, প্রকল্পের প্রারম্ভে প্রকল্পে তথ্য সূত্র বিভিন্ন চিত্রসহ বই মুদ্রণের পরামর্শ দিয়ে প্রকল্পের কাজটি অসম বসেছে এছাড়া অসমের কাজে সহায়তা করেছেন, তাঁর কাছে ধন্যবাদ কীটপতঙ্গ।

ভাণ্ডার প্রাপ্ত  
 26.05.23  
 তারিখ

R.B  
 26/5/2023  
 V. Good - জিগ্মস্ব প্রাপ্ত

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# **SAMMILANI MAHAVIDYALAYA**

**DEPARTMENT OF POLITICAL SCIENCE**

**TOPIC: MGNREGA**

**2023**

**NAME : KAKALI BHANDARI**

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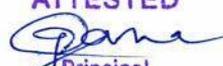
  
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## কৃতজ্ঞতা স্বীকৃতি

আমার এই Tutorial টি সম্পূর্ণ করতে গিয়ে  
যাও আমাকে আরাধ্য করেছেন, তাই অবশ্যই জানাই  
আমার কৃতজ্ঞতা ও শ্রদ্ধা। এ অঙ্কে যাঁদের নাম প্রথমে  
আমি ভুলে গিয়েছিলাম তাঁদের স্বাধীনভাবে রাম্বলিভিড্যান  
বিভাগের শিক্ষক-শিক্ষিকা স্বাধীনতা মুখার্জি স্বাধীনতা রাম,  
সুধাংশু মুখার্জি, রাহুল মুখার্জি এবং দেবদত্ত চক্রবর্তী  
স্বাধীনতা-স্বাধীনতাকে জানাই আমার কৃতজ্ঞতা ও শ্রদ্ধা।  
এই অঙ্কে বিন্যাস জানাই আমার অস্বীকারিতা যাও  
আমাকে আরাধ্য করেছেন।

বিন্যাসদাতা  
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# অনুলিপি

MGNREGA

1 - 6

সুবিধা

1

MGNREGA-এর উদ্দেশ্য

1-2

বিষয়

2-3

আরম্ভ

4-5

ব্যয়

5-6

অন্যান্য

6

অনুলিপি

6

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# MAHATMA GANDHI NATIONAL RURAL EMPLOYMENT GUARANTEE ACT (MGNREGA)

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ভূমিকা 

Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) একটি অর্থীয় প্রকল্প আইন। অর্থ. আঞ্চলিক সুযোগ্য আইন যা প্রবান উদ্দেশ্য হল নাগরিকদের কাজ করতে অধিকারকে সুশীলিত রাখা। ২০০৫ সালে এই আইনটি প্রচলিত হয়। প্রথমে এই আইনটির নাম ছিল National Rural Employment Guarantee Act। পরবর্তীকালে আইনটির নামের আগে Mahatma Gandhi নাম যুক্ত করা হয়।

১৯৯১ সালে এই আইনটির প্রথম প্রস্তাব দেন পি. বি. নরসিংহ রাও। প্রথমে ৬২৫ টি জেলায় এই প্রকল্পটির একটি pilot project রূপে বাস্তবায়িত করা হয়। ২০০৪ সালে সারা দেশে এটি কার্যকরী হয়। বিশ্ব ব্যাংক ২০১৪ সালের 'Work programme in the world Report - এ এটিকে "stellar example of rural development" রূপে বর্ণনা করে।

MGNREGA- এর উদ্দেশ্য 

এই আইন তথা প্রকল্পের উদ্দেশ্য হল গ্রামীণ এলাকায় আদিবাসী জনসমূহের অশীলিত কার্যকরী কাজ করতে ইচ্ছুক প্রত্যেক পরিবারের জন্য

ATTESTED  
*[Signature]*  
Principal  
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ଅନୁତ 100 ଦିନେ ନିମ୍ନିତ ସେନ ପ୍ରଦାନେ ଛାତ୍ରୀଙ୍କ  
ଜୀବିକା ସୁରକ୍ଷା ବୃଦ୍ଧି କରା।

ସେନ ଅନ୍ତର୍ଗତ ବର୍ଷକ୍ରମ. କ୍ରମେ ବିକଳପତ୍ରାଣି ଦ୍ଵାରା  
ତଥା ସ୍ଵାକ୍ଷିପ୍ତ ଆଖିନ ଜନସେବୀମାନଙ୍କ ଦ୍ଵାରା MGNREGA  
ନିମ୍ନିତେ ମଧ୍ୟ ସୁରକ୍ଷେତ କାନ୍ଦେ ଉପାଦାନ ସିଦ୍ଧେତେ ବାନ୍ଧେ କରା।

ସ୍ଵାକ୍ଷି ଅନୁକ୍ରମେତେ ଦେଖାଉ ଉପକ୍ରମ - ଏତେ ଦ୍ଵାରା ଏତେ ଏକାଦି  
ସ୍ଵାକ୍ଷିତ ସ୍ଵାକ୍ଷିତା ସିଦ୍ଧେତେ ବାନ୍ଧେ କରା ଦୀର୍ଘକ୍ରମେତେ ଦୀର୍ଘକ୍ରମେତେ  
କ୍ରମେତେ, କ୍ରମେତେ ଓ ଏତେ କ୍ରମେତେତେ କାନ୍ଦେତେ ନିମ୍ନିତ  
ବର୍ଷକ୍ରମ. କ୍ରମେତେ ସୁରକ୍ଷା ପ୍ରଦାନେତେ ଛାତ୍ରୀଙ୍କ ଏତେ ଏକାଦି ଆଖିନ  
ଜୀବିକାସୁରକ୍ଷାତେ ଆକ୍ରମେତେ ଅନୁକ୍ରମେତେ ବାନ୍ଧେ କରା ଏତେ ଏକାଦି  
ଆଖିନ ଏକାଦିତେ ଦେଖାଉ ଅନୁକ୍ରମେତେ ତିଦି କରାତେ କରା।

ଅନୁକ୍ରମେତେ ସୁରକ୍ଷା ସିଦ୍ଧିତେ

MGNREGA-ଏତେ ସୁରକ୍ଷା ସିଦ୍ଧିତେ

ସୁରକ୍ଷା ସୁରକ୍ଷା -

- 1) ଆଖିନ ମାନ୍ଦିତେତେ ପ୍ରାକ୍ରମେତେ ଅନୁକ୍ରମେତେ, ଅନୁକ୍ରମେତେ  
କାନ୍ଦେତେ ଅନୁକ୍ରମେତେ କରାତେ, ନିମ୍ନିତେ ଦାନ୍ଦେ ମିଧ୍ୟମେତେ ବା  
କ୍ରମେତେ ଦାନ୍ଦେ କ୍ରମେତେ ଆଖିନ ମାନ୍ଦିତେତେତେ କାନ୍ଦେତେ ଆଖିନ  
କରାତେ ମାନ୍ଦିତେ।
- 2) ଏତେତେତେତେତେତେ ମାନ୍ଦିତେତେ ଆଖିନ ମାନ୍ଦିତେତେ ଏକାଦିତେ  
CORP ପ୍ରଦାନ କରା।
- 3) ଏକାଦି କାର୍ଡ ବାନ୍ଧେ ଆଖିନ ମାନ୍ଦିତେତେତେ ବର୍ଷକ୍ରମ. କ୍ରମେତେ  
କ୍ରମେତେ ନିମ୍ନିତେ ଆଖିନ ମାନ୍ଦିତେତେ କରା ଦିତେ ମାନ୍ଦିତେ। ଆଖିନ ମାନ୍ଦିତେ  
କରା ଦେଖାତେ ମାନ୍ଦିତେ 15 ଦିନେତେ ଛାତ୍ରୀ କାନ୍ଦେତେ ସୁରକ୍ଷା କରାତେ  
କରା ନା କରାତେ ତିଦି ସୁରକ୍ଷା ଦେଖାତେ ଏତେ ମାନ୍ଦିତେ।

Laxmi Mohanty  
Head, Department of Political Science  
Sammilani Mahavidyalaya

ATTESTED  
Sammilani  
E.M. I

4) কাজ সমাপনস্থ ক্ষেত্রে 5 কিম্বা ত্যাগার্থে স্বল্প  
প্রদান করা উচিত। যদি তা না হয়, তখন অতিরিক্ত  
পরিবহন এক. জীবনযাত্রার হার প্রত্যেক ক্ষেত্রে 10%  
অতিরিক্ত খরচ দেওয়া হয়।

5) যাত্রার ব্যয় প্রমিতদের জন্য সর্বোচ্চ স্বল্প  
৩০ দিন ১৯৪৪ অনুসারে স্বল্প দিবে হবে।

6) স্বল্প বিতরণ আনুমানিক ভিত্তিতে এক. কোনো ক্ষেত্রে  
15 দিনের বেশি খরচ না হয়।

7) কমপক্ষে এক তৃতীয়াংশ সুবিধাজোগী এই প্রকারের  
অধিনে নিযুক্ত এক. অনুশীলিত নারী হতে পারে।

8) বাস্তবিক জ্ঞান অথবা কাজে আনুমানিক অর্জন করতে  
হবে। কোনো অভিযোগ থাকলে তা সমাধানে পদ্ধতি  
স্বয়ং করতে হবে।

9) প্রকারে অসম্পূর্ণ অথবা অসঙ্গত এক. বেকার  
জনসংখ্যার হারের জন্য উপলক্ষ করতে হবে।

10) কেন্দ্রীয় অথবা অসম্পূর্ণ বাস্তবিক ক্ষেত্রে সতর্কতা  
100 ডায় প্রত্যেক এক. দক্ষ ও অসা-দক্ষ প্রমিতদের  
স্বল্প অর্ 75% ব্যবস্থায় হার বহন করতে হবে।

11) একটি ৪০:৪০ স্বল্প এক. উপস্থান অনুসারে বাস্তব  
যাত্রা আবশ্যিক।

12) স্বল্পের চিকিৎসা নিয়ন্ত্রণ এই প্রকারে, একজন  
'প্রোগ্রাম অফিসার' স্বল্পে লোক পর্যায়ে কার্যনির্বাহী  
অন্যত্র অধিনে কথা বলা হয়েছে।

*Suresh Mohanty*  
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ATTESTED  
*Gana*  
Principal  
Sammilani Mahavidyalaya  
E.M. Bypass, ...  
Kolkata-700094



তাৰ পৰিষ্কাৰ সুশিষ্টি হোকে আৰ্জনৰ উন্নয়ন কৰে আৰু তাৰ  
 পৰিষ্কাৰ-ডিগ্ৰাডেচন বৰ্ত্তমানিকৈ কমেওহে হিজে আৰু  
 পল-ডিগ্ৰাডেচন বৰ্ত্তমানিকৈ বান্ধা বান্ধোৱাৰে জল শ্ৰবণ কৰা  
 হয়।

অন্যান্য সুবিধাভোগী কাল:-

*Supriya Mahanta*  
 Head, Department of Political Science  
 Sammilani Mahavidyalaya

MRS. M. MANREGA স্বামীৰ এলকাৰ

আজি বিভিন্ন কাল কৰে পুৰুষ-লোকৰ পৰিষ্কাৰ হোকে  
 সুবি কৰে বৃষ্টি পোষন, বৃষ্টিৰ প্ৰভুতি কাল কৰে,  
 যা একদিকে পৰিবেশে উন্নয়নৰ আৰু আৰু স্বামীৰ  
 অৰ্থনীতি ও স্বাভাৱে জীৱনযাত্ৰাৰ জ্ঞান ও বৃদ্ধি পালে।

MANREGA - এৰু ব্যৱস্থা

পাৰিপালি কিছু অসুবিধাও দেখা যায় এই প্ৰকল্পেৰ  
 প্ৰথমদিকে এটি এটি অসুবিধাৰে পৰিষ্কাৰ কৰাৰ  
 হলেও পৰৱৰ্ত্তীকালে - এৰু কাৰ্যকাৰিতা ও স্বামীৰ অৰ্থনীতি  
 উপৰ প্ৰভাৱ নিজে প্ৰশ্ন উঠেই হানোৱাৰ ব্যৱস্থাসুবি  
 হন -

১) জিওগ্ৰাফিক চিমেণ্ট :-

পাৰিপালি পৰিষ্কাৰিত হয়। জিওগ্ৰাফিক চিমেণ্ট হৈছে  
 স্বামীৰ জনসংখ্যাৰ সহায় আৰু আৰু যি পৰিষ্কাৰ  
 দেখানো হয়, তা প্ৰকৃতপক্ষে অতিৰিক্ত থাকে।

২) কোণত অসুবিধা তৈৰি হয়নি :-

জেনাৰেলৰ অৰ্জি চিমেণ্ট প্ৰকল্পেৰ অতিৰিক্ত  
 "সুৰক্ষিত কৰি" কমেওহে এখন অতিৰিক্ত পৰিষ্কাৰিত  
 হৈছে না। কিন্তু অসুবিধা উপস্থিত না হৈছে অসুবিধা  
 উদ্যোগকে অসুবিধাৰে বান্ধা কৰা হয় না।

৩) অসুবিধাৰি কাল :-

এই প্ৰকল্পেৰ অৰ্জি হৈছে কাৰ্যসুবি কৰে

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জেমলি বেশির ভাগ অন্যান্য সীমিত বাদ। পুষ্কর থেকে  
 পনি তোলা হলে তা পুষ্কর থেকে দেওয়া হয়, যা  
 বর্তমানে প্রসারিত হয়ে পুষ্কর পড়ে।

□ সুশাসন :-

সম্মেলন অনুষ্ঠিত MANREGA - এর সুবিশেষ  
 আধার অধীকার করতে পারি না। ভারতের হাতে একটি  
 বৃহৎ জনসংখ্যার দেশে অসিদ্ধিত স্থায়ী জনসংখ্যাকে  
 100 দিনের বাজেট ব্যয় করা, একটি অত্যন্ত সুকল্প  
 পদক্ষেপ এই প্রকল্পে নারী-পুষ্কর সম্মেলন বাজেট  
 সুযোগ পায়। যা বিশ্বায়ন দৃষ্টিকোণে একটি সুকল্প পদক্ষেপ  
 তবে বর্তমানে এই প্রকল্পে আর্থিকতা কিছুটা প্রসার  
 হুয়ে পড়েছে। 2012-23 আলে 89.400 কোটি টাকা MANREGA  
 জন্য বরাদ্দ করা হয়েছিল। যা বর্তমান আর্থিক বহুত্ব বরাদ্দ  
 করা হয়েছে 60 000 কোটি টাকা যা ভারতের বৈশিষ্ট্য  
 বৃদ্ধির সাথে বরাদ্দ টাকার পরিমাণ নিম্নগামী। এছাড়া  
 Middleman - এর প্রত্যেক এই প্রকল্পে একটি সুবিশেষ  
 বাস। এছাড়াও নানা অন্যান্য উদ্ভিদ এই প্রকল্পে এই  
 প্রকল্পে আর্থিকের জন্য উৎসাহ এই বিশেষ সুনির্দিষ্ট  
 উপর সুশাসন করা উচিত।

□ অনুপাদিত :-

- ① আর্থিক জনসংখ্যা — সোতাল সুযোগ
- ② S. R. Maheswari : Indian Administration
- ③ Rumki Basu : Public Administration

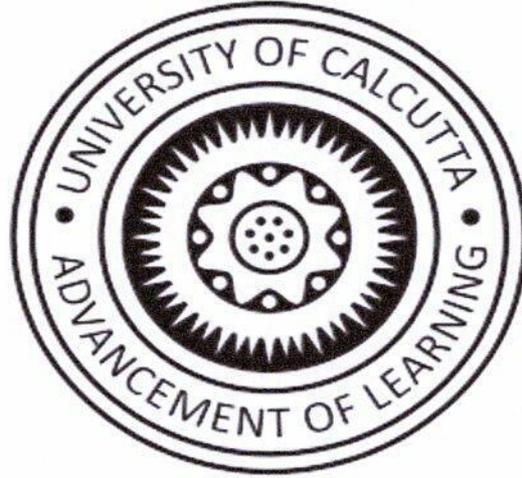
④ Google

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 Head, Department of Political Science  
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ATTESTED  
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**PROJECT REPORT**  
**Cryptocurrency Application**



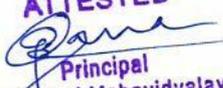
**University of Calcutta**  
**Submitted by**  
**Debdaipayan Chakroborty**

**Registration Number:**  
**513-1111-0425-20**  
**Roll Number:**  
**203513-21-0050**

**B.Sc Semester - VI (Honours)**  
**Examination 2023 (under CBCS)**

**Department of Computer Science**  
**Sammilani Mahavidyalaya, Baghajatin, Bypass,**  
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Head  
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**ATTESTED**  
  
Principal  
Sammilani Mahavidyalaya  
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## DECLARATION

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at any university or any other institutions.

DebdaiPAYAN Chakroborty

Signature

DEBDAIPAYAN CHAKROBORTY  
Roll No.: 203513-21-0050

Sammilani Mahavidyalaya, Baghajatin.  
University of Calcutta.

BM  
04/08/2023  
Head

Department of Computer Science  
Sammilani Mahavidyalaya, Kolkata-700075

Sunandana Banerjee  
Supervisor  
04/08/2023

Dept. of Computer Science  
Sammilani Mahavidyalaya



# Sammilani Mahavidyalaya

( NAAC ACCREDITED B++ )

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## To whom it may concern

This is to certify that the project work "Cryptocurrency Application" is a bonafide work carried out by Debdaipayan Chakroborty, student of B.Sc. CMSA, 6th Semester from Sammilani Mahavidyalaya and registered under Calcutta University (Registration Nos.513-1111-0425-20), in partial fulfilment of the degree of Bachelor of Science on Computer Science (Hons.).

*BM*  
04/08/23

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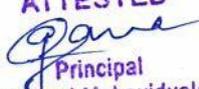
## ACKNOWLEDGEMENT

I would like to express my sincere gratitude to all of the teachers of our computer science department for their valuable and constructive suggestions during the planning and development of our Project Work. It also helped me in doing a lot of Research and I learnt so many new concepts.

I would also thank my parents and friends for their immense support and help during this project. Without their help and encouragement, completing this project would have been very difficult. I am grateful to my supervisor Mrs Sunandana Banerjee Ma'am for her guidance and encouragement.



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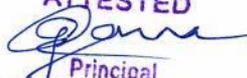
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## ABSTRACT

This abstract presents a cryptocurrency web application "DCash". It is designed to revolutionize the way individuals engage with digital currencies. Leveraging the power of blockchain technology, the application provides users with a secure, transparent, and decentralized platform for conducting cryptocurrency transactions. Users can create wallets, securely store their assets, and seamlessly execute transactions with minimal fees and fast processing times. The application incorporates advanced security measures, such as encryption, multi-factor authentication and Gossip Based Byzantine Fault Tolerance algorithms, to protect user funds and personal information. With a user-friendly interface and intuitive features, this cryptocurrency web application aims to empower individuals to participate in the exciting world of cryptocurrencies and unlock new possibilities for financial transactions in the digital age.



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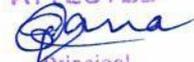
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# 1. INTRODUCTION

DCash is an exciting cryptocurrency web application developed aiming to provide a comprehensive platform for users to engage with digital currencies. With the increasing popularity and significance of cryptocurrencies in the financial landscape, Dcash offers an opportunity to explore and understand this emerging technology in a practical and hands-on manner. Our project endeavors to showcase the potential of cryptocurrencies and their underlying blockchain technology, while also highlighting the importance of security, transparency, and usability in the realm of digital finance.

Dcash offers a user-friendly interface, making it accessible to both cryptocurrency enthusiasts and beginners. Through the application, users can create their own digital wallets, securely store their cryptocurrency assets, and execute transactions seamlessly. This provides a valuable learning experience, as users can gain insights into the mechanics of blockchain-based transactions, such as address generation, transaction verification, and the concept of decentralized ledgers.

One of the key objectives of our project is to emphasize the significance of security in the world of cryptocurrencies.

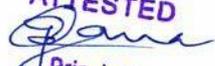
We have implemented robust encryption techniques and multi-factor authentication to ensure that user funds and personal information is safeguarded against potential threats. By incorporating these security measures, we aim to instill confidence in users and promote responsible practices when engaging with digital assets.

Dcash not only serves as a learning tool but also as a platform for experimentation and innovation.

In conclusion, Dcash is an ambitious project that provides a practical and engaging platform for users to explore the world of cryptocurrencies. By emphasizing security, transparency, and usability, we aim to contribute to the ongoing dialogue surrounding digital finance while offering a valuable educational resource for our community.



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### 1.1 Domain Description:

This software is Website Based. A website is easily accessible across platforms and can be easily shared among users, as well as search engines. It has far greater reach capability than any other platform. This Website has been developed using HTML, CSS, Python, MySQL that most developers are intimately familiar with.

The reason, Website rules the software market is its ability to run on more devices than its competitors. The simple reason being that a website will be used by more people, owing to the 'affordability' part. Thus, Website development is proved to be wiser and a more profitable option.

We can open a website from any web browser, not just Google Chrome. In addition, website is very much user friendly. All of this makes the website available to a larger number of users and is a major reason to invest in a website development platform.

#### ✚ Hardware Requirements:

PC WITH 250GB HARD DISK
PC WITH 1GB RAM

#### ✚ Software Requirements:

Operating System	Windows10
Language	HTML, CSS, Python, MySQL
IDE	Visual studio code and notepad
Browser	Google Chrome



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## 1.2 Motivation:

Imagine a world where financial transactions are instant, secure, and accessible to anyone, anywhere. A world where individuals have complete control over their money, free from the constraints of traditional banking systems. This vision of a decentralized financial future is what motivates us to build a cryptocurrency web application.

We are captivated by the potential of cryptocurrencies to disrupt the status quo, empowering individuals and revolutionizing the way we think about money. The current financial system is burdened with intermediaries, complex processes, and hidden fees that disproportionately affect those who are unbanked or underserved by traditional banking institutions. It's time for a change, and we believe that cryptocurrencies hold the key.

By developing a cryptocurrency web application, we seek to democratize access to financial services and put the power back into the hands of the people. We envision a future where anyone with an internet connection can create a digital wallet, transact securely, and participate in the global economy. No longer will individuals be subject to the limitations imposed by borders or lengthy verification processes. Cryptocurrencies transcend these barriers, offering a borderless and inclusive financial ecosystem.

The potential for innovation within the cryptocurrency space is boundless. With the introduction of smart contracts, decentralized applications, and tokenization, we have only scratched the surface of what can be achieved. By building our web application, we aim to contribute to this ongoing evolution and be at the forefront of this technological revolution.

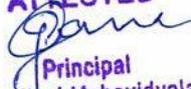
But our motivation extends beyond the practical and transformative aspects of cryptocurrencies. It is rooted in a deep belief in the power of decentralized networks and the principles of trust, transparency, and autonomy. We envision a future where financial transactions are conducted peer-to-peer, removing the need for intermediaries and creating a level playing field for individuals around the world. This vision drives us to build a cryptocurrency web application that encapsulates these ideals.

Of course, we acknowledge the challenges ahead. Cryptocurrencies are still relatively nascent, and there are hurdles to overcome in terms of scalability, regulatory frameworks, and mainstream adoption. However, it is precisely these challenges that make the journey exhilarating. We are motivated by the opportunity to contribute to the development of solutions, to collaborate with like-minded individuals and organizations, and to be part of a global movement that is reshaping the future of finance.

In conclusion, our motivation to build a cryptocurrency web application from a passion for creating a fairer, more inclusive financial system. We are driven by the belief that cryptocurrencies have the power to empower individuals, disrupt traditional banking systems, and foster innovation. We invite you to join us on this exciting journey as we work towards a future where financial freedom is not just a dream but a reality for all.



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### 1.3 Scope of the work:

In the realm of traditional financial systems, several gaps exist that can be overcome by leveraging the advantages of cryptocurrencies. Let's explore three of these gaps and how cryptocurrencies provide solutions, One significant gap in the normal financial system is the exclusion of a large portion of the global population from accessing basic financial services. Crypto-currencies can bridge this gap by enabling individuals without access to traditional banking services to participate in the global economy. With cryptocurrencies, all that is required is an internet connection, empowering individuals in underserved regions to create digital wallets and engage in secure transactions. This inclusivity fosters economic growth, reduces poverty, and provides opportunities for financial empowerment. Another gap in the traditional financial system lies in the complexity and inefficiency of cross-border transactions. Conventional methods often involve multiple intermediaries, lengthy settlement times, and high fees. Cryptocurrencies, on the other hand, offer a seamless solution by providing borderless transactions with reduced fees and faster settlement times. By eliminating the need for intermediaries and leveraging blockchain technology, cryptocurrencies enable individuals and businesses to conduct cross-border transactions efficiently and securely. This capability opens doors for global trade, encourages economic collaboration, and enhances financial connectivity between countries. Lack of trust and transparency within the traditional financial system is a significant concern. Cryptocurrencies address this gap by leveraging the decentralized nature of blockchain technology. The immutable and transparent nature of blockchain provides a public ledger of all transactions, which can be audited and verified by anyone. This fosters trust among participants, as it eliminates the need to rely solely on intermediaries for financial transactions. Furthermore, smart contracts, programmable agreements built on blockchain, enable self-executing and tamper-proof transactions, ensuring transparency and reducing the risk of fraud or manipulation.

By harnessing the potential of cryptocurrencies, we can overcome these gaps in the traditional financial system. Cryptocurrencies offer financial inclusion, enabling individuals without access to traditional banking services to participate in the global economy. They streamline cross-border transactions, making them faster, more cost-effective, and efficient. Additionally, the transparency and trust inherent in cryptocurrencies address concerns related to accountability and fraud, providing a secure and reliable financial ecosystem. With these solutions, cryptocurrencies pave the way for a more inclusive, efficient, and equitable financial future.



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## 2. REVIEW OF RELATED WORK

During our research about our related work, we came across various types of Research papers,

Following is the list of some works mentioning approaches and gaps with respect to our work:

### 1. Blockchain for decentralization of internet: prospects, trends, and challenges:

The authors have described about two consensus algorithms one is Practical Byzantine Fault tolerance (PBFT) and the other one is dBFT (Delegated Byzantine Fault tolerance)

Delegated Byzantine Fault Tolerance (dBFT):

Delegated Byzantine Fault Tolerance (dBFT) is a consensus algorithm used in blockchain systems. It involves a group of delegates who take turns proposing and validating blocks of transactions. Validators vote on proposed blocks, and if at least two-thirds agree, the block is added to the blockchain. dBFT assumes that most participants are honest. This delegated approach reduces complexity and enables faster transaction confirmation times. dBFT ensures fault tolerance and reliable transactions on a decentralized network.

Practical Byzantine Fault tolerance (PBFT):

Practical Byzantine Fault Tolerance (PBFT) is a method used in computer systems to ensure agreement among a network of computers, even if some are faulty or malicious. It works by having a leader propose a value, which is then sent to replicas. The replicas respond with their agreement or disagreement. If a majority agrees, the leader broadcasts the agreed value. Replicas check for consistency and consult with each other if there are conflicts. PBFT requires at least two-thirds of replicas to be honest. It uses digital signatures for message authenticity and is widely used in blockchain and distributed systems for reliable consensus.

After reading the articles I have realized that PBFT requires all the nodes to take part in the consensus process, and only need 2/3<sup>rd</sup> of all node's agreement to reach consensus.

However,

It lacks scalability to work in a permissionless Blockchain due to its limited scalability caused by high network overhead and a low tolerance for exploits.

**Consensus** in blockchain is the process of reaching an agreement among participants in a decentralized network. It ensures that all participants have the same version of the blockchain and agree on the validity and order of transactions. Consensus mechanisms like Proof of Work (PoW) and Proof of Stake (PoS) are used to prevent fraud and maintain the integrity of the blockchain. Consensus enables trust and transparency in decentralized systems by ensuring everyone follows the same rules and agrees on the blockchain's state.

### 2. Graph Convolution Network approach: <https://doi.org/10.1016/j.bcra.2022.100111>

It includes Blockchains Security with Machine learning by using Graph Convolutional Networks.

Graph Convolutional Networks are a type of machine learning model that can analyze and understand the relationships and connections between entities in a graph-like structure.

Graph Convolutional Networks (GCNs) can enhance blockchain security by analyzing the relationships between transactions, blocks, and addresses in a blockchain. GCNs extract features and patterns from historical data to detect anomalies, fraud, and attacks. They help identify suspicious activities and ensure the integrity of the blockchain network.

GCNs can face challenges when applied to large-scale graphs. As GCNs typically operate by aggregating information from neighboring nodes, the computational complexity can increase significantly with the size of the graph. This can limit their scalability and efficiency for tasks involving massive graphs.

And also, GCNs have problems detecting anomaly-based intrusions.



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### 3.Tendermint Approach: arXiv:1807.04938v3 [cs.DC] 22 Nov 2019

“Tendermint” the name of the proposed approach, operates in rounds, where each round consists of a proposal, pre-vote, pre-commit, and commit phase.

In the proposal phase, a validator proposes a block of transactions.

In the pre-vote phase, validators broadcast their votes on the proposed block.

In the pre-commit phase, validators broadcast a second vote, signaling their commitment to the proposed block. In the commit phase, a block is considered committed when a two-thirds majority of validators have pre-committed it.

Tendermint can tolerate up to one-third of the validators behaving in a Byzantine or malicious manner. This means that as long as at least two-thirds of the validators are honest and follow the protocol correctly, safety and liveness guarantees are maintained.

Which makes this approach similar to our approach is that the broadcasting of information is done using gossip-based protocol.

Once a block is committed, it is considered final and cannot be reverted or changed. This ensures the irreversibility of transactions and enhances the security of the system.



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### 3. SOFTWARE REQUIREMENT SPECIFICATION DOCUMENT

#### Functional Requirements

- login to their [system name] account.
- logout of the [system name] account.
- create a profile for using the system.
- take the information given by the user.
- take the user to his corresponding wallet.

#### Non-Functional Requirements:

- responsive interface that will size to the respective screen of the user.
- same or similar experience across all platforms.

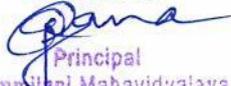
#### Domain Description:

- Hardware Requirements:
  - PC WITH 250 GB HARD DISK
  - PC WITH 1 GB RAM
- Software Requirements:
  - Operating System- Windows 10
  - Language- HTML, CSS, Python, MySQL
  - Frame Work - Flask
  - IDE- Visual studio code and notepad
  - Browser- Google Chrome



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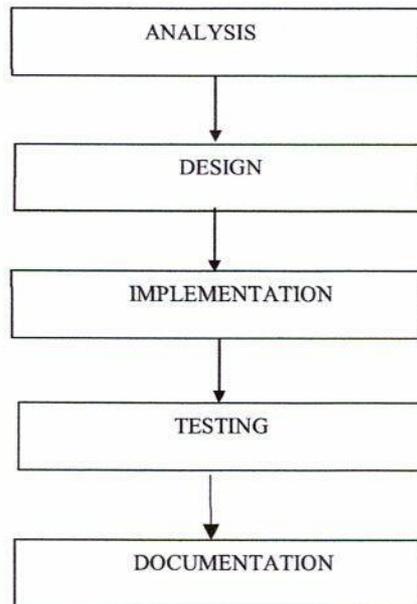
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#### 4. METHODOLOGY:

This part will describe the methodology of the project.



##### **Analysis phase**

In analysis phase, literature review will be conducted by reviewing some similar research papers. The data and information were gathered and collected during this phase. Thus, the strength and weakness between them are able to compare to each other. After reviewing for the related works, the project objectives and project scope of this web-based application project can be defined clearly.

**I have used Blockchain Cryptocurrency datasets from Kaggle and AWS for analysis.**

##### **Design phase**

The user interface and functionalities for this “DCash” website will be developed during the design phase. In this phase, an intuitive user interface is developed. In additions, the hardware and software specification are identified in this phase. The website will be designed by using Python, CSS and HTML coding as the graphical user interface is designed completely well.

##### **Implementation phase**

During the implementation phase, the coding part of the actual project is started to build. The languages used for this website development project is Python. The coding will be implemented and the correctness of the coding will be done in this phase.

##### **Testing phase**

After developing the “DCash” website which is able to perform the operations and function, a testing phase of this project will be carried out. The “DCash” decentralized web application will be tested by developer only in this case. After that, the question list will be created and the data collected will be used to determine where the website is well developed or not.

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## Documentation phase

After the testing phase is done, the output produced in the previous phase is documented during the last phase which is documentation phase. The results of the testing and data collection for this website development project will be also included in the documentation.

### 4.1 Problem statement

#### Motivation

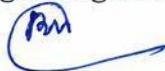
There are various limitations that the traditional financial system faces that hinder seamless transactions and financial inclusion. Also, there is lack of Transparency in Centralized Currency. There is Currency Manipulation and Counterfeiting of currency. Traditional currencies rely on centralized institutions, leading to vulnerability to fraud and manipulation. Cross-border transactions are burdened with high fees, lengthy processing times, and dependency on intermediaries. Moreover, a significant portion of the population lacks access to basic banking services, excluding them from the global economy. These challenges call for an innovative solution that provides a secure, efficient, and inclusive financial ecosystem.

#### Objective

An innovative solution is required to provide a secure, efficient, and inclusive financial ecosystem. This solution should address the vulnerabilities of centralized institutions, reduce costs and processing times for cross-border transactions, and ensure access to basic banking services for all individuals, thereby promoting financial inclusion.

#### Problem statement

- **A consensus mechanism needs to be suggested to reach consensus among network users regarding the legitimacy of a blockchain.**



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### 4.1 Algorithm Description:

#### Algorithm for the External application

##### 1. User Registration and Wallet Creation:

- User provides necessary information for registration.
- Generate a unique user ID and securely store it.
- Create a digital wallet associated with the user ID
- Store the wallet details securely.

##### 2. User Authentication:

- User provides login credentials (username and password).
- Verify the credentials against stored user information.
- If the credentials are valid, generate and return success.

##### 3. Balance Inquiry:

- User provides their user ID.
- Verify user ID.
- Retrieve the user's wallet details from the database.
- Return the balance associated with the user's wallet.

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#### 4. Send Cryptocurrency:

- User provides the recipient's wallet address and the amount to send.
- Verify the user ID.
- Retrieve the user's wallet details from the database.
- Check if the user has sufficient funds in their wallet.
- Create a transaction record with details (sender, recipient, amount).
- Deduct the amount from the sender's wallet and update the balance in the database.
- Add the amount to the recipient's wallet and update the balance in the database.
- Return a confirmation message indicating the success of the transaction.

#### 5. Transaction History:

- User provides their user ID.
- Verify the user ID.
- Retrieve the user's wallet details from the database.
- Retrieve the transaction history associated with the user's wallet.
- Return the transaction history to the user.

### Algorithm for the Internal application

#### 1. Initialize the Blockchain:

- Create an empty chain as a list or array to store blocks.

#### 2. Block Creation and Validation:

- Define the structure of a block with attributes such as index, timestamp, data, previous block hash, and current block hash.
- Assemble the block by gathering necessary data and assigning values to its attributes.
- Calculate the hash of the block using a cryptographic hash function (e.g., SHA-256).

#### 3. Add Block to the Chain:

- Append the validated block to the chain.

#### 4. Consensus Mechanism:

- consensus mechanism to achieve agreement among network participants on the validity of the blockchain
- mechanisms for block validation, mining, and determining the longest valid chain.

#### 5. Output Result:

- Give output in Boolean



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## Algorithm for the Consensus

### The Gossip-Based BFT Algorithm

#### Step 1: Node Initialization:

- Each node in the network initializes its own state and maintains a list of neighbors to communicate with.

#### Step 2: Information Propagation:

- Nodes exchange information by randomly selecting a subset of neighbors and sharing messages.
- Each message includes a timestamp, sender's identity, and relevant information (e.g., proposed values, signatures, etc.).

#### Step 3: Information Validation:

- Upon receiving a message, each node validates the message for integrity, authenticity, and adherence to the consensus protocol's rules.
- Nodes discard invalid messages and keep valid ones for further processing.

#### Step 4: Voting and Decision-Making:

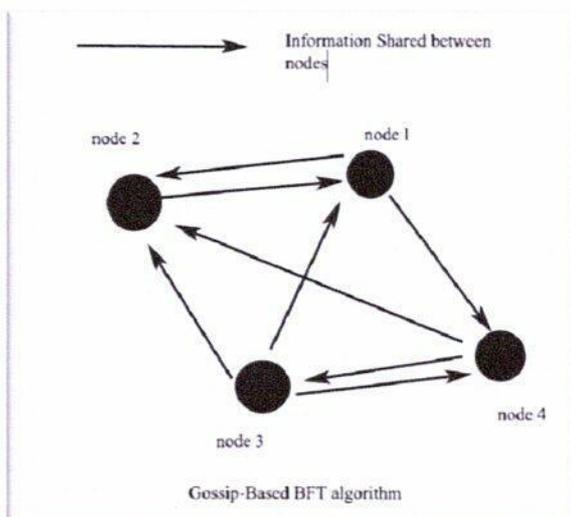
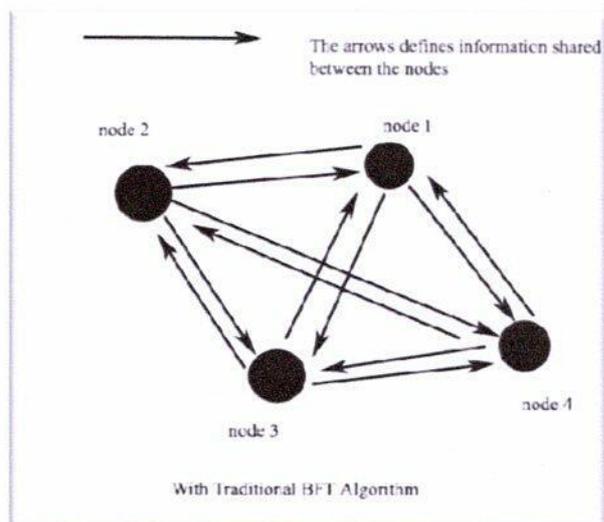
- Each node collects a set of valid messages from different neighbors and aggregates them.
- Nodes may apply a voting scheme to determine the most frequently observed value(s) or take other decision-making measures.
- Nodes evaluate the aggregated values based on the consensus protocol's rules to make a final decision.

#### Step 5: Byzantine Fault Tolerance:

- Nodes handle Byzantine faults by applying redundancy and evaluating messages from multiple sources.
- Nodes can use techniques like voting majorities, weighted voting, or other consensus protocols to handle faulty nodes and ensure the correctness of the decision.

#### Step 6 :Iterative Process:

- The algorithm operates in repeated rounds.
- In each round, nodes exchange messages, update their state, and repeat the process until consensus is reached or termination conditions are met.



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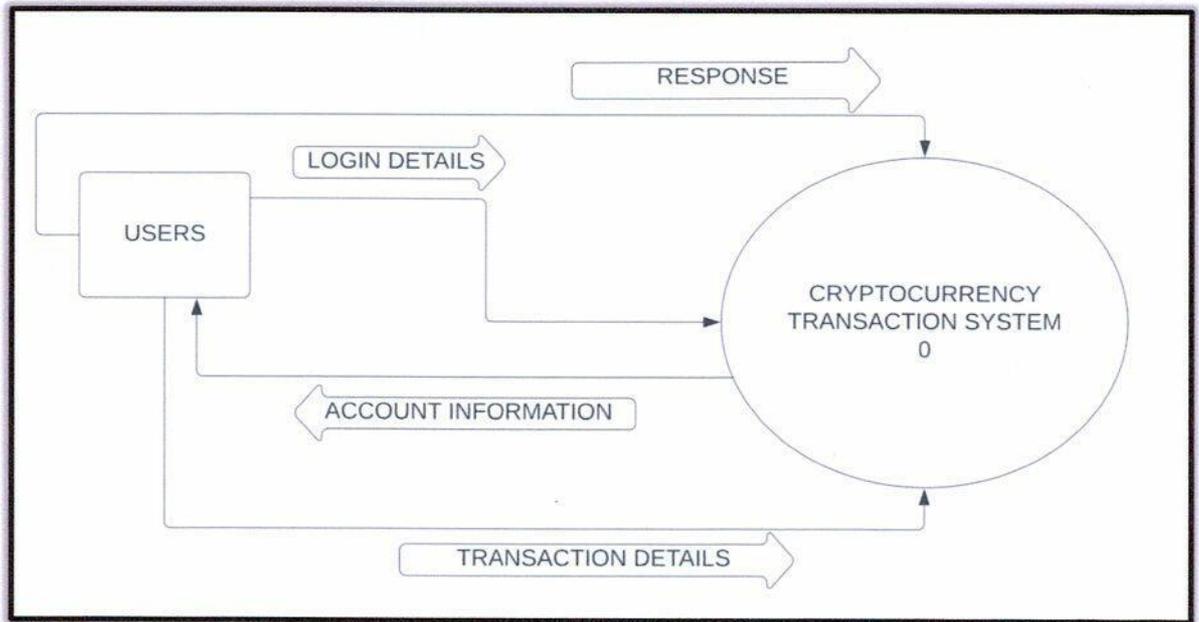
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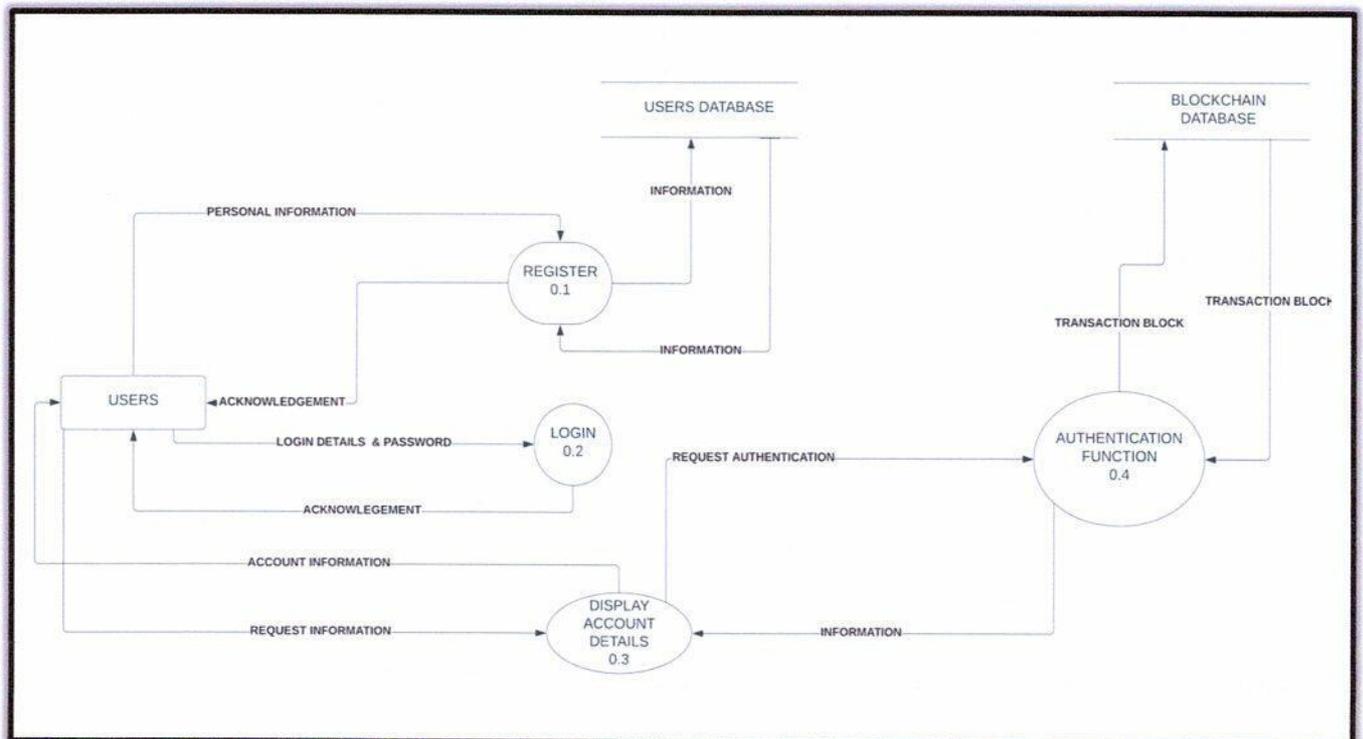
## 4.3 DESIGN

### DATA FLOW DIAGRAMS

#### LEVEL-0 DFD



#### LEVEL-1 DFD

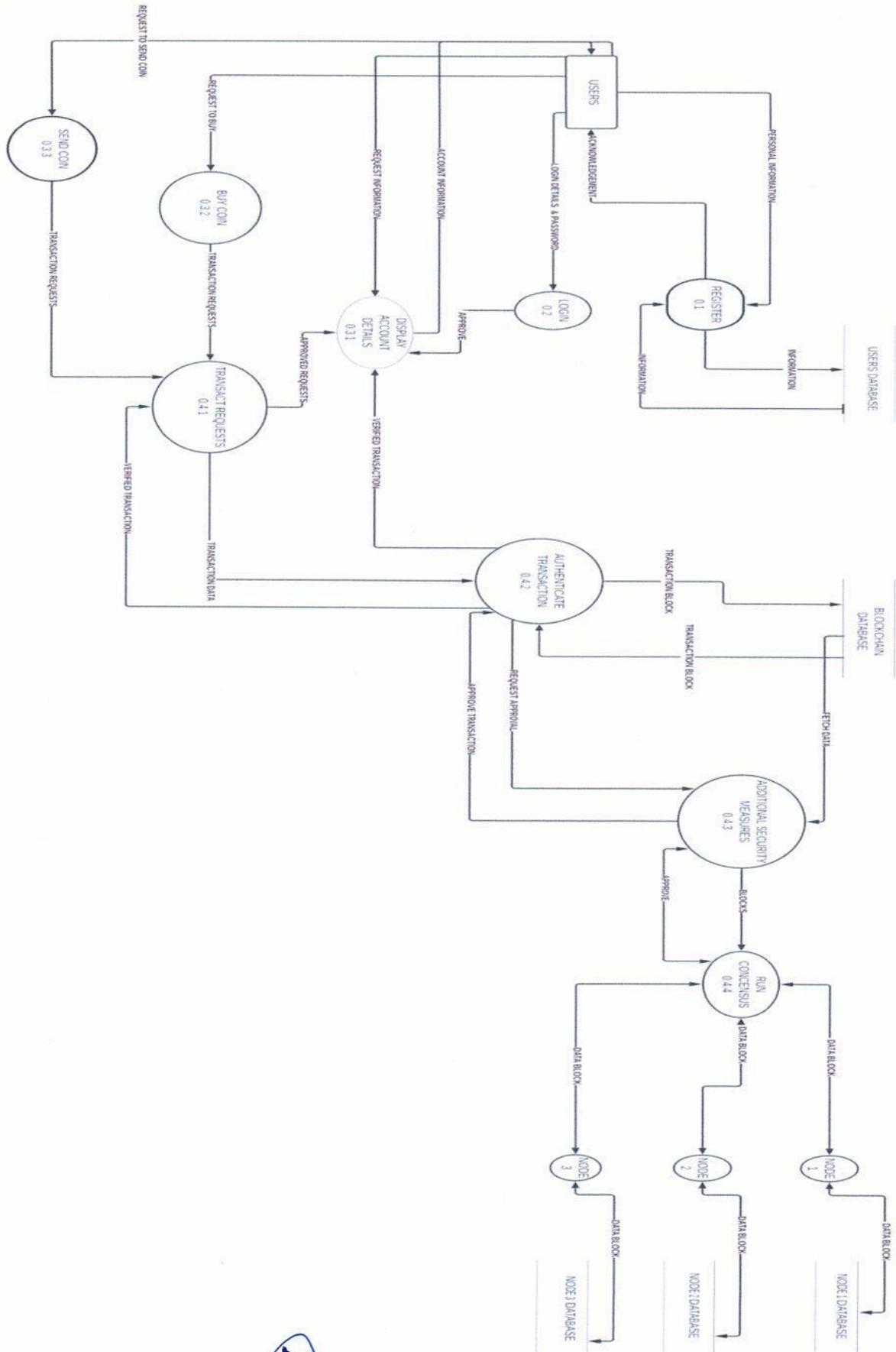


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# LEVEL-2 DFD

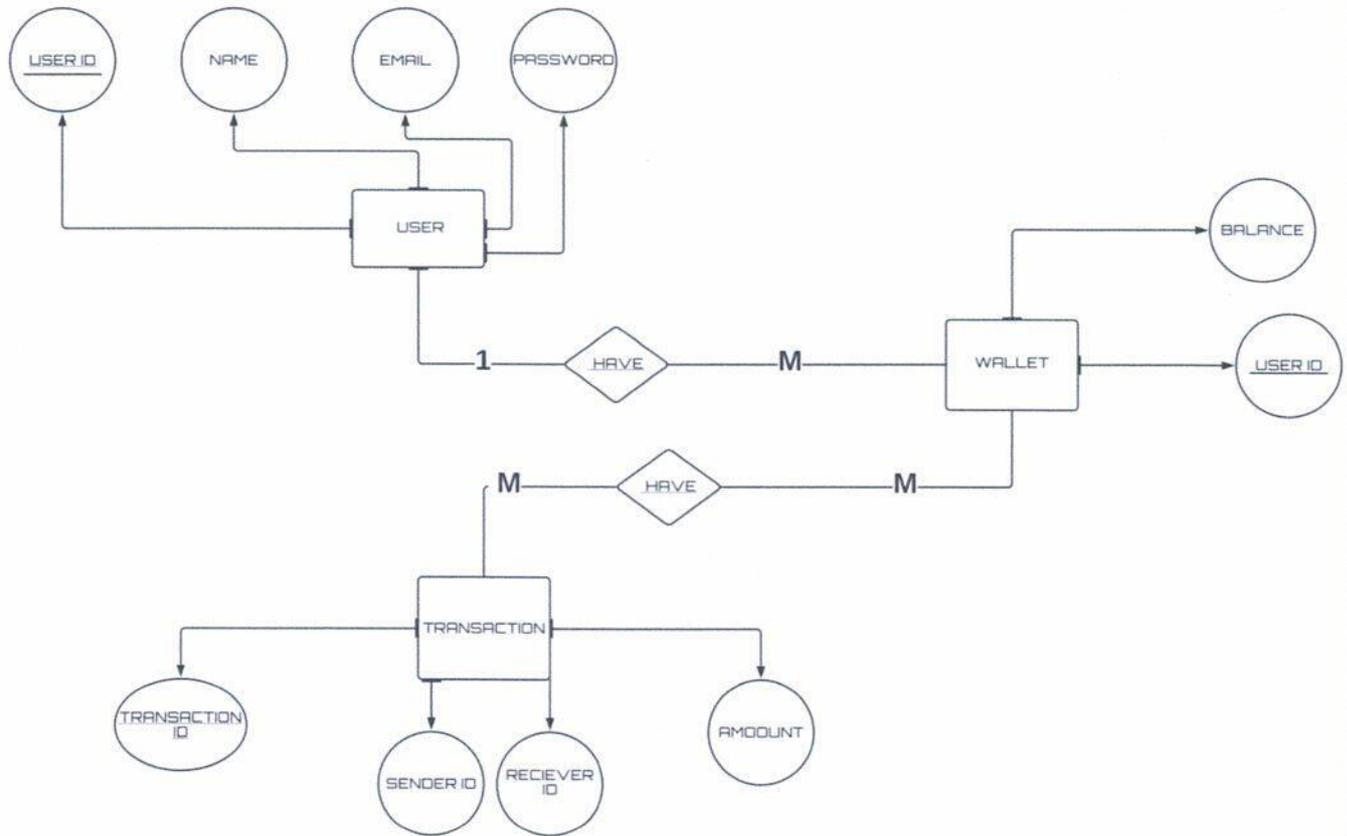


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**ER DIAGRAM :**

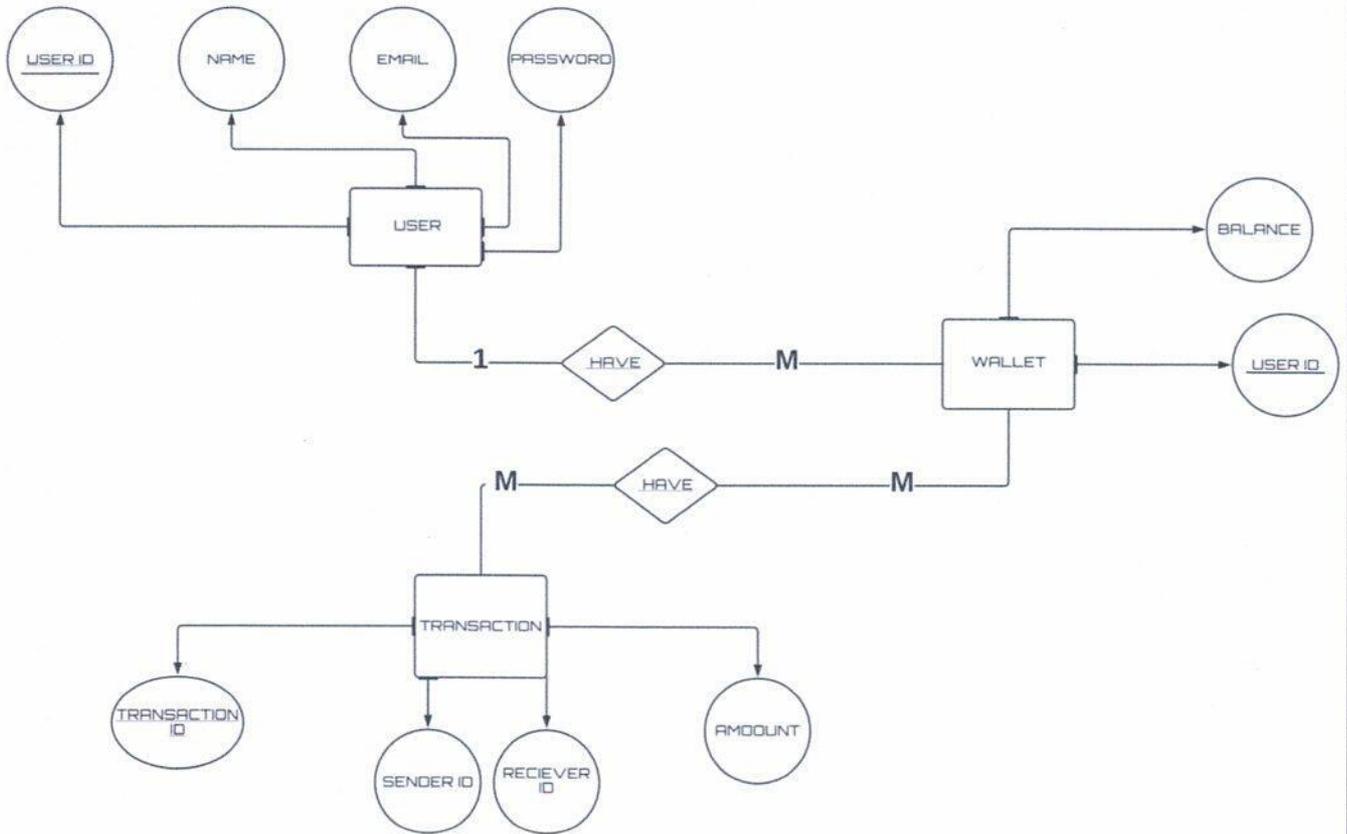


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## [-- CSS Code Application --]

```
html {
  position: relative;
  min-height: 100%;
}

body {
  height: 100%;
}

#wrapper {
  display: -webkit-box;
  display: -ms-flexbox;
  display: flex;
}

#wrapper #content-wrapper {
  overflow-x: hidden;
  width: 100%;
  padding-top: 1rem;
  padding-bottom: 80px;
}

body.fixed-nav #content-wrapper {
  margin-top: 56px;
  padding-left: 90px;
}

body.fixed-nav.sidebar-toggled #content-wrapper {
  padding-left: 0;
}

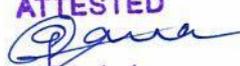
@media (min-width: 768px) {
  body.fixed-nav #content-wrapper {
    padding-left: 225px;
  }
  body.fixed-nav.sidebar-toggled #content-wrapper {
    padding-left: 90px;
  }
}

.scroll-to-top {
  position: fixed;
  right: 15px;
  bottom: 15px;
  display: none;
  width: 50px;
  height: 50px;
  text-align: center;
  color: #fff;
}
```



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Kolkata

```
background: rgba(52, 58, 64, 0.5);
line-height: 46px;
}
```

```
.scroll-to-top:focus, .scroll-to-top:hover {
  color: white;
}
```

```
.scroll-to-top:hover {
  background: #343a40;
}
```

```
.scroll-to-top i {
  font-weight: 800;
}
```

```
.smaller {
  font-size: 0.7rem;
}
```

```
.o-hidden {
  overflow: hidden !important;
}
```

```
.z-0 {
  z-index: 0;
}
```

```
.z-1 {
  z-index: 1;
}
```

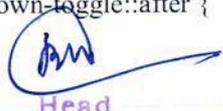
```
.navbar-nav .form-inline .input-group {
  width: 100%;
}
```

```
.navbar-nav .nav-item.active .nav-link {
  color: #fff;
}
```

```
.navbar-nav .nav-item.dropdown .dropdown-toggle::after {
  width: 1rem;
  text-align: center;
  float: right;
  vertical-align: 0;
  border: 0;
  font-weight: 900;
  content: '\f105';
  font-family: 'Font Awesome 5 Free';
}
```

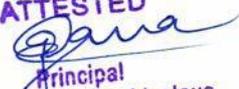
```
.navbar-nav .nav-item.dropdown.show .dropdown-toggle::after {
  content: '\f107';
}
```

```
.navbar-nav .nav-item.dropdown.no-arrow .dropdown-toggle::after {
  display: none;
}
```



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```

.navbar-nav .nav-item .nav-link:focus {
  outline: none;
}

.navbar-nav .nav-item .nav-link .badge {
  position: absolute;
  margin-left: 0.75rem;
  top: 0.3rem;
  font-weight: 400;
  font-size: 0.5rem;
}

@media (min-width: 768px) {
  .navbar-nav .form-inline .input-group {
    width: auto;
  }
}

.sidebar {
  width: 90px !important;
  background-color: #212529;
  min-height: calc(100vh - 56px);
}

.sidebar .nav-item:last-child {
  margin-bottom: 1rem;
}

.sidebar .nav-item .nav-link {
  text-align: center;
  padding: 0.75rem 1rem;
  width: 90px;
}

.sidebar .nav-item .nav-link span {
  font-size: 0.65rem;
  display: block;
}

.sidebar .nav-item .dropdown-menu {
  position: absolute !important;
  -webkit-transform: none !important;
  transform: none !important;
  left: calc(90px + 0.5rem) !important;
  margin: 0;
}

.sidebar .nav-item .dropdown-menu.dropdown {
  bottom: 0;
  top: auto !important;
}

.sidebar .nav-item.dropdown .dropdown-toggle::after {
  display: none;
}

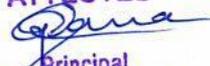
.sidebar .nav-item .nav-link {

```



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```

color: rgba(255, 255, 255, 0.5);
}

.sidebar .nav-item .nav-link:active, .sidebar .nav-item .nav-link:focus, .sidebar .nav-item .nav-link:hover {
color: rgba(255, 255, 255, 0.75);
}

.sidebar.toggled {
width: 0 !important;
overflow: hidden;
}

@media (min-width: 768px) {
.sidebar {
width: 225px !important;
}
.sidebar .nav-item .nav-link {
display: block;
width: 100%;
text-align: left;
padding: 1rem;
width: 225px;
}
.sidebar .nav-item .nav-link span {
font-size: 1rem;
display: inline;
}
.sidebar .nav-item .dropdown-menu {
position: static !important;
margin: 0 1rem;
top: 0;
}
.sidebar .nav-item.dropdown .dropdown-toggle::after {
display: block;
}
.sidebar.toggled {
overflow: visible;
width: 90px !important;
}
.sidebar.toggled .nav-item:last-child {
margin-bottom: 1rem;
}
.sidebar.toggled .nav-item .nav-link {
text-align: center;
padding: 0.75rem 1rem;
width: 90px;
}
.sidebar.toggled .nav-item .nav-link span {
font-size: 0.65rem;
display: block;
}
.sidebar.toggled .nav-item .dropdown-menu {
position: absolute !important;
-webkit-transform: none !important;
transform: none !important;
left: calc(90px + 0.5rem) !important;
margin: 0;
}
}

```

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```

.sidebar.toggled .nav-item .dropdown-menu.dropdown {
  bottom: 0;
  top: auto !important;
}
.sidebar.toggled .nav-item.dropdown .dropdown-toggle::after {
  display: none;
}

.sidebar.fixed-top {
  top: 56px;
  height: calc(100vh - 56px);
  overflow-y: auto;
}

.card-body-icon {
  position: absolute;
  z-index: 0;
  top: -1.25rem;
  right: -1rem;
  opacity: 0.4;
  font-size: 5rem;
  -webkit-transform: rotate(15deg);
  transform: rotate(15deg);
}

@media (min-width: 576px) {
  .card-columns {
    -webkit-column-count: 1;
    column-count: 1;
  }
}

@media (min-width: 768px) {
  .card-columns {
    -webkit-column-count: 2;
    column-count: 2;
  }
}

@media (min-width: 1200px) {
  .card-columns {
    -webkit-column-count: 2;
    column-count: 2;
  }
}

:root {
  --input-padding-x: 0.75rem;
  --input-padding-y: 0.75rem;
}

.card-login {
  max-width: 25rem;
}

.card-register {
  max-width: 40rem;
}

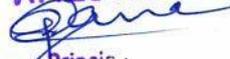
```



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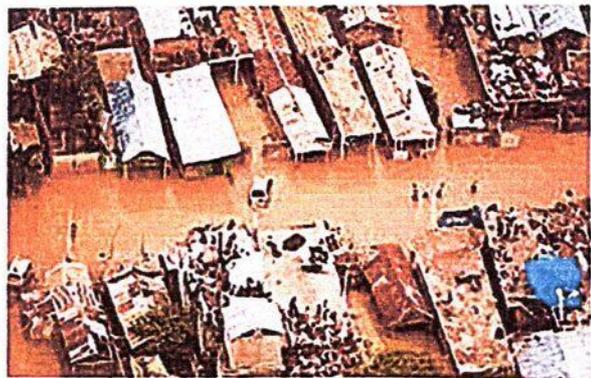
## ASSESSMENT OF FLOOD CONDITION : A CASE STUDY OF MALDA, NORTH BENGAL, INDIA

**B.SC. SEMESTER - VI (HONS) EXAMINATION-2023  
UNDER CBCS SYSTEM**

**PAPER-CC14**

**UNIVERSITY ROLL NO-203513-11-0056**

**UNIVERSITY REG. NO-513-1212-0369-20**



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# Sammilani Mahavidyalaya

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Date .....

## Certificate

This is to certify that Sri/Smt. .... PRITI PAIK ....., appearing in the B.Sc.  
Semester-VI, Honours Practical Examination, 2023, bearing Roll No.  
... 203513-11-0056 and Registration No. .... 513-1212-0369-20, has  
duly completed his/her project work on ..... ASSESSMENT OF FLOOD  
... CONDITION : A CASE STUDY OF MALDA, NORTH  
... BENGAL, INDIA ..... under my supervision, as part  
fulfilment of B.A./B.Sc. SEM VI GEOA CC - 14 (Practical) curriculum of the University of  
Calcutta (CBCS).

*Achintya Pramanik*  
Supervisor 19.07.2023

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*Examined*  
*S. Mukherjee*  
27.07.23

# ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to our respected Prof. Mr. Achintya Pramanik for his time and efforts he provided throughout the semester. Your useful advices and suggestions were really helpful to me during the project's completion. Under your guidance, this project also helped me in doing a lot of research and I came to know about a lot of new things. In this aspect, I am eternally grateful to you.

Besides, I am also very thankful to my fellow group members who have boosted me up morally with their continuous support. Their cooperation, advice and involvement helped me to do this project with the given time frame.

3.07.2023

Date

Prithi Paik

Signature of the Student

  
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## ABSTRACT

Flood a perennial phenomenon mainly in low lying deltaic areas and flood plain regions, can be viewed as beneficial for enhancing soil fertility and agricultural production, but also as one of the most destructive natural hazard endangering human life, property, economy and environment. Floods in lower Gangetic flood plain are annual event, especially Malda district of West Bengal has been severely affected by flood over the years by the mighty Ganga and its left bank tributaries during high stage of flow. The analysis of the present investigation concluded that the northern and western parts of the Malda district are most risk prone from flood hazard than the eastern part. The present investigation is an endeavor to assess risk due to flooding using analytical hierarchical processes in incorporating flood hazard elements and vulnerability indicators in geographical information system environment. The entire project has been done by the secondary data and we used some statistical and cartographic techniques. In the end we concluded that flood cannot be absolutely controlled, it can only be manage to reduce flood losses.

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## INTRODUCTION

Flood is an extreme hydrologic condition that occurs when overflows the artificial or natural boundaries of a stream, river or other body of water onto normally dry land. Flood often happens due to heavy rainfall or thawing snow, havoce river discharge and becomes a disaster when it influences heavy loss of life and damage to infrastructure and property.

According to Oxford Dictionary —

"An overflow of a large amount of water beyond its normal limits, especially over what is normally dry land."

Among all kinds of natural hazards, the flood hazard is one of the most devastating, wide spread and frequent in monsoon-dominated tropical and sub-tropical regions of this Planet (Sanyal and Lu 2006, Islam and Dharanirajan 2017).

In monsoon dominated Asia flood is perpetual natural hazard, where over 80% of annual rainfall is received during June to September. The problem of river flood is of a great concern in the Indian state of West Bengal, which is the lower most riparian state in the Ganga basin.

Malda district of West Bengal is situated in alluvial filled gap between Rajmahal hills on the east. The major rivers of the district are Ganga, Mahananda, Fulhar, Kalindi, Tangon and Punorvha. Hence, this district faces the initial thrust of flood water coming from Bihar and North Bengal. Out of 15 Administrative Blocks of Malda, Harishchandrapur II, Ratua I, Manikchak, Kaliachak II and Kaliachak III have been severely affected by flood (Sahana et al, 2015; Abhishek Ghosh & Shyamal Kumar Kar, 2018; Disaster Management Dept. Govt. of West Bengal, 2016).

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## MATERIALS AND METHODS

The entire project has been carried out through secondary data sources. The various statistical and Cartographic Techniques, Quantitative and Qualitative data analysis method used to show the output of results.

• Materials: The important materials those are used for this project are — different open and governmental sources, District Disaster Management Plans, various statistical data, qualitative and quantitative data, West Bengal flood reports, IMD, published books and articles, many websites, Research works and other drawing related belongings.

• Methods: To complete the objectives of the project, the whole work has been divided into broad three parts —

- Reviews of Literature.
- Collection of Data
- Analysis and Interpretation of Results.

Some cartographic techniques those are used to conduct this project are —

- Line Graph
- Bar Graph

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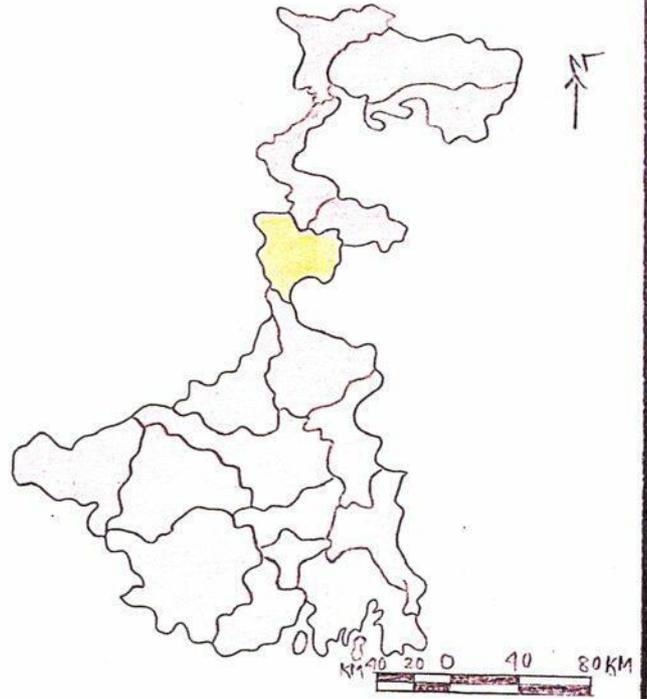
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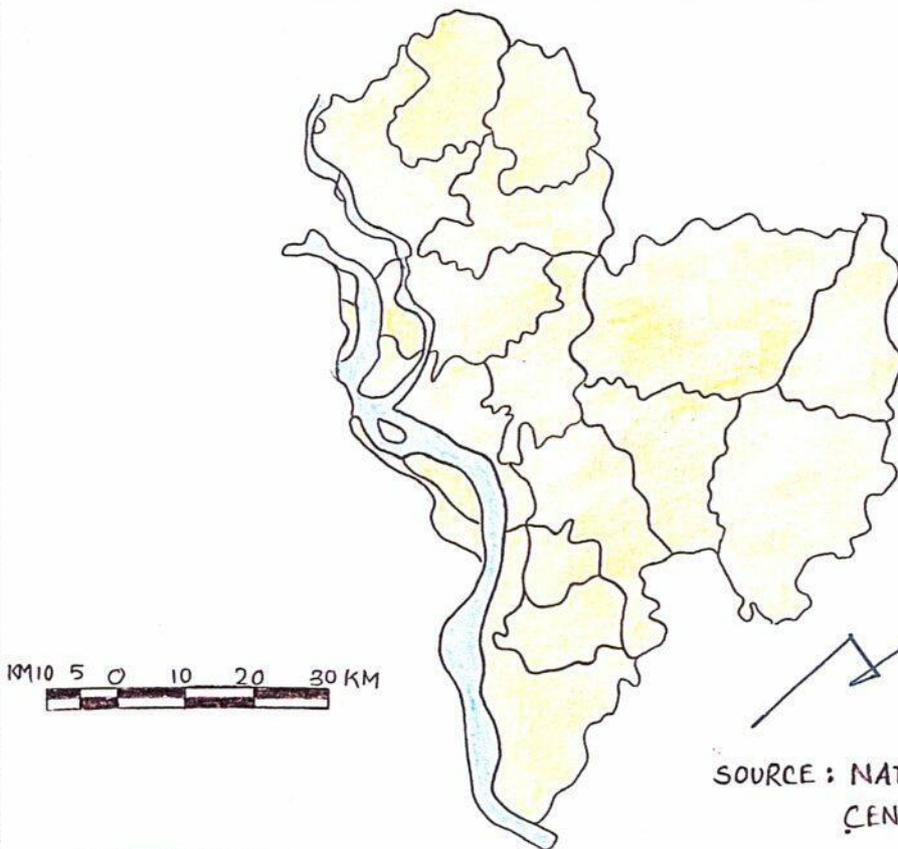
## LOCATION OF WEST BENGAL IN INDIA



## LOCATION OF MALDA IN WEST BENGAL



## MALDA DISTRICT



SOURCE : NATIONAL INFORMATION  
CENTRE & ESRA BASE MAP

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## LOCATION OF THE STUDY AREA

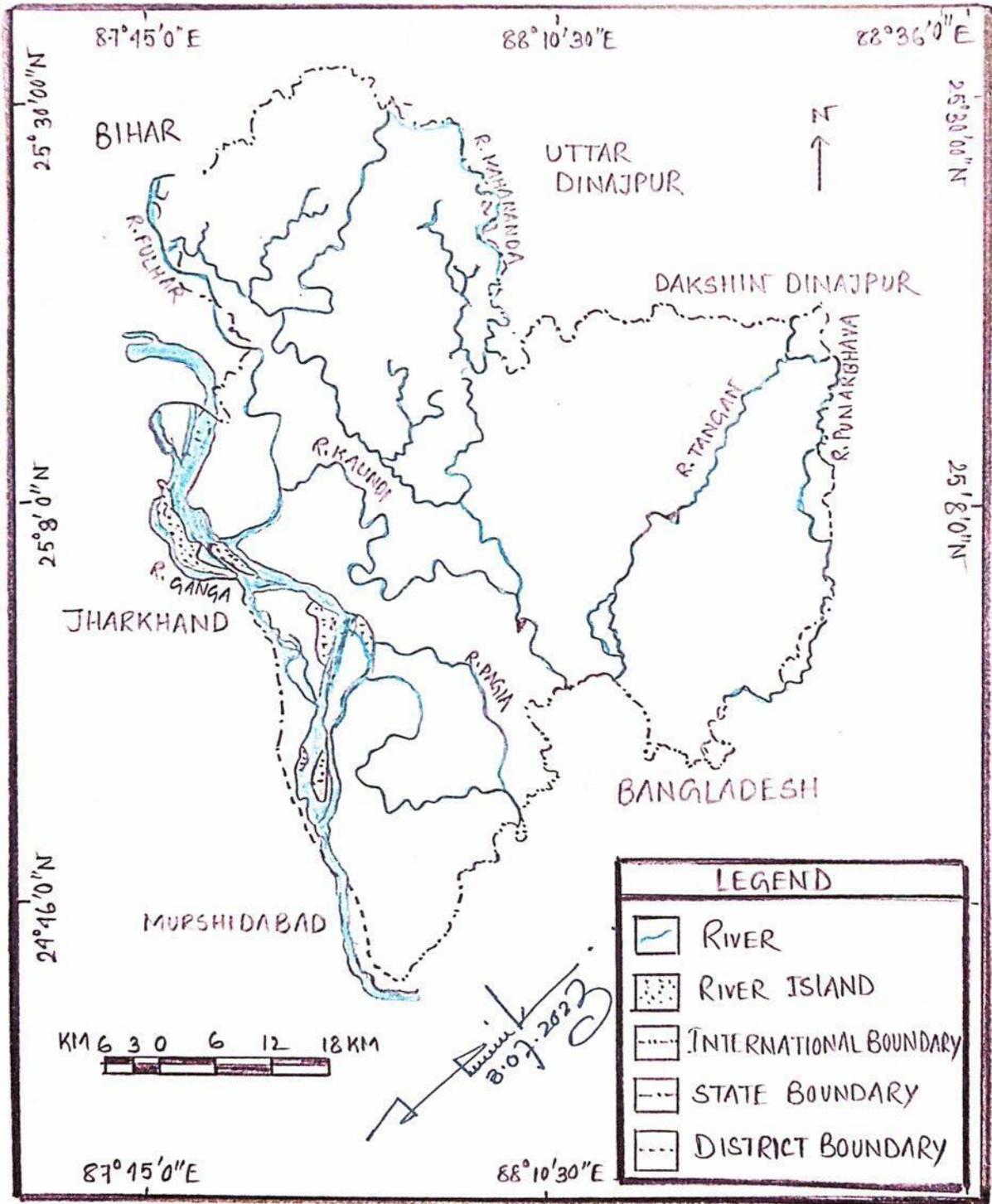
Spreading over an area of 3733 Square Kilometers with a population of 3,447,185 lakhs in 2011, the district Malda covers 4.2% of total land masses of the state of West Bengal located between latitudes from  $24^{\circ}40'20''N$  to  $25^{\circ}32'8''N$  and longitudes from  $87^{\circ}45'50''E$  to  $88^{\circ}28'10''E$ . The district is bounded in the south by district Munshidabad across the river Ganga, by Bangladesh and Dakshin Dinajpur district in east and north-east and by the state of Bihar and Jharkhand in the West and South-west. The district is located in sub-tropical monsoon dominated region. The annual rainfall pattern gradually decreases from north to south due to the variation in topography, vegetation character and orientation of monsoon tract. The Gangetic flat land of the district is composed of highly productive recent alluvium which has facilitated agricultural productivity leading to commercial expansion therefore, the population growth and overall household density are very high.

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# DRAINAGE MAP OF MALDA DISTRICT



SOURCE: DEPT. OF IRRIGATION AND WATERWAYS, GOVT. OF WEST BENGAL

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## DRAINAGE SYSTEM OF MALDA

Rivers in the district constitute an important feature upon its landscape. The earth surface here is washed by the waves of rivers like the Ganga, Mahananda, Fulhar, Kalindi, Tangaon, Punarbhava, Pagla and Bhagirathi. All main rivers of the district are of the Himalayan or sub-Himalayan origin and flows towards south direction. Due to the devastating flood particularly in the western side of the district huge amount of life and property, human establishments and agricultural land goes into the Ganga Rivers each year.

➤ GIANGA : River Ganga flows through the western part of the district and act as a natural division between Jharkhand and Malda district. The Ganga first touches the district as it sweeps round to the south of the Rajmahal hills and leaves the district at Khejuria near Farakka Barrage.

Rajmahal at its west and almost threatened to cut into the river Kalindi, as a result of which a good amount of erosion took place in the Malda bank. But at the present time the river has been flowing through the channel.

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➤ MAHANANDA: The main channel of river Mahananda in Malda district is fairly deep and alluvium and diluvium processes are going on gradually. River Mahananda runs for about 88.6 km in the district and divided the district into two nearly equal portions or regions, — (i) the eastern region, consisting mainly of old alluvial and relatively infertile soil is commonly known as Barind, and the (ii) Western region, which is further subdivided by the river Kalindi into two areas, northern area is known as 'Tal' and southern area is known as 'Diara'.

The Mahananda river system consists of two streams — one is locally known as Fulahar river and the other Mahananda. Mahananda originates from the mountainous region of Himalayas.

➤ KALINDRI: Kalindri river is a tidal estuarine river in and around the Sundarbans in North 24 Parganas district in the Indian state of West Bengal, bordering on Satkhira District of Bangladesh.

It enters into the Malda district near Miaghat of Harishchandrapur - II, in the Tal region, the river Kalindri received four tributaries, namely Kalkos, Kankar, Kos and Baromasia. These four small tributaries of Kalindri drain the excess water of Tal region and meet river Kalindri. After then, Kalindri is flowing mainly in south-eastern direction and meets river Mahananda.

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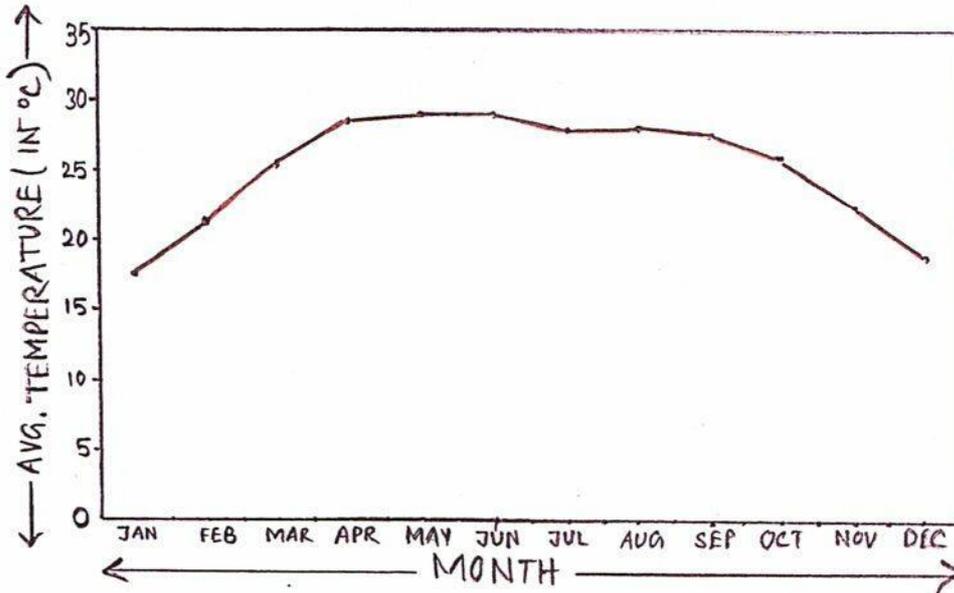
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# LINE GRAPH

SHOWING

## MONTHLY AVERAGE TEMPERATURE OF MALDA (2021)

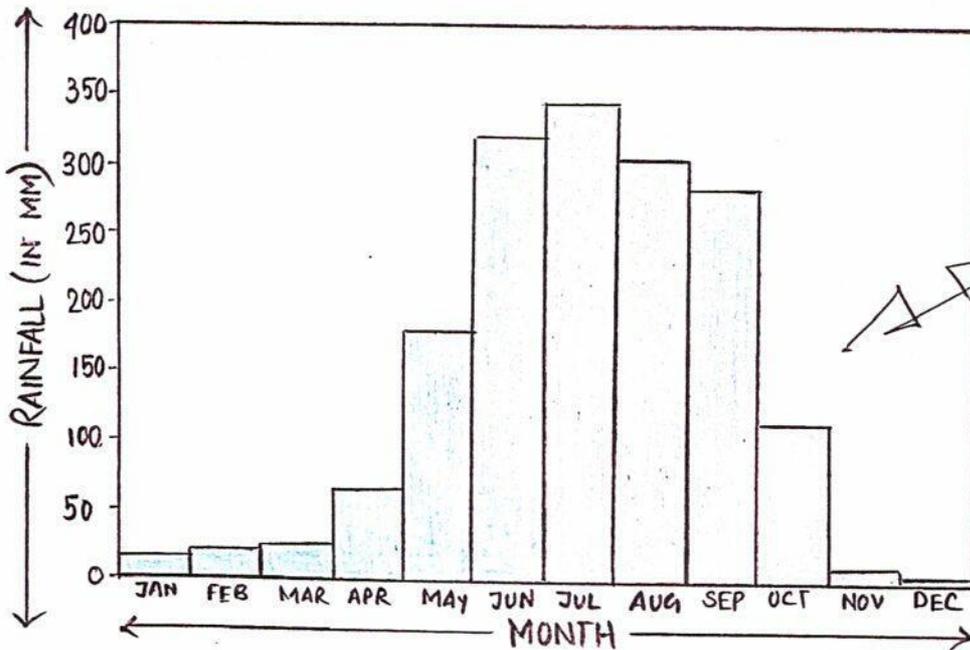


SCALE
Vertical: 1 cm $\cong$ 5°C
Horizontal: 1 cm $\cong$ 1 month

# BAR GRAPH

SHOWING

## MONTHLY RAINFALL OF MALDA (2021)



SCALE
Vertical: 1 cm $\cong$ 50 mm
Horizontal: 1 cm $\cong$ 1 month

*13.07.2023*

SOURCE : IMD

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## CLIMATIC CONDITION OF MALDA

The climatic characteristics of the district can be considered as one of the explanatory factors for the nature and the type of surface water bodies essentially the 'bils' in the district. Reduction in the water qualities during summer months and recharging of water during monsoon and post-monsoon months depended to a great extent on the temperature, humidity and precipitation. Rainfall naturally carries slightly more weightage in determining the recharge quantity of water in the bils. The district with its notorious flooding background provides the recharging quantity and quality factors of the bils of the Malda district.

A brief description of the climatic parameters of the district is given below :

The Malda district is significantly under hot and humid monsoonal climate. An oppressive summer season, plentiful rain and humid atmosphere all through the year are the main characteristics of the climatic condition of Malda district. On the basis of temperature variation rainfall, humidity and winds, the year of the district can be divided into four well defined seasons.

The four well defined seasons of Malda district are —

- 1) Hot-Summer season — March to May
- 2) Monsoon season — June to September
- 3) Retreating Monsoon — October to November
- 4) Winter season — December to February.

### 1. Summer Season :

The hot summer season starts from March and ends in the 1st week of June. This season mainly characterised by a rise in temperature, increases in the amount and frequent rainfall in diurnal range of temperature. The total average temperature of this season is around  $30^{\circ}\text{C}$ , average diurnal range of about  $6^{\circ}\text{C}$  and average rainfall is 308.7 mm.

### 2. Monsoon Season :

The monsoon season of Malda district mainly starts from June and extends upto September month. The seasonal characteristics includes weak surface winds, cloudy sky, high humidity and sultry weather. The average rainfall during the monsoon season is recorded 250 cm. Maximum amount of the rainfall of the year in the district takes place during this period.

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### 3. Retreating Monsoon Season :

In retreating monsoon season through three prevails a homogeneous climate in plain nevertheless; a little heterogeneous climatic conditions within and between different parts of the district in terms of variation in rainfall and range of temperature etc. prevails.

### 4. Winter Season :

The winter season in Malda district starts from December and ends in February. The main characteristics phenomena of this season is cool weather, frequent morning fog, average monthly temperature above  $10^{\circ}\text{C}$  and a little amount of rainfall.

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## RAINFALL AND HUMIDITY

The average annual rainfall is 1326.08 mm from year 2014-2018. The minimum rainfall in the area as per IMD (Indian Meteorological Department) data was recorded in the month of June and July followed by August and September. The rainfall in winter season is very low in amount.

## TEMPERATURE

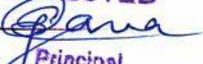
This district lies in near Himalayan foothills. So the climate is not too much hot. The minimum temperature of the district lies in the month of January and August respectively and the maximum temperature lies within  $24.2^{\circ}\text{C}$  and  $36.1^{\circ}\text{C}$  in the month of January and April respectively.

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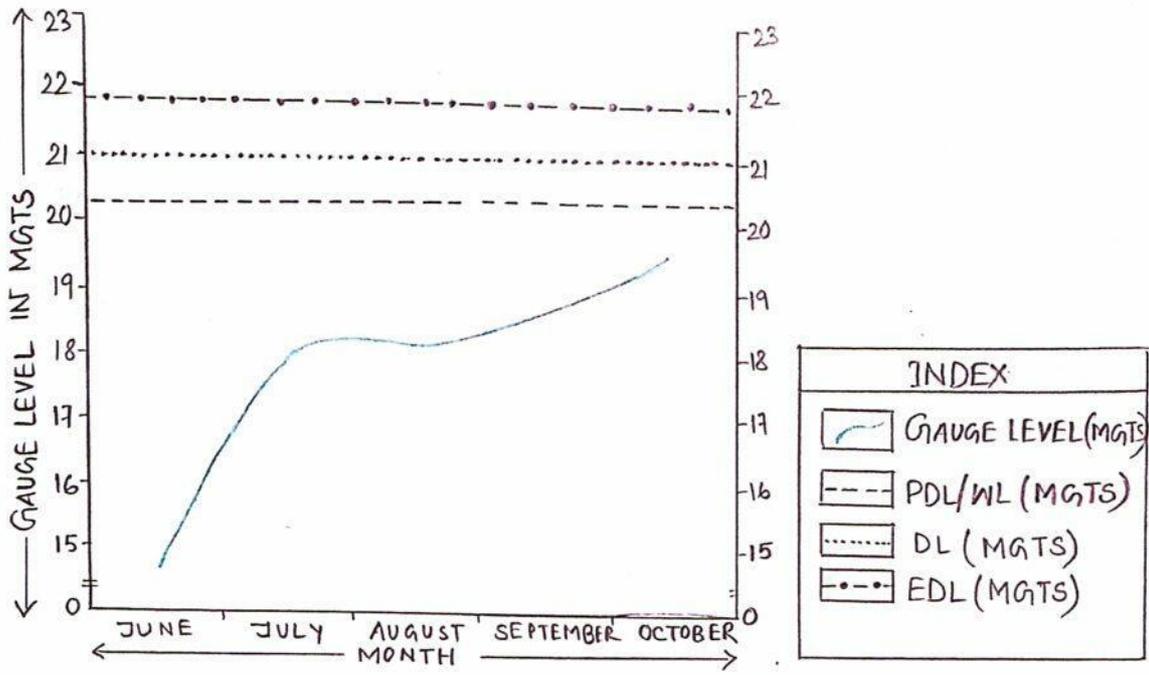
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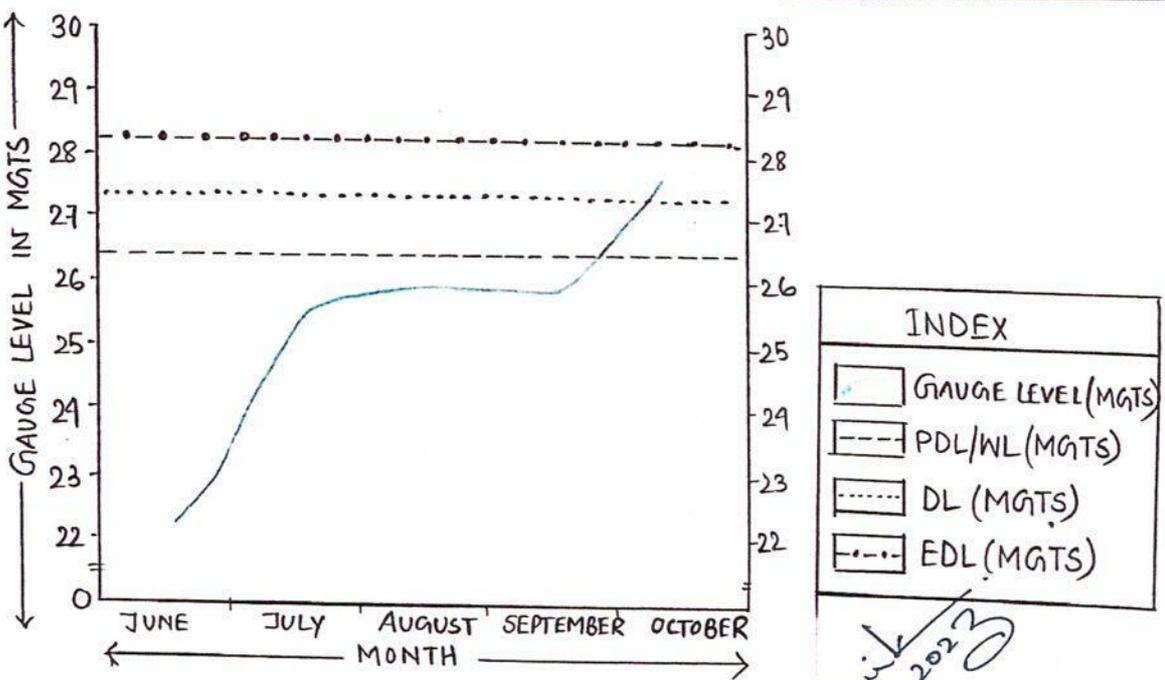
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# GAUGE LEVEL OF RIVER MAHANANDA AT ENGLISHBAZAR (DURING FLOOD)



# GAUGE LEVEL OF RIVER FULHAR AT TELJANA (DURING FLOOD)



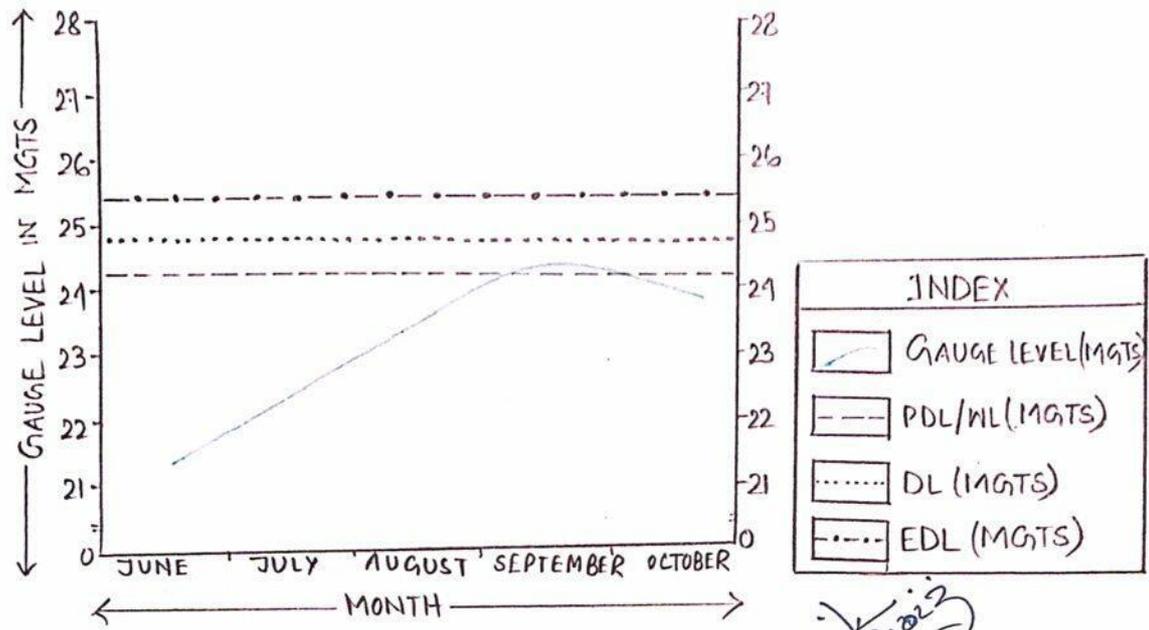
SOURCE : Annual Flood Report, 2019

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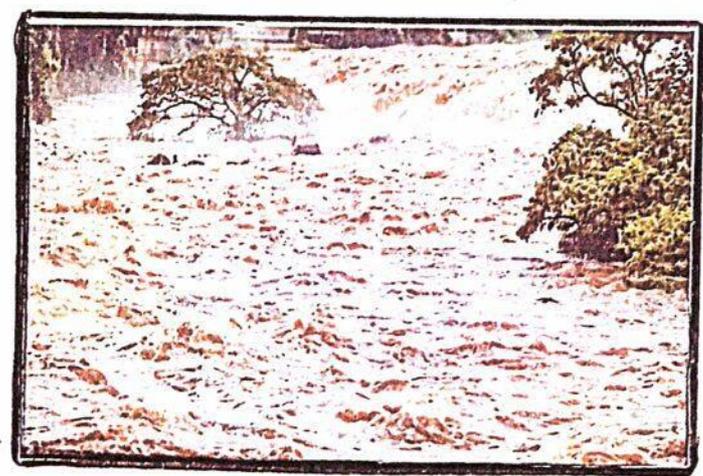
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# GAUGE LEVEL OF RIVER GANGA-PADMA AT MANIKCHAKGHAT (DURING FLOOD)



*Principals*  
3.07.2019

SOURCE: Annual Flood Report, 2019



PIC : INCREASING WATER LEVEL DURING THE FLOOD

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## TEMPORAL CHANGE OF WATER LEVEL

As per Government of India's Water Resources Information System (WRIS) and Central Water Commission (CWC) monsoon period comprises of five months, from June to October. Consequently, flood season also comprises from June to October. The distribution of monthly average rainfall in the state for this season shows overall normal rainfall with average deficit of rainfall of 13.2% that varies from maximum deficit of 49.1% in June, 2019 to maximum surplus of 19.2% in October, 2019.

In June, Malda has normal discharge and the rainfall water is capable for rivers of Malda district. In September, River Fulhar at Telsana where gauge had crossed EDL during heavy precipitation and river Ganga at Manikchakghat, Malda where gauge had crossed EDL during heavy precipitation as well as upper catchment discharge. Last week of July, middle Ganga basin stated affected by gauge level in Malda. River Fulhar in particular, continuously flowed at alarming level during entire month due to the prolonged rainfall and its accumulated at its upper catchment situated outside of the state.

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In August, Rainfall of 2019 was deficient. Hence, river stages were also not troublesome. In September, River Fulhar at Telsana where gauge had crossed DL during heavy precipitation and River Ganga at Manikchakghat, Malda where gauge had crossed EDL during heavy precipitation as well as upper catchment discharge.

From the period of 2001 to 2010 the highest shift under only the part of the Uttar Bhakuria. From 2010 to 2018 the highest shift due to erosion and flood near Sambalpur - Basitpur, Nantapur - Cropalpur and Bishnupur - Lakshipur.

During the period of 1973 to 2018 (45 years) the maximum mitigation of the river bank which both left and the right bank has shifted respectively. The overall shift of the river course time span from 1973 to 2018, shows that the highest portion of the shift was at Ratua-I block, about 4.8 km both of the banks of the river.

Due to shift of Fulhar river Uttar Bhakuria, Dakshin Bhakuria, Maniknagar, Bishnupur - Lakshipur and Dwitiya, Bhagalpur are most hazardous parts in the study area. Therefore, because of every year flooding and erosion, the left and right bank of the Fulhar river has shifted vastly.

RDM

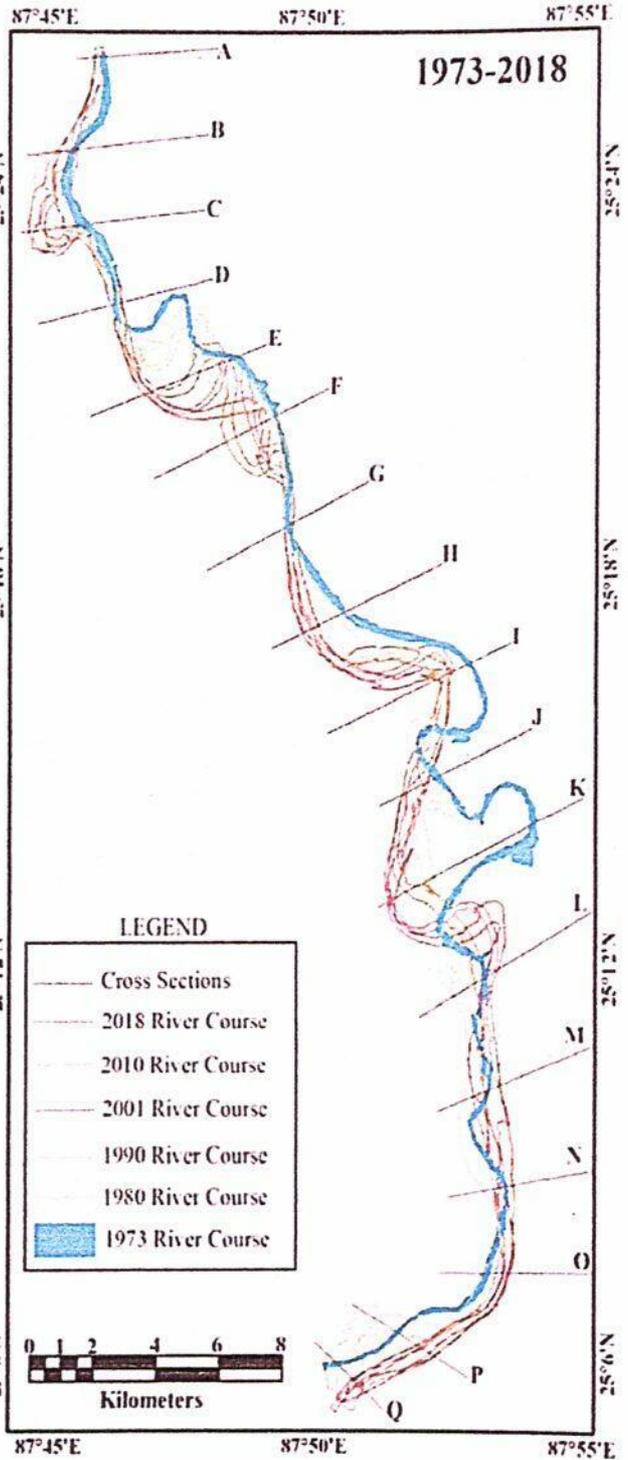
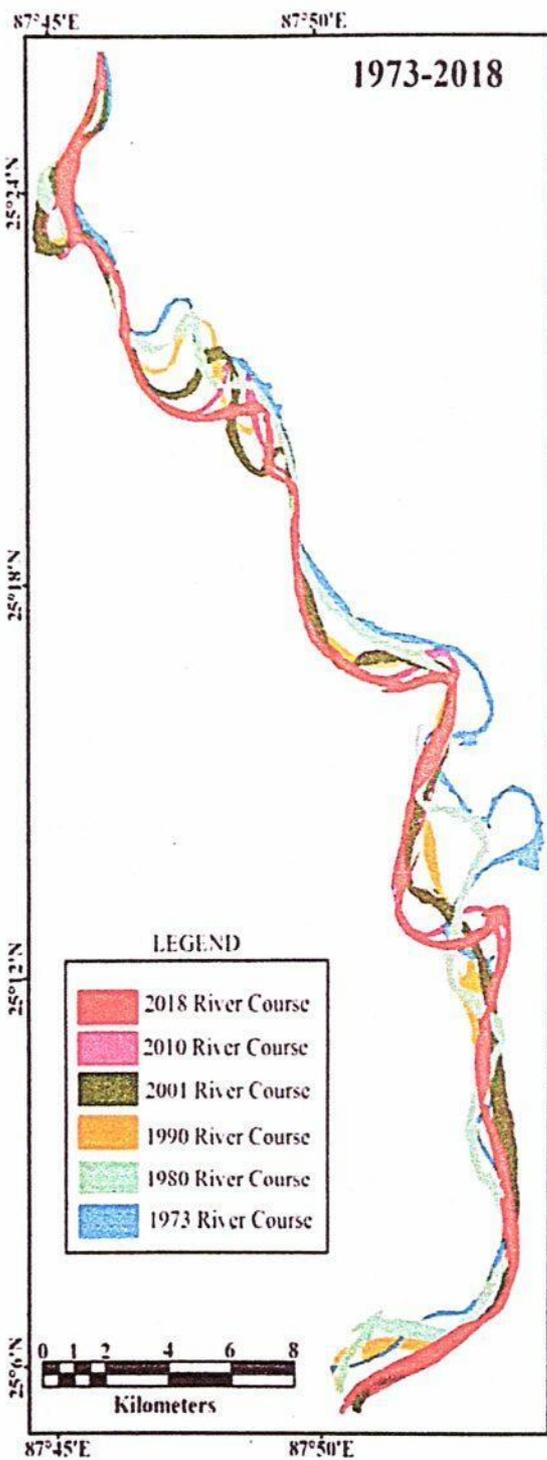
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# RIVER SHIFT OF FULHAR IN MALDA BETWEEN 1973-2018



Source: USGS

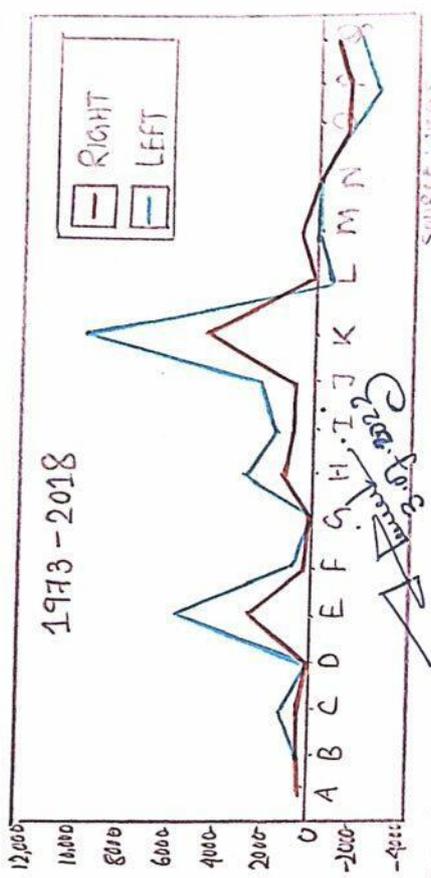
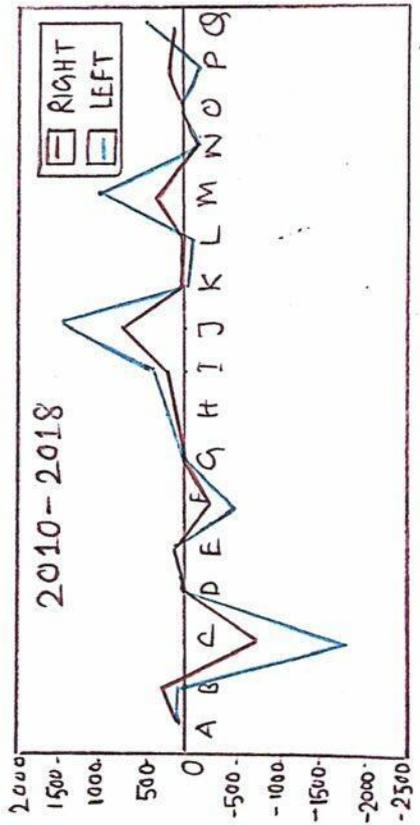
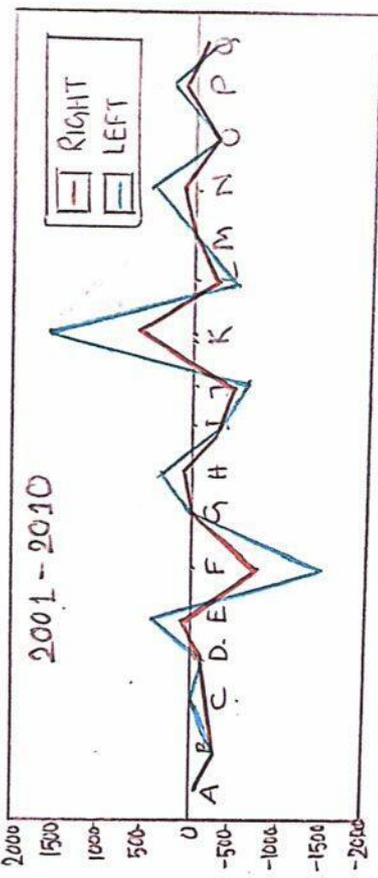
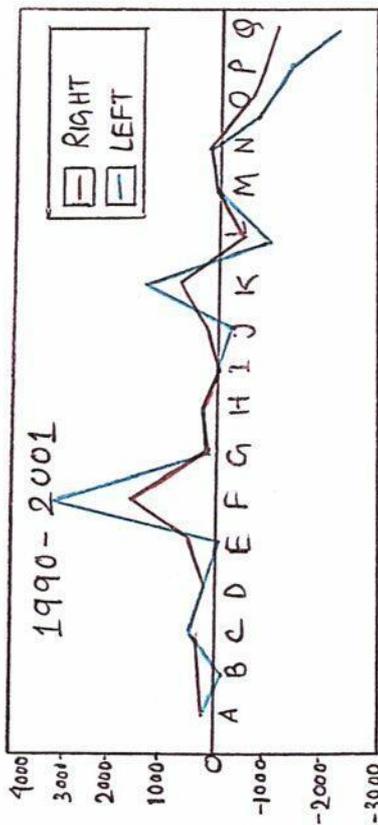
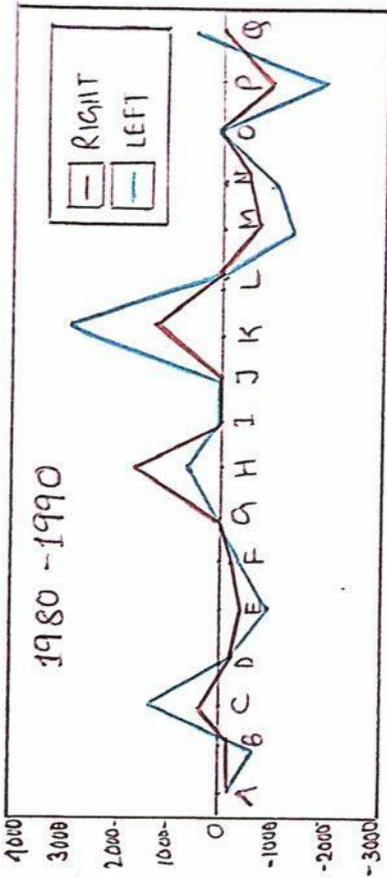
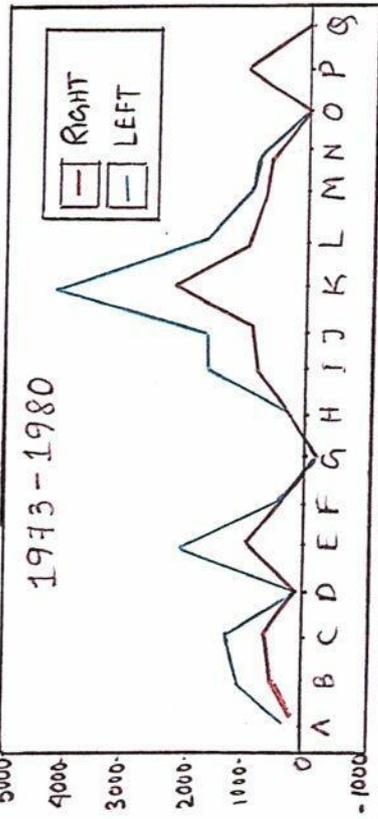
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# BANKWISE MIGRATION OF RIVER FULHAR ALONG EACH CROSS-SECTION



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SOURCE: VISAN

## AVULSION OF RIVER FULHAR

The Fulhar river is an important river of the Malda district, extends about 60 km. It is a main flow of the river Mahananda. The river flows through Bihar and enters in the district near Minaghat of Harishchandrapur-II block and merges with Ganga at Manikchak. We have studied the spatio temporal shift of the river channel (1973-2018) of Fulhar river in the Malda district using geospatial method.

For the temporal shift of the Fulhar river's 17 cross sections have been made covering entire the study area which has been calculated left and right bank of the river in meters. The three blocks are mainly affected across the cross section near Harishchandrapur-II block, Ratua-I block and Manikchak block.

From 1973 to 2018, the maximum shift was at Ratua-I and Harishchandrapur-II blocks which have about 2298.6 m and 1066.4 m on the right side of the river bank and 2014.87 m and 1085.3 m on the left side of the river bank. In this bank migration, comes under the Uttar Bhakuria, Pachim Bhakuria, Maniknagar and Duitiya, Balapur village which has the most affected villages.

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During the time period 1980-1990, the shift is wide-spread at Ratua-I block, 1282.43 m near the left and 1531.16 m near the right bank of the river. From 1990 to 2001 a maximum number of eroded comes under Uttar Bhakuria, Kamalpur and Maniknagar villages and has largest part as 1560.87 m and 1372.68 m at the right and left part of the river bank respectively.

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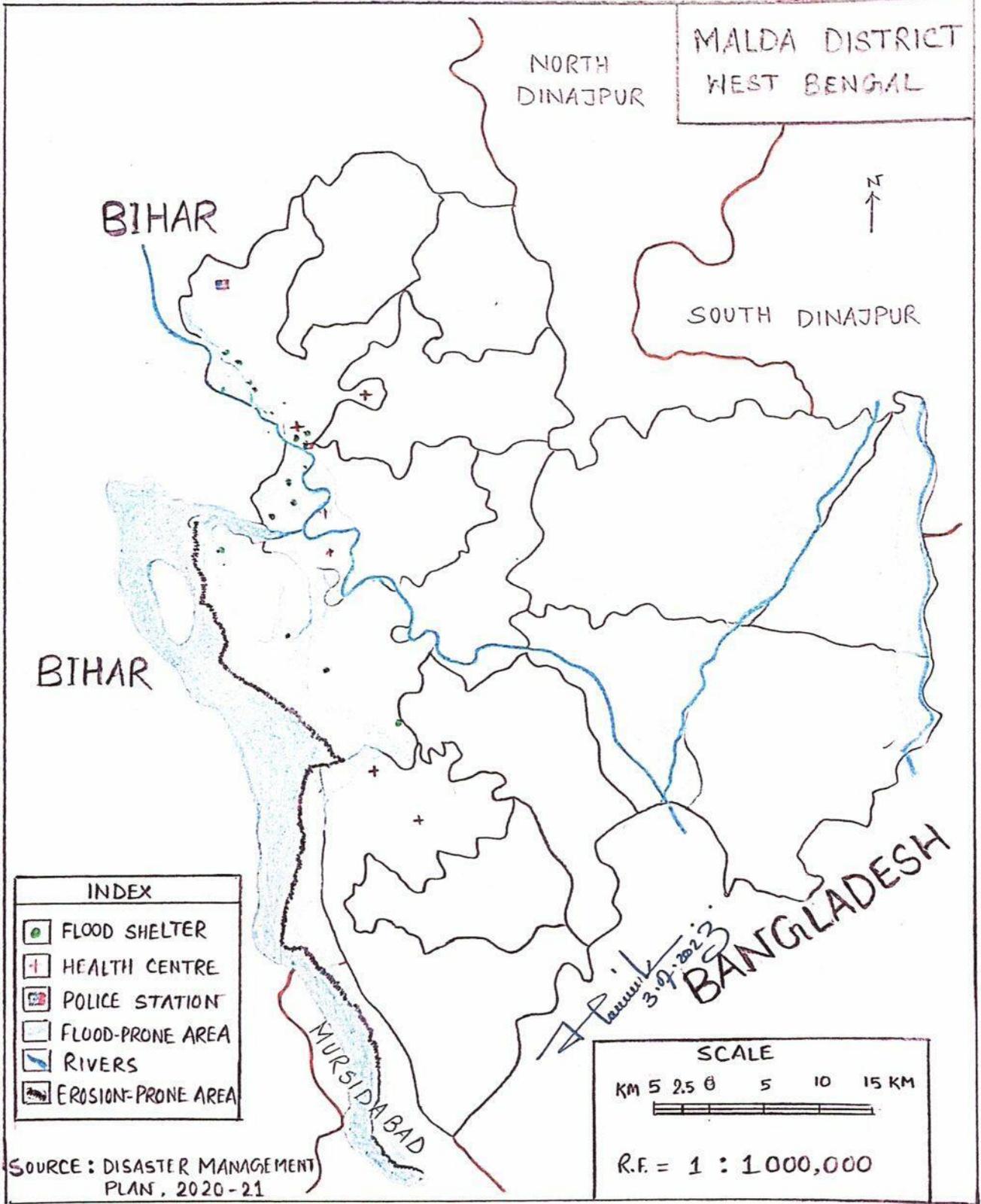
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# VULNERABILITY MAP OF MALDA DISTRICT



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## EFFECT OF FLOODS IN MALDA

Floods can sometimes be a huge destructive power having devastating effects. Besides the physical dangers that floods pose, they cause economic and social problems too.

In the Malda district floods and river-bank erosion predominantly affect the district as it is located in the moribund part of the Bengal delta. The main effects of flooding in Malda are—

### A. PHYSICAL EFFECTS :

➤ Impact on Environment: Flooding in Malda has a huge range of impacts on the environment, including—

- Wildlife habitats can be destroyed by flood water.
- Trees can be uprooted by high velocity of water flow.
- Plants that survive the initial flood may die due to being inundated with water.

➤ Landslide Risk: Due to high velocity of flood water the trees from the river bank or the side areas of the river can be uprooted, which may cause a huge landslide risk in that particular area.

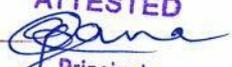
➤ River Bank Erosion: Besides, landslide risk, there are high chance of river bank erosion by the high velocity of water flow. Malda district is well known for river bank erosion by floods in every year.

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## B. EFFECTS ON HUMAN LIFE :

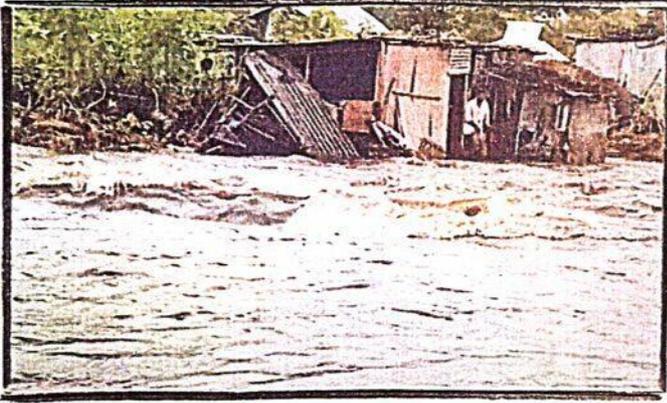
- Loss of Human Life : Floods are considered to be one of the severe weather killers. Floods carry people away in fast-moving water or it drowns them causing death.
- Damage of Property : Floods in the Malda district cause great loss of property and belongings. It also causes damage to buildings by blowing out windows, sweeping away doors, corroding walls and foundations and carrying debris into the infrastructure as it makes its way in, at a fast pace.
- Disruption of Communication : Due to flood in the Malda district as well as in India disruption of the communication system is a common incident caused by the flood.
- Loss of Livestock : Death can be the gravest effect of flooding. Besides human life, many domestic and wild animals are drowned by the flood water in every year of flooding in the Malda district.
- Water Pollution and Diseases : During flood many poisonous substances mixed with the river water and it caused water pollution. By these contaminated water caused waterborne, Black-foot etc. deadly diseases which have deadly effects on lives.
- Electricity Supply off : After a devastating flood condition sometimes the electricity supply can be off for electric posts and wires damage in the area.

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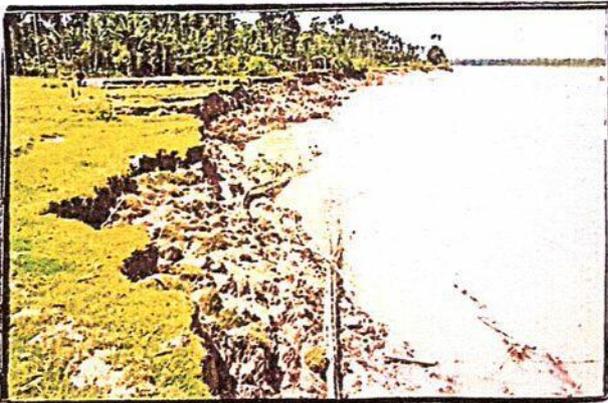
# EFFECTS OF FLOOD IN MALDA



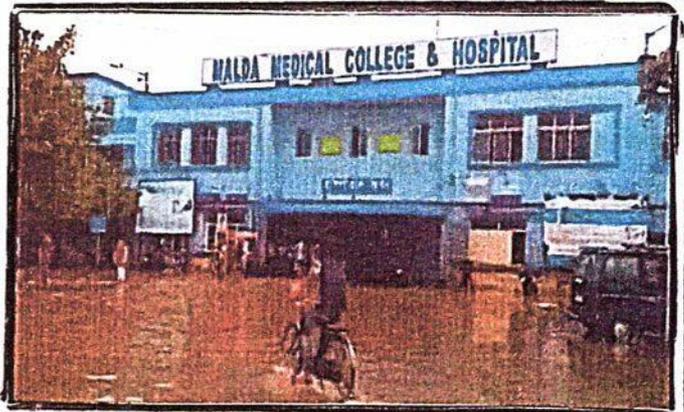
PIC-1: EFFECT ON SETTLEMENTS



PIC-2: DAMAGE OF CROPS



PIC-3: RIVERBANK SOIL EROSION



PIC-4: WATERLOGGING SITUATION

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## FLOOD MANAGEMENT PLANNING

Floods can be serious catastrophes and they are one of the most common hazards in West Bengal, especially of Malda in North Bengal. In case of Malda the flood disaster is highly correlated with heavy and sudden rainfall and dam failure management.

Disciplinary and Productive approach including pre-flood plan and Post flood management plan. Therefore it is keep important to put a plan in place dealing with flood in an organized way with all the stakeholders, who are well aware of their duty in responding on pre-planning per disaster.

NDMA (National Disaster Management Authority) and DDMA (District Disaster Management Authority) are working together on an effort aimed at improving the way people prepare for on respond on severe Auathor.

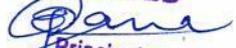
The DDMA (District Disaster Management Authority) process is there by bring legitimacy to the entire process. The entire process was divided into three phases i.e Pre-disaster activity, During Disaster activity and Post-disaster activity which were mainly focused on the parametens.

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## ▲ Pre-Flood Arrangements :

1. Holding meetings of District Block, Gram Panchayat and Gram Sansad level Disaster Management Committees and updating of Contingency plan.
2. Functioning of control room in collectorate as well as in the office of every GP blocks, line departments specially police, irrigation, Agriculture, Animal Resource, PHE, PWD, Mahananda Embankment Division and Health Dept.
3. Identification of vulnerable areas, vulnerable groups and people and mapping thereof Repair and maintenance of flood shelters.
4. Communication of river gauge reading of various rivers issued by flood forecasting cell malda and Central Water Commission. Patna to respective SDOs, BDOs and GPs.
5. Dissemination of rainfall, weather and Flood reports, received from government and IMD.
6. Installation of temporary Police RT sets at different vulnerable points in addition to eight irrigation TR sets.
7. Arrangements for storage of adequate relief materials in every block relief go-down stocks of Sub-Division Officer, chanchal is also to the enriched.
8. Rolling stock of kerosene Oil to be maintained at MR Dealer, Big dealer and Agent level, Rolling stock of rice at the rice millers level and adequate stock in FCI Go-down.

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## Δ Activities During Flood :

1. Control room will function round the clock, RT set, Telephone and Fax will be done in working condition.
2. People will be made alert with study of gravity of situation and evacuation will be taken up to the people of high risk zone.
3. Boats and other conveyance will be deployed in strategic point.
4. Shelter Management with drinking water facility and sanitation arrangement will be ensured.
5. Necessary steps are being taken up for sinking and re-sinking of tube-wells and setting up of latrine is being ensured through total sanitation programme in the identified flood shelter.
6. Health system development scheme have been taken up for better health service to the vulnerable people. NGOs to be mobilised to this work also.
7. Co-ordination meeting with different line department for taking follow up Resque, Relief and Rehabilitation Programme and to analysis the problem and action taking decision.

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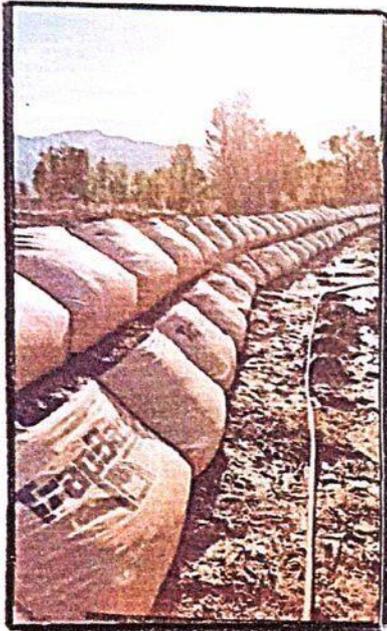
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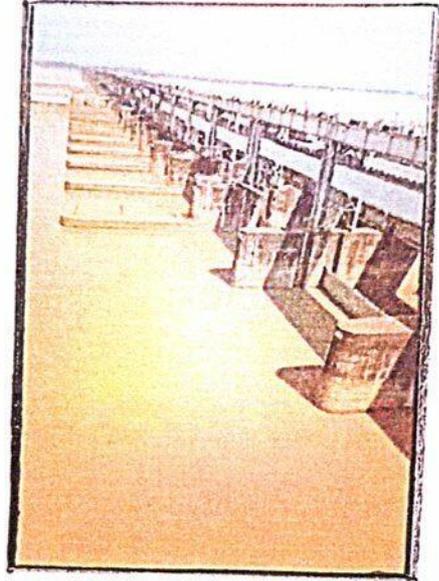
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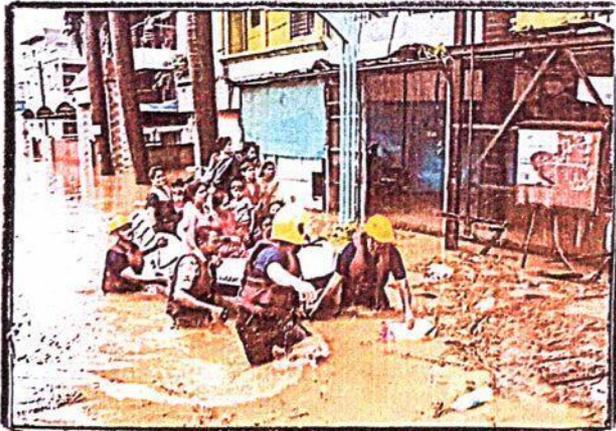
# MANAGEMENT AND PLANNING OF FLOOD SITUATION IN MALDA



PIC-1: CONSTRUCTION OF LEVEES USING SAND BAGS



PIC-2: CONSTRUCTION OF RIVER DAM



PIC-3: POST-FLOOD RESCUE WORK BY RESCUERS



PIC-4: PROVIDING RELIEF TO THE FLOOD VICTIMS

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## CONCLUSION

Deforestation via-a-vis environmental degradation in the watersheds of the sub-Himalayan river indeed plays the decisive role in contemporary increased frequency and magnitude of hazards. Vicious cycle of degradation has already been established in the Sub-Himalayan watersheds. Perhaps, the only possibility to save the habitat environment lies into the pro-active watershed management. It is thus, our imperative duty to inform the people living in threshold areas within the watersheds (Prohibitive/restrictive zone) categorically about the hard reality of possible hardship during the different stages of watershed management process!

Let us tell our people living in threshold areas (Prohibitive/restrictive zone) category that you are living in an unsafe area and it is not possible to provide you security against possible flood. The land-use pattern, house type must be suitable to cope up the possible threat. The traditional are and life style of living with flood must be adhered to.

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# MONTHLY STATISTICS OF RIVER GAUGES DURING FLOOD SEASON, 2019

Sl. No.	RIVER	GAUGE STATION	DIS-TRICT	PDL/WL (MGTS)	DL (MGTS)	EDL (MGTS)	MONTHLY AVG. RIVER GAUGE LEVEL (MGTS)				
							JUN-19	JUL-19	AUG-19	SEP-19	OCT-19
1	MAHANANDA	ENGLISH BAZAR	MALDA	20.25	21.00	21.75	17.68	17.94	17.97	18.55	19.70
2	FULHAR	TELJANA	MALDA	26.51	27.93	28.35	22.32	25.68	25.93	26.11	25.98
3	GANGA-PADMA	MANIKCHAK GHAT	MALDA	24.09	24.69	25.30	21.39	22.52	23.64	24.35	23.88

**TABLE : MONTHLY AVERAGE TEMPERATURE DISTRIBUTION  
IN 2021**

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MINIMUM TEMPERATURE (°C)	12.1	14.8	19.1	22.9	24.6	25.4	25.4	25.8	25.1	22.9	17.6	13.8
MAXIMUM TEMPERATURE (°C)	23.1	26.7	31.9	34.5	33.6	32.5	31.4	31.4	31	29.9	27.7	24.5
AVERAGE TEMPERATURE (°C)	17.5	20.8	25.5	28.5	28.9	28.9	28.2	28.2	27.6	26	22.5	19

**TABLE : RAINFALL AND HUMIDITY DATA OF MALDA  
IN 2021**

MONTH	RAINFALL (mm)	HUMIDITY (%)
JANUARY	16	68
FEBRUARY	20	61
MARCH	26	49
APRIL	63	54
MAY	182	70
JUNE	322	81
JULY	343	89
AUGUST	304	84
SEPTEMBER	283	85
OCTOBER	117	80
NOVEMBER	10	69
DECEMBER	6	68

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Table : TEMPORAL SHIFT OF THE RIVER ALONG EACH CROSS SECTION  
(River Shift in Meters)

CROSS SECTION	1973-1980		1980-1990		1990-2001		2001-2010		2010-2018		1973-2018	
	RIGHT	LEFT										
A	204.74	212.92	-78.45	-8.79	-41.36	-2.14	-88.62	-2.14	24.29	-3.42	93.95	157
B	570.84	603.42	-171.5	-291.04	-224.29	62.73	-319.54	62.73	193.45	-146.46	327.47	-0.092
C	707.78	653	581.34	831.71	37.48	-87.61	-185.79	-87.61	-933.71	-1031.8	449.35	402.76
D	45.85	90.94	-90.41	6.78	-57.41	-4.03	171.42	-4.03	-24.55	-59.45	-142.69	-22.16
E	1066.4	1085.3	-322.88	-449.1	-362.83	262.54	-859.83	262.54	73.57	89.78	2878.64	2931.21
F	245.29	136	-142.73	-41.81	1372.68	-6.24	-697.13	-6.24	-371.74	-345.89	411.88	426.63
G	15.39	-118.96	33.5	85.26	-26.71	109.45	-27.19	-27.19	-1.35	-15.15	42.02	-102.73
H	203.07	91.26	783.22	892.28	-29.65	139.68	-270.41	139.68	61.93	123.67	1348.72	1217.25
I	881.79	759.41	-37.83	65.85	-102.55	-97.19	-596.96	-97.19	174.93	70.62	908.61	699.16
J	908.73	800.53	30.25	-5.35	-271.2	609.53	-91.14	-91.14	701.71	773.91	1071.6	1203.78
K	2298.6	2014.87	1282.43	1531.16	530.78	-308.65	919.79	919.79	-95.02	-116.52	4830.52	4882.68
L	972.59	755.92	57.35	-287.17	-765.8	13.29	-278.69	13.29	-23.59	-147.43	-68.37	-338.51
M	738.04	340.04	-684.81	-697.62	-38.79	102.91	31.81	31.81	386.61	677.48	414.34	362.45
N	609.66	258.68	-537.93	-42405	119.64	-33.29	-237.37	353.91	-155.34	-125.65	138.92	56.59
O	-73.6	-170.66	126.04	9.67	-485.73	-237.37	-237.37	-52.13	32.89	-19.88	-637.78	-592.84
P	1139.2	-38.5	-1115	-857.26	-991.07	52.82	208.49	208.49	110.08	-182.58	-803.93	-1253.5
	128.15	-111.54	188.22	318	-1126.78	1172.1	-109.95	-138.37	170.02	241.64	-750.33	-753.74

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*QUEUING THEORY AND ITS APPLICATION*

**UNIVERSITY OF CALCUTTA**



***B.Sc. Semester - VI Examination (Hons) - 2023***

***(Under CBCS System)***

***(TUTORIAL EXAMINATION)***

***Subject - MTMA***

***Paper-DSE-A(2)***

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## Queuing Theory

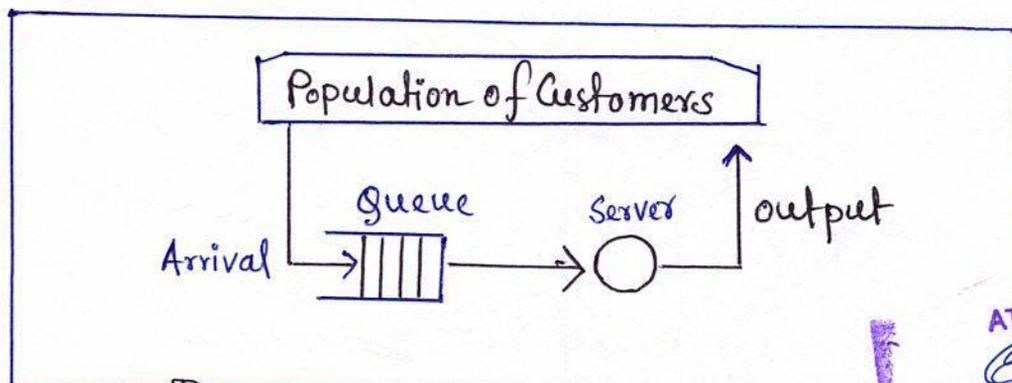
Queuing theory was first introduced in the early 20<sup>th</sup> century by Danish mathematician and engineer Agner Krarup Erlang. His mathematical analysis culminated in his 1920 paper "Telephone waiting Times", which contained some of the first queuing models served as the foundation of applied queuing theory.

Queuing theory refers to the mathematical study of the formation, function, and congestion of waiting lines, or queues.

A queuing situation involves two parts:

1. Someone or something that requests a service - usually referred as the customer, job or request.
2. Someone or something that completes or delivers the services - usually referred to as the server.

When looking at the queuing situation at a bank, the customers are people seeking to deposit or withdraw money, and the servers are the bank tellers.



**(a) Customer:** One who requires service is called customer.

**(b) Server:** One who provides service called server.

**(c) Queue (Waiting Line):** A group of customers at some places to receive service is called the queue.

### Components of Queue System

- ⊙ The input or arrival pattern
- ⊙ Queue or waiting line
- ⊙ The service discipline
- ⊙ The service mechanism or service pattern.
- ⊙ The output or departure.

### Input or Arrival Pattern

**(i) Balking:** If the customer return back without getting service.

**(ii) Reneging:** When the waiting customer leaves the queue due to impatient.

**(iii) jockeying:** If there be more than one queue and customer leave one queue and join other is called jockeying.

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## Poisson Queuing System

The queuing system where the distribution of arrival and the departure both are assumed to be poisson or the distribution of inter-arrival time and service time are assumed to be exponentially distributed are called as the poisson queuing system. The main poisson queuing system are :

1. (M/M/1) : ( $\infty$  | FCFS)
2. (M/M/1) : (N | FCFS)
3. (M/M/c) : ( $\infty$  | FCFS)
4. (M/M/c) : ( $\infty$  | FCFS)

## Steady state

A queuing system is said to be in steady state if the characteristics (like queue length, different probability etc.) probabilities of the system become independent of time ( $t$ ).

If  $P_n(t)$  denotes the probability that there are  $n$  customers in the system at time  $t$  then in steady state

$$\lim_{t \rightarrow \infty} P_n(t) = P_n$$

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### MODEL I - (MIMI) : ( $\infty$ | FCFS)

In this model,

1. Distribution of arrival is poisson with arrival rate  $\lambda$ .
2. Distribution of departure is poisson with service rate  $\mu$  ( $\lambda < \mu$ )
3. Distribution of inter-arrival time is exponential with mean arrival time ( $1/\lambda$ ).
4. Distribution of service time is exponential with mean service time ( $1/\mu$ ).
5. System has single server.
6. Queue length is unrestricted.
7. Queue discipline is first come first serve.

### characteristics of (MIMI) : ( $\infty$ | FCFS)

1. Steady state Distribution: The steady state distribution for the model is obtained under following axioms:

**Axiom 1:** The no. of arrivals as well as departures in non-overlapping intervals of time are statistically independent.

**Axiom 2:** The Probability that an arrival occurs within a very small time interval  $\Delta t$  is given by:

$$P_1[\Delta t] = \lambda \Delta t + o(\Delta t)$$

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**2. Average number of customers in the system:** Average number of customers in the system are denoted by  $E(n)$ . It is defined by:

$$\begin{aligned} E(n) &= \sum_{n=0}^{\infty} n p_n \\ &= \sum_{n=0}^{\infty} n p^n (1-p) \\ &= (1-p) (\rho + 2\rho^2 + 3\rho^3 + \dots) \\ &= (1-p) \left\{ \frac{\rho}{(1-p)^2} \right\} \\ &= \frac{\rho}{(1-p)} \end{aligned}$$

Hence the average number of customers in the system is  $\rho/(1-p)$ .

**3. Average queue Length:** The customer in the system involve the customers in queue as well as the customer who is at the service counter (server) and getting service. For obtaining the average queue length customer at the server is not considered. It is denoted by  $E(m)$  and defined by:

$$\begin{aligned} E(m) &= E(n-1) \\ &= \sum_{n=1}^{\infty} (n-1) p_n \\ &= \sum_{n=1}^{\infty} (n-1) p^n (1-p) = (1-p) \frac{\rho^2}{(1-p)^2} \\ &= \frac{\rho^2}{(1-p)} \end{aligned}$$

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Hence the average queue length is  $\rho^2/(1-p)$ .

4. Probability that there are at least  $k$  customer in the system:

$$\begin{aligned}
 P(n \geq k) &= \sum_{n=k}^{\infty} P_n \\
 &= \sum_{n=k}^{\infty} (1-\rho) \rho^n \\
 &= (1-\rho) \sum_{n=k}^{\infty} \rho^n \\
 &= (1-\rho) \frac{\rho^k}{(1-\rho)} = \rho^k
 \end{aligned}$$

Hence the Probability that there are at least  $k$  customer in the system is  $\rho^k$ .

5. Waiting time distribution: Waiting time of the customer is a continuous variable except that there is a non-zero probability that upon arrival the customer is served immediately. The waiting time is denoted by  $W$  and the commulative density function of waiting time is denoted by  $\Psi_w(t)$ .

$$\begin{aligned}
 \text{Now, } \Psi_w(0) &= P(W=0) \\
 &= P(\text{there is no customer in the system}) \\
 &= P_0 \\
 &= (1-\rho)
 \end{aligned}$$

Now consider,

$$\int_0^t \sum_{n=1}^{\infty} \left\{ P_n \cdot P[(n-1) \text{ customers are served in time } t] \cdot P[\text{one customer is served in time } \Delta t] \right\}$$

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$$\begin{aligned}
 &= \int_0^t \sum_{n=1}^{\infty} \left\{ (1-\rho) \rho^n \frac{e^{-\mu t} \cdot (\mu t)^{(n-1)}}{(n-1)!} \right\} \cdot \mu dt \\
 &= (1-\rho) \rho \mu \int_0^t e^{-\mu t} \left\{ \sum_{n=1}^{\infty} \frac{(\mu t)^{n-1}}{(n-1)!} \right\} dt \\
 &= (1-\rho) \rho \mu \int_0^t e^{-\mu t} \cdot e^{\rho \mu t} dt \\
 &= 1 - \rho e^{-\mu(1-\rho)t}
 \end{aligned}$$

Hence the waiting time distribution is given by:

$$\Psi_w(t) = \begin{cases} (1-\rho); & t=0 \\ 1 - \rho e^{-\mu(1-\rho)t}; & t > 0 \end{cases}$$

#### 6. Average waiting time:

The average waiting time is the average time spent by a customer in the queue. It is denoted by  $E[W]$  and given by:

$$\begin{aligned}
 E[W] &= \int_0^{\infty} t \Psi(t) dt \\
 &= \int_0^{\infty} t \mu \rho (1-\rho) \exp\{-\mu(1-\rho)t\} dt
 \end{aligned}$$

Taking  $\{-\mu(1-\rho)t\} = z$ , it is obtained that:

$$\begin{aligned}
 E[W] &= \frac{\rho}{\mu(1-\rho)} \int_0^{\infty} z e^{-z} dz \\
 &= \frac{\rho}{\mu(1-\rho)}
 \end{aligned}$$

Hence, the average waiting time is  $\rho / \{\mu(1-\rho)\}$ .

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## The application of queuing theory

Queuing theory is powerful because the ubiquity of queue situations means it has countless and diverse applications.

Queuing theory has been applied, just to name a few to:

- ① Telecommunications
- ① Transportations
- ① Logistics
- ① Finance
- ① Emergency Services
- ① Computing
- ① Industrial engineering.

It's helpful to understand Little's Law, a formula that helps operationalize queuing theory in many of these applications.

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Kinkar Gayen 01.06.23  
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**Environmental Studies**

**Field work on**

**A Study Of Rainwater Harvesting**

**Sammilani Mahavidyalaya**

**Name of the student: Gautam Ghosh**

**Course: B.COM(Hons)**

**Year: 2<sup>nd</sup> Semester, 2023**

**College Roll: 568**

**C.U. Registration No: 513-1111-0554-22**

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**(UNDER THE GUIDELINE OF TEACHER: MRS. KEYA SAHA)**

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# ACKNOWLEDGEMENT

It is a matter of great pleasure to present this project on

"THE STUDY OF RAINWATER HARVESTING"

I take this opportunity to thank our respected principal "Dr. C.K. Jana" for giving me an opportunity to study in his college. I am eagerly grateful to our Head of Department "Ananda Mukherjee" without whom this project would not have been successful one.

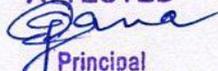
I am very ~~thank~~ thankful to my supervisor "KEYA SAHA" for her full support in completing this project work.

Finally, I am gratefully acknowledge the support of my family and friends who had given me full support and co-operated with me for the completion of this project.

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# STUDENT DECLARATION

I hereby declare that my Project Report titled "RAINWATER HARVESTING" is a bonafide record of the project work which I have submitted to Sammilani Mahavidyalaya, affiliated under University of Calcutta in fulfillment of credit requirement <sup>for</sup> of the degree of Bachelor of Commerce [HONS.] is my authentic work.

This project report has not been copied, duplicated from any other paper, journal, document or book and has not been submitted to any educational institute or otherwise for the award of any certificate, degree or recognition.

This is an authentic piece of work and in case there is any query regarding the same, I shall be held responsible for answering any queries in this regard.

NAME OF STUDENT : GAUTAM GHOSH

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# SUPERVISOR DECLARATION

This is to certify that "MR. Gautam Ghosh" of semester II of B.COM (HONS.) of "Sammilani Mahavidyalaya" has completed his project on the study of "RAIN WATER HARVESTING" under my guidance and supervision. He has taken proper care and shown utmost sincerity in completion of this project.

I certify that this project is upto my expectations and according to the latest CBCS guidelines.

---

MRS. KEYA SAHA  
(ENVS TEACHER)

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# INTRODUCTION

Millions of people throughout the world do not have access to clean water for domestic purposes. In many parts of the world conventional piped water is either absent, unreliable or too expensive. One of the biggest challenges of the 21st century is to overcome the growing water shortage. Rainwater harvesting (RWH) has thus regained its importance as a valuable alternative or supplementary water resource, along with more conventional water supply technologies. Much actual or potential water shortages can be relieved if rainwater harvesting is practiced more widely.

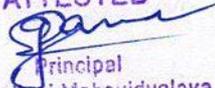


People collect and store rainwater in buckets, tanks, ponds and wells. This is commonly referred to as rainwater harvesting and has been practiced for centuries. Rainwater can be used for multiple purposes ranging

## NEED FOR RAINWATER HARVESTING

Due to pollution of both groundwater and surface waters, and the overall increased demand for water resources due to population growth, many communities all over the world are approaching the limits of their traditional water resources. Therefore they have to turn ~~to~~ to alternative or 'new' resources like rainwater harvesting (RWH).

  
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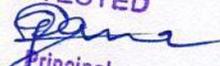
## PREVENT OVER USE OF AQUIFERS

As cities and towns grow the need for water increases. Many municipalities rely upon aquifers deep below the ground for this water supply. The problem is it takes a long time to replenish an aquifer if it is quickly drained. By harvesting rainwater for later use, the demand on aquifers is reduced, which enables them to remain full.

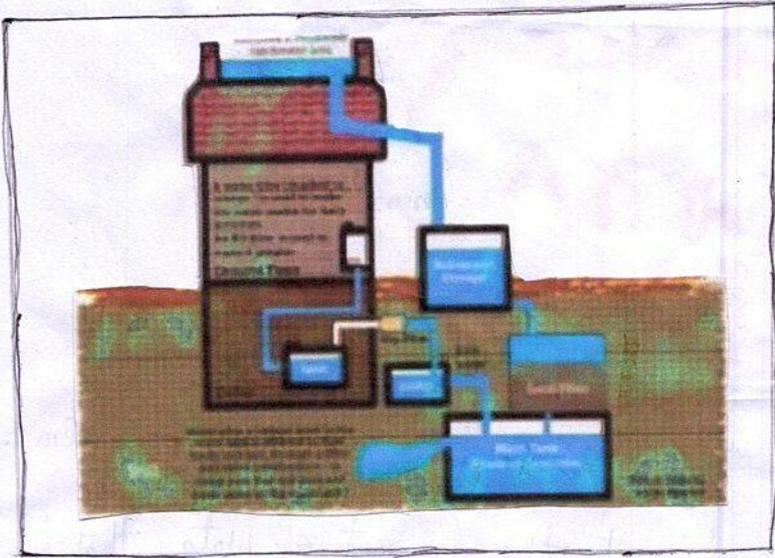
## SAVE MONEY

Pumping water up from underground aquifers can be a fairly expensive operation. It is estimated that for every one meter rise in water level, there is a reduction of 0.4 KWH of electricity usage. So, by having water closer to the surface, or at the surface in reservoirs less electricity is needed to pump it so less money is spent.

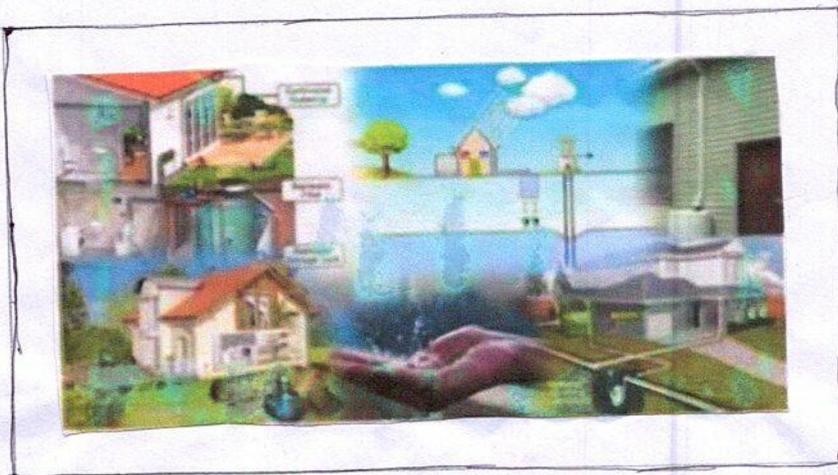
  
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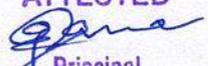
# CONVEYANCE



Conveyance system basically includes rain gutters and down pipes which collect the rain water from catchment to the storage tank. These rain gutters are usually built during the time of construction. They need to be designed appropriately as to avoid the loss of water during the conveyance process.



  
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# DESIGNING A RAINWATER HARVESTING SYSTEM

The main consideration in designing a rainwater ~~har~~ harvesting system is to size the volume of the storage tank correctly. The tank should give adequate storage capacity at minimum construction costs.

## FOUR STEPS TO BE FOLLOWED IN DESIGNING A RWH SYSTEM:-

STEP 1: Determine the total amount of required and available rainwater.

STEP 2: Design your catchment area.

STEP 3: Design your delivery system.

STEP 4: Determine the necessary size of your storage reservoir.

## THESE STEPS ARE DESCRIBED BELOW :-

STEP 1: Total amount of required and available rainwater

### Estimating Domestic Water Demand

The first step in designing a rainwater harvesting system is to consider the annual household water demand. To estimate water demand the following equation can be used :

$$\text{Demand} = \text{Water Use} \times \text{Household Members} \times 365 \text{ days}$$

For example, the water demand of one household is 31,025 litres per year when the average water use per person is 17 litres per day and the household has <sup>CHS</sup> 5 family members :

$$\text{Demand} = 17 \text{ litres} \times 5 \text{ members} \times 365 \text{ days} = 31,025 \text{ litres per year..}$$

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## RAINFALL DATA

The next step is to consider the total amount of available water, which is a product of the total annual rainfall and the roof or collection surface area. These determine the potential value for rainwater harvesting. Usually there is a loss caused mostly by evaporation (sunshine), leakage (roof-surface), overflow (rainwater that splashes over the gutters), and transportation (guttering and pipes). The local climatic conditions are the starting point for any design. Climatic conditions vary widely within countries and regions. The rainfall pattern or monthly distribution, as well as the total ~~amount~~ annual rainfall, often determine the possibility of constructing a RWH system. In a climate with regular rainfall throughout the year the storage requirement is low and the system cost will be low. It is thus very important to have insight into local (site-specific) rainfall data. The more reliable and specific the rainfall data is, the better the design can be. In mountainous locations and locations where annual precipitation is less than 500 mm per year, rainfall is very variable. Data from a rain gauging station 20 km away may be misleading when applied to your system location.

Rainfall data can be obtained from a variety of sources. The primary source should be the national meteorological organisation in the country. In some countries, however, ~~rainwater~~ rainfall statistics are limited

## STEP 2: Designing Your Catchment Area

Roofs provide an ideal catchment surface for harvesting rainwater provided they are clean. The roof surface may consist of many different materials. Galvanised corrugated iron sheets, corrugated plastic and tiles all make good roof catchment surfaces. Flat cement roofs can also be used. Traditional roofing materials such as grass or palm thatch may also be used. If a house or a building with an impermeable (resistant to rain) roof is already in place, the catchment area is available free of charge.

The roof size of a house or building determines the catchment area and runoff of rainwater. The collection of water is usually represented by a run-off coefficient (RC). The run-off coefficient for any catchment is the ratio of the volume of water that runs off a surface to the volume of rainfall that falls on the surface. A run-off coefficient of 0.9 means that 90% of the rainfall will be collected. So, the higher the run-off coefficient, the more rain will be collected. So, the higher the run-off coefficient, the more rain will be collected. An impermeable roof will yield a high run-off of good quality water that can be used for all domestic purposes: cooking, washing, drinking etc.

Thatched roofs can make good catchments, although run-off is low and the quality of the collected water is generally not good.

quite efficient but they tend to get more easily blocked with debris and leaves.

V-shaped gutters are usually tied directly under the roof or onto a so-called splash guard. V-shape gutters are often continue all the way to the tank without addition of the usual rounded downpipe section.

Wooden planks and bamboo gutters are usually cheap (or even free of charge).

These gutters do, however, suffer from problems of durability as the organic material will eventually rot away and leak. Their porous surfaces also form an ideal environment for accumulation of bacteria that may be subsequently washed into the storage tank.

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## RESULTS AND CURRENT STATUS

Currently in China and Brazil, rooftop rainwater harvesting is being practiced for providing drinking water, domestic water, water for livestock, water for small irrigation and a way to replenish ground water levels. Gansu province in China and semi-arid north east Brazil have the largest rooftop rainwater harvesting projects ongoing.

- In Bermuda, the law requires all new construction to include rainwater harvesting adequate for the residents.
- The U.S. Virgin Islands have a similar law.
- In Senegal and Guinea-Bissau, the houses of the Diola-people are frequently equipped with homemade rainwater harvesters made from local organic materials.
- In the Irrawaddy Delta of Myanmar, the groundwater is saline and communities rely on mud-lined rainwater ponds to meet their drinking water needs throughout the dry season. Some of these ponds are centuries old and are treated with great reverence and respect.
- Until 2009 in Colorado, water rights laws almost completely restricted rainwater harvesting, a property owner who captured rainwater was deemed to be stealing it from those who have rights to take water from the watershed. Now, residential well owners that meet certain criteria may obtain a permit to install a rooftop precipitation collection system (SBO9-080). Up to 10 large scale pilot studies may

# RAINWATER HARVESTING IS NOW MANDATORY

With several governments banning the use of ground water in construction and making it mandatory for residential projects to have water harvesting systems, most developers are meticulously following this directive, especially in Gurgaon. PUNIA writes

**D**uring the last 10 years, the world has witnessed a significant increase in the use of rainwater harvesting systems. This is due to the growing awareness of the benefits of rainwater harvesting, such as reducing water bills, conserving water, and protecting the environment. In many countries, rainwater harvesting is now mandatory for residential projects. In Gurgaon, India, the Government of Haryana has implemented a rainwater harvesting policy that requires all residential projects to have rainwater harvesting systems. This policy is part of the Gurgaon Urban Development Authority's (GUDA) efforts to conserve water and protect the environment. The policy states that all residential projects with a plot area of more than 1000 sq. m. must have a rainwater harvesting system. The system must be designed to collect rainwater from the roof of the building and store it in a tank. The water can then be used for various purposes, such as watering plants, flushing toilets, and washing cars. The policy also states that the rainwater harvesting system must be maintained and the water must be used for the intended purposes. The policy is a significant step towards conserving water and protecting the environment in Gurgaon.

In this article, we will explore the benefits of rainwater harvesting and how it can be implemented in residential projects. We will also discuss the challenges of rainwater harvesting and how they can be overcome. Rainwater harvesting is a simple and effective way to conserve water and protect the environment. It can be implemented in residential projects of all sizes and in all climates. By harvesting rainwater, we can reduce our dependence on municipal water supplies and save money on our water bills. Rainwater harvesting is also a sustainable way to use water, as it does not require the use of fossil fuels or other non-renewable resources. Rainwater harvesting is a win-win solution for everyone.

rainwater harvesting system. Unfortunately, the water is often lost to the ground or evaporates before it can be used. This is why it is important to have a rainwater harvesting system that is designed to collect and store rainwater. A rainwater harvesting system should be designed to collect rainwater from the roof of the building and store it in a tank. The tank should be made of a material that is resistant to rust and corrosion. The tank should also be protected from the sun and other weather conditions. The water in the tank should be filtered before it is used. This will help to remove any dirt or debris that may be in the water. Rainwater harvesting is a simple and effective way to conserve water and protect the environment. It can be implemented in residential projects of all sizes and in all climates. By harvesting rainwater, we can reduce our dependence on municipal water supplies and save money on our water bills. Rainwater harvesting is also a sustainable way to use water, as it does not require the use of fossil fuels or other non-renewable resources. Rainwater harvesting is a win-win solution for everyone.



Lanka rainwater harvesting forum is leading the Sri Lanka's initiative. Traditional methods of rainwater harvesting pits :- Recharge pits are constructed for recharging the shallow aquifer. These are constructed 1 to 2 m, wide and to 3 m. deep which are back filled with boulders, gravels, coarse sand.

Trenches :- These are constructed when the permeable stream is available at shallow depth. Trench may be 0.5 to 1 m. wide, 1 to 1.5 m deep and 10 to 20 m. long depending up availability of water. These are back filled with filter materials.

Dug Wells :- Existing dug wells may be utilised as recharge structure and water should pass through filter media before putting into dug well.

Hand Pumps :- The existing hand pumps may be used for recharging the shallow/deep aquifers, if the availability of water is limited. Water should pass through filter media before diverting it into hand pumps.

## OBSERVATION & FINDING

Principle # 1: Begin with long and thoughtful observation.

Principle # 2: Start harvesting rain at the top of your watershed, then work your way down.

Principle # 3: Always plan an overflow route, and manage overflow as a resource.

Principle # 4: Start with small and simple strategies that harvest the rain as close as possible to where it falls.

Principle # 5: Spread, slow and infiltrate the flow of water into the soil.

Principle # 6: Maximise living and organic groundcover.

Principle # 7: Maximize beneficial relationships and efficiency by "stacking functions".

## SUGGESTIONS

The system now functions with very little water, and serves as an example to community members as well as visitors to the reserve of appropriate irrigation and water management techniques. As the trees grow older and need less assistance, it is agreed that the community will locate the tank under the roof of the Visitor's center, harvesting rains that fall when the large surface.

CSB





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- <http://www.tn.gov.in/dth/rainwater.htm>
- <http://in.images.search.yahoo.com/search/images;-yft=A2okmLY91PhQ>

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# **PRACTICAL NOTE BOOK**

(Prepared for the Degree of B.Com. Honours in Accounting & Finance  
under the University of Calcutta)

## **SUBJECT: COMPUTERISED ACCOUNTING SYSTEM and E-FILING OF TAX RETURN**

### **Submitted by-**

Name of the Candidate : Snigdha Sarkar  
College Roll No : 73  
CU Registration no. : 513-1211-0567-20  
CU Roll no. : 201513-11-0017  
Name of the College : Sammilani Mahavidyalaya

### **Supervised by-**

Name of the Professors : *Smt.* Keya Saha  
Name of the College : Sammilani Mahavidyalaya

**MONTH & YEAR OF SUBMISSION**

**JUNE 2023**

Principal  
Sammilani Mahavidyalaya  
E.M.Bypass, Baghajatin  
Kolkata - 700 094

## Assignment 1: (MS ACCESS)

- 1) Create a database file and name it as StudentDetails.accdb
- a) Create a table STUDENTS as per following schema:

Field Name	Data Type	Size	Constraints
Registration No	Number	Long Integer	Primary Key
St Name	Text	50	
St DOB	Date/Time		
St City	Text	30	
Contact Number	Number	10	

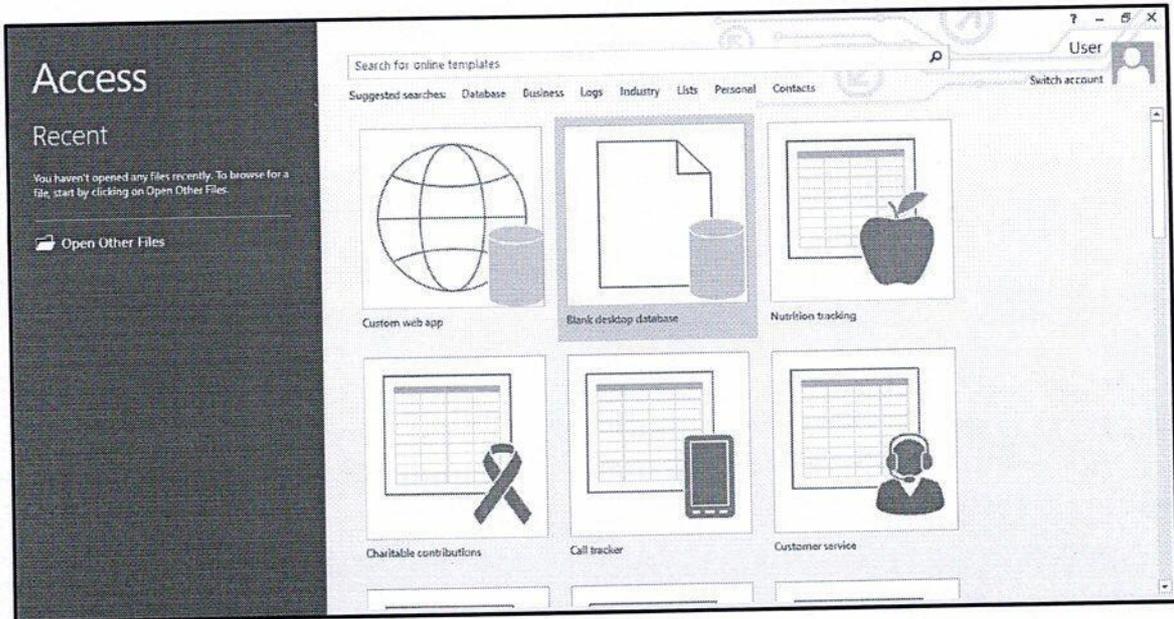
- b) Enter 10 Records in the table STUDENT:

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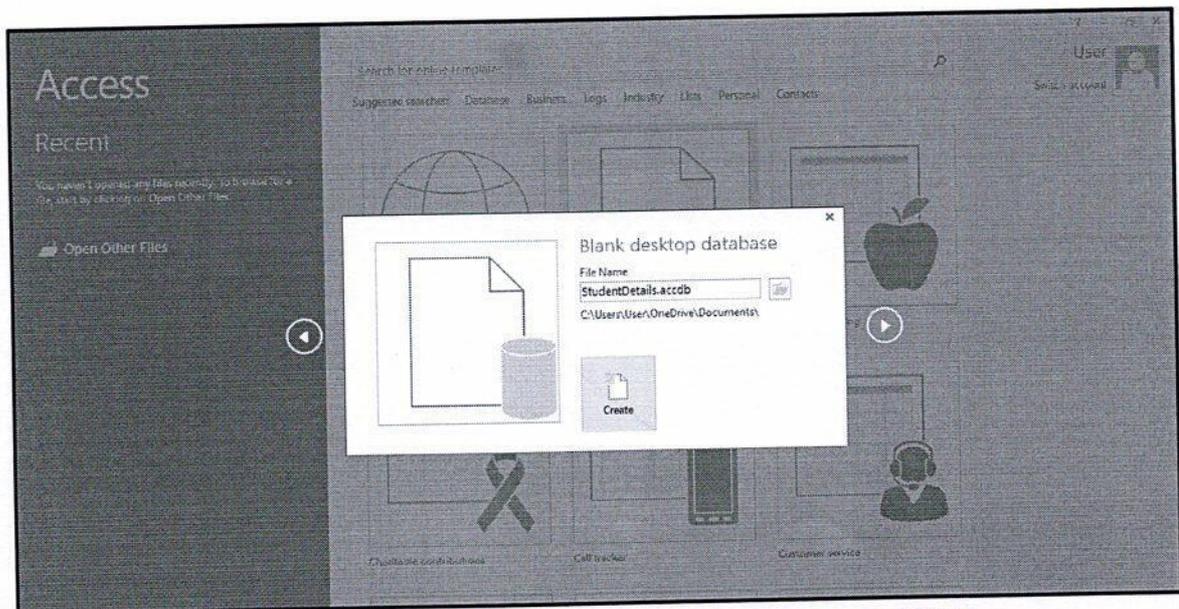
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- 1) Create a database file and name it as StudentDetails.accdb
- a) Create a table STUDENTS as per following schema:

i. Open Ms Access and Select Blank Desktop Database:



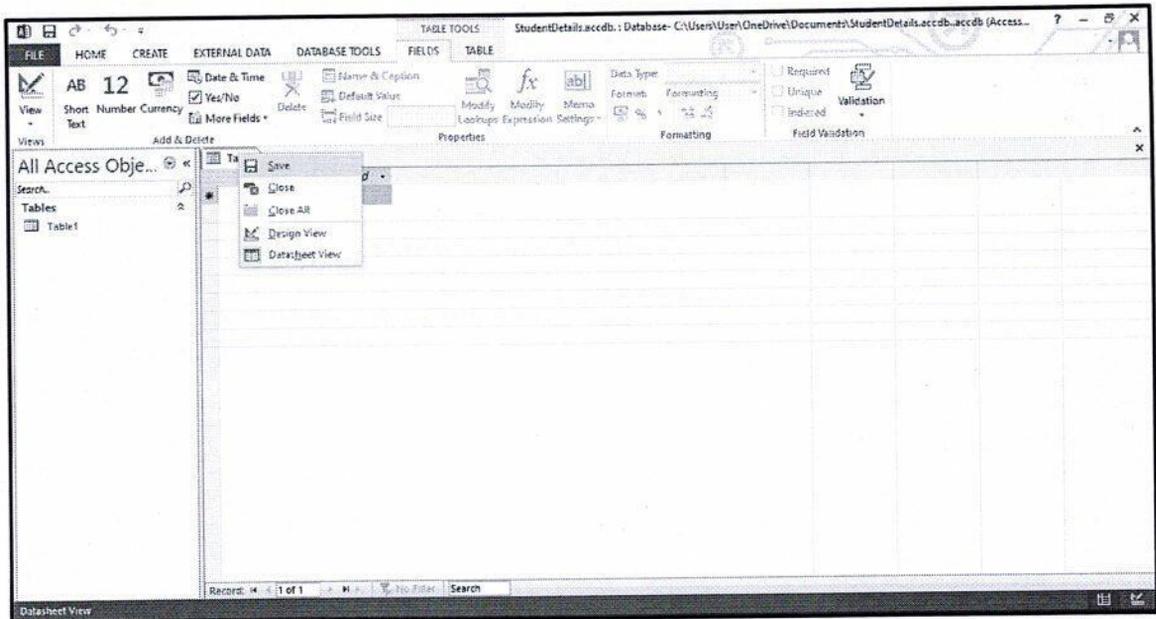
ii. Create a Database and name it as StudentDetails.accdb:



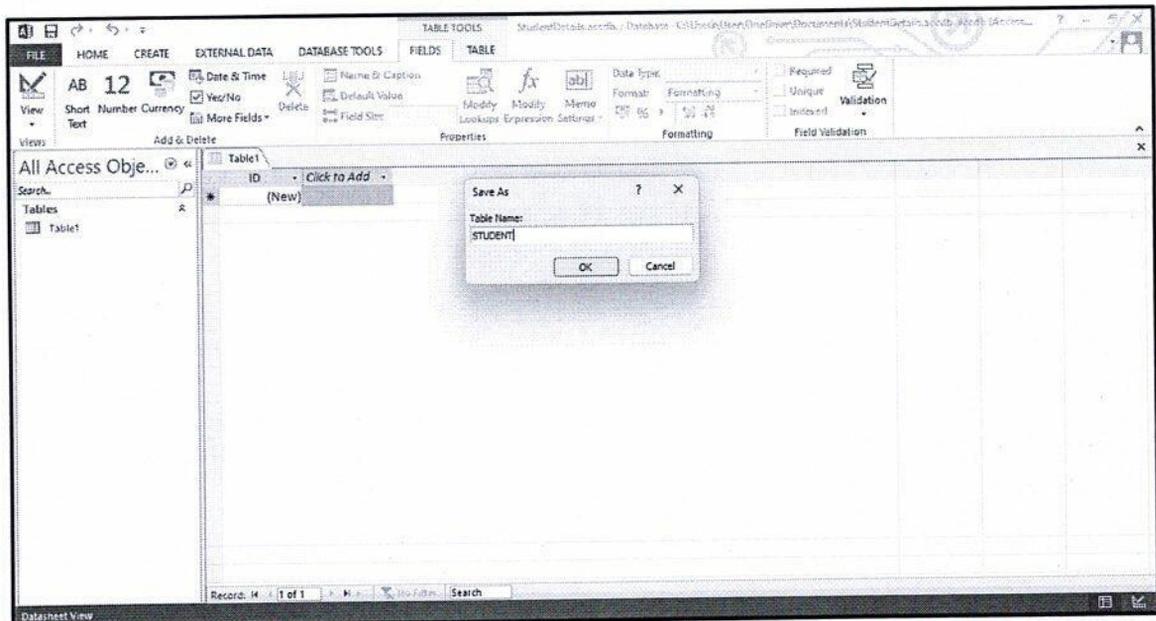
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iii. Tap on Table and select Save:



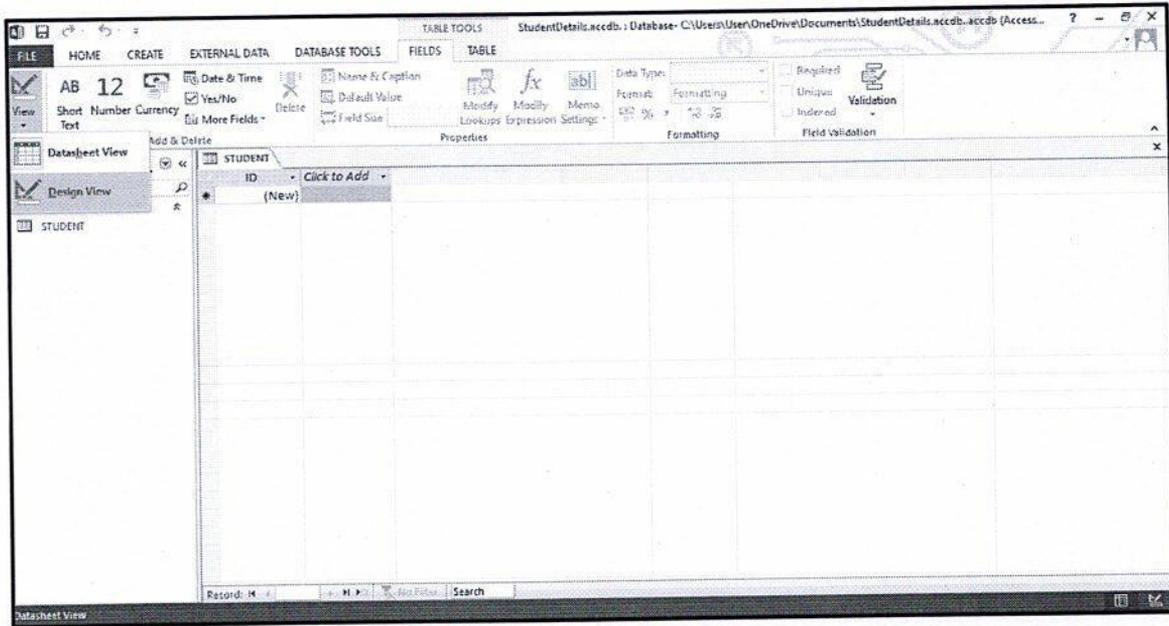
iv. Change the Table name as STUDENT:



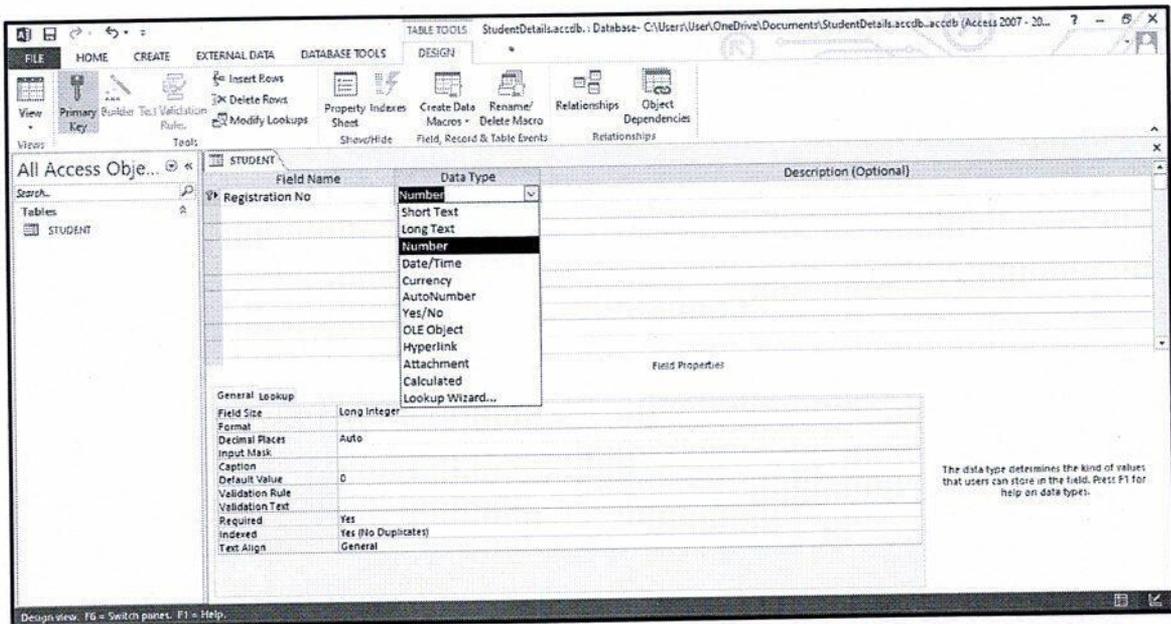
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v. Set the View as Design View:



vi. Set Field Name as Registration\_No:

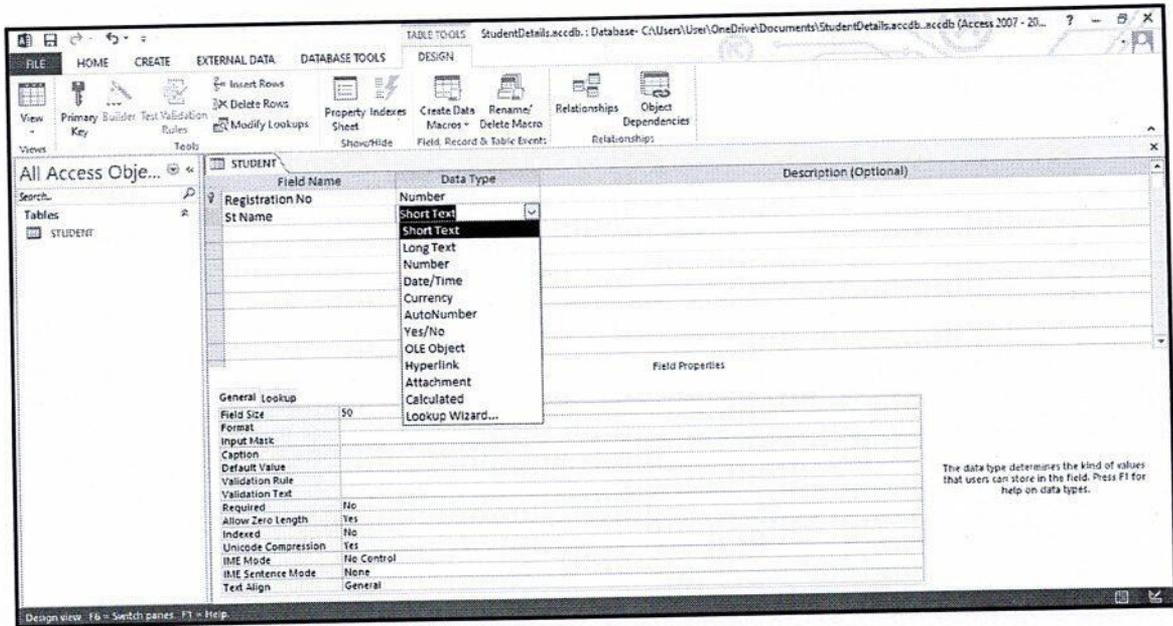


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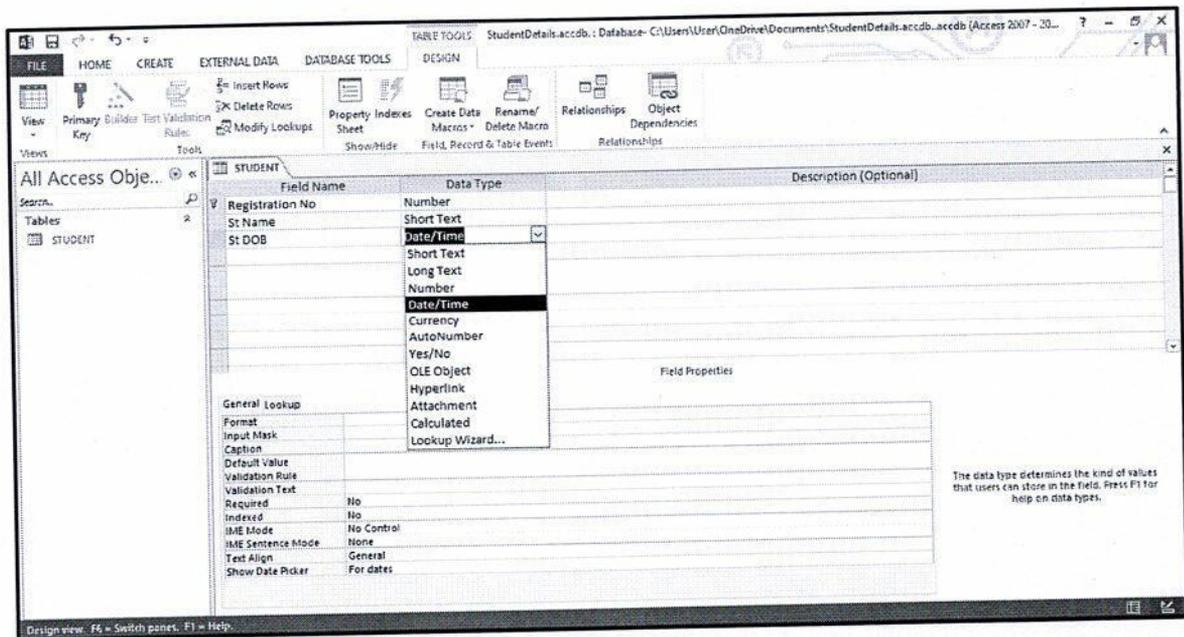
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vii. Set Field Name as St\_Name:



viii. Set Field Name as St\_DOB:

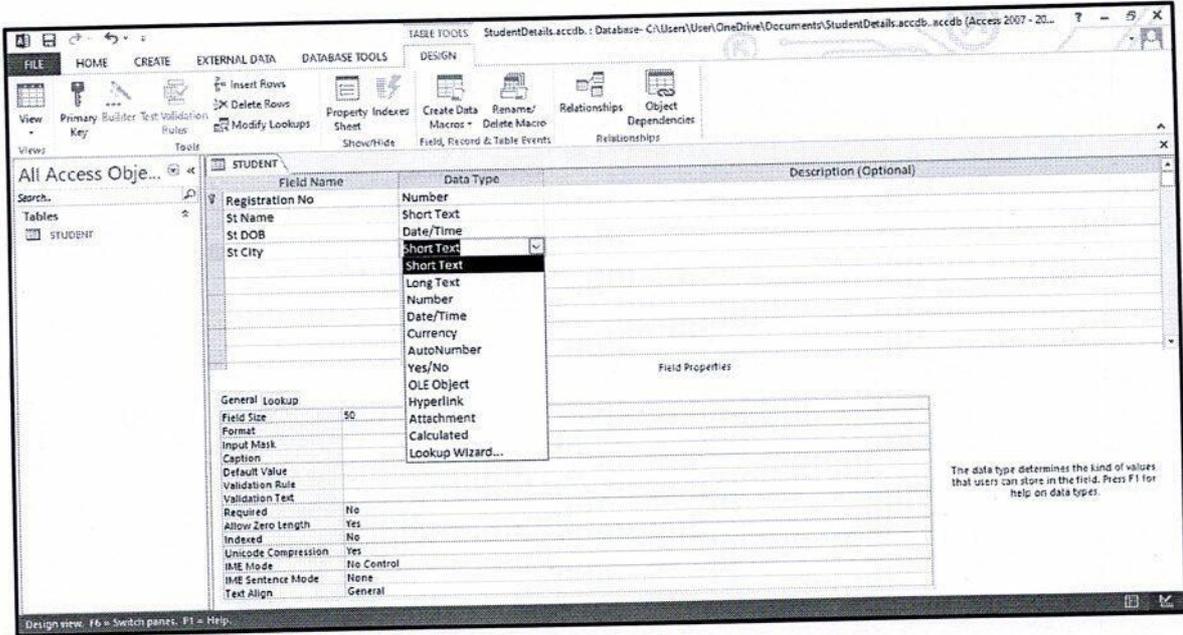


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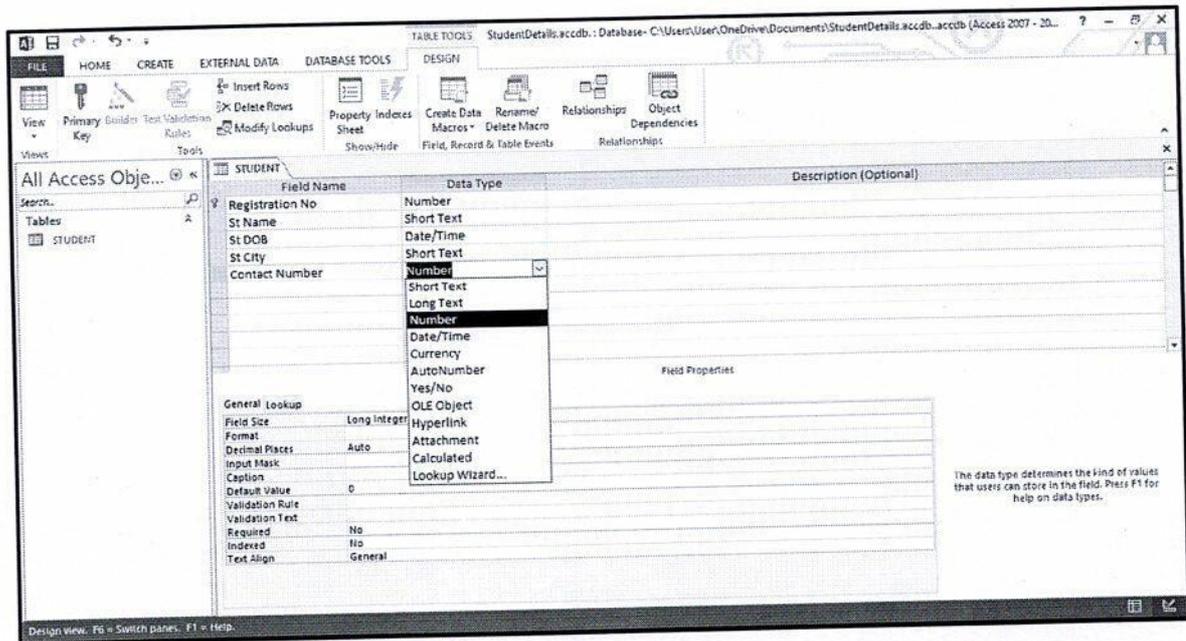
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ix. Set Field Name as St\_City:



x. Set Field Name as Contact\_Number:

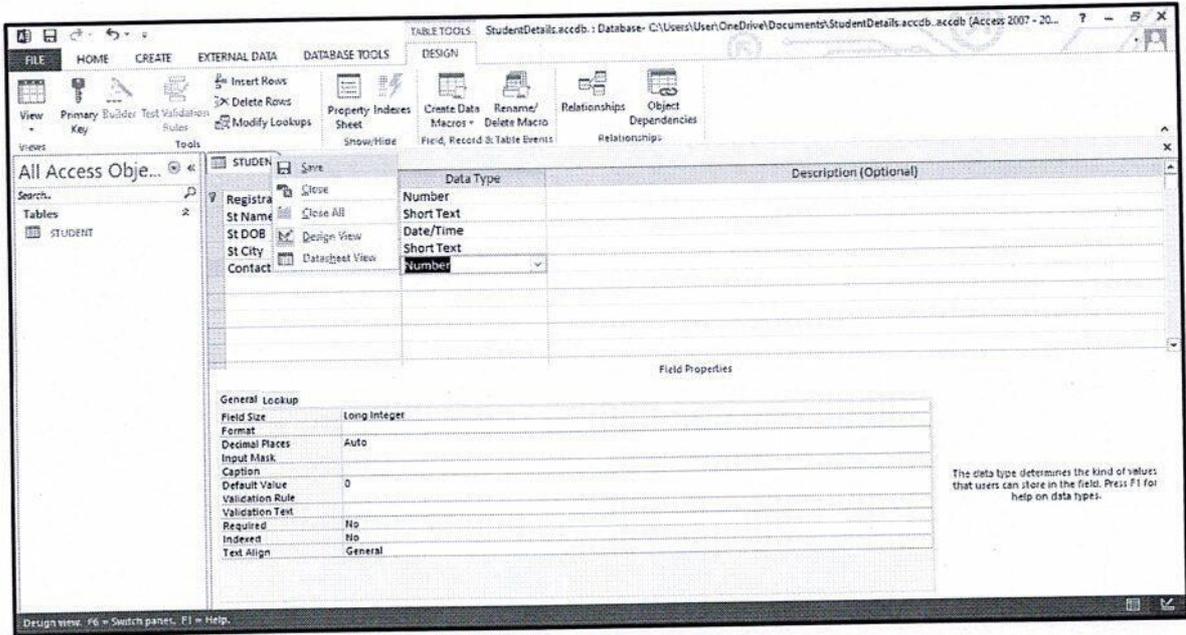


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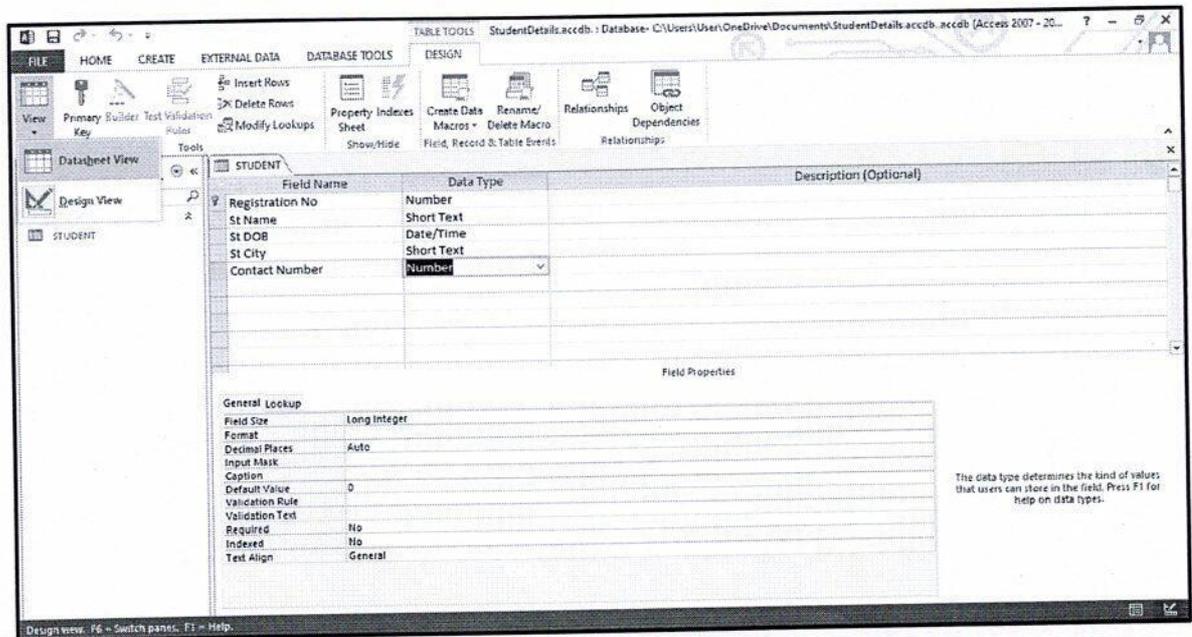
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xi. Save the Table Design:



b) Enter 10 Records in the table STUDENT:

i. Change the View as Database View:



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ii. Fill the table STUDENT as per student information:

The screenshot shows the Microsoft Access interface with the 'STUDENT' table open in Datasheet View. The table has the following columns: Registration, St Name, St DOB, St City, and Contact Nur. A single record is visible:

Registration	St Name	St DOB	St City	Contact Nur
1	Rupam Das	09-07-2001	Kolkata	982537102

iii. Enter 10 records in the Table:

The screenshot shows the Microsoft Access interface with the 'STUDENT' table open in Datasheet View. The table now contains 10 records:

Registration	St Name	St DOB	St City	Contact Nur
1	Rupam Das	03-07-2001	Kolkata	982537102
2	Suman Ghosh	07-04-2002	Ballygunge	783562926
3	Arka Neogi	19-01-2002	Kalighat	880736435
4	Sayan Maiti	25-10-2001	Rajarhat	975635367
5	Nildip Sanyal	06-12-2002	Alipore	786256126
6	Souvik Datta	17-05-2001	Bidhannagar	995632683
7	Arjun Pati	12-11-2001	Park Street	873562530
8	Anirban Gupta	05-10-2002	Hawrah	974676260
9	Rajat Basu	23-04-2001	New Town	987379622
10	Ayan Roy	02-07-2000	Esplanade	766537223

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## Assignment 2: (MS ACCESS)

Create a database named "Company" with two tables "Employees" and "Department". Follow the instructions below:

1) Table "Department" contains fields "Dept\_ID", "Dept\_Name", "Dept\_HeadOffice", "Annual\_Turnover".

Note:

- Dept\_ID is a primary key

2) Table "Employees" has fields "Emp\_ID", "Emp\_Name", "Emp\_DOB", "Gender", "Salary" and "Dept\_ID".

Note:

- The "Gender" field can take values among "Female", "Male", and "Others"
- Emp\_ID is Primary key
- Dept\_ID is foreign key referencing Dept\_ID of table Department.

3) Insert at least 5 records in both the tables such that the queries given below generate some rows as results.

4) Create queries for the following requirements:

- a) Display all employee names, employee id and salary.
- b) Display name(s) of employees of employees who earns more than Rs. 5000 per month salary.
- c) Display all Department Names along with the Head office City and Turnover.
- d) Display Employee ID, Employee Name, Department ID, and Department Name of all employees.
- e) Print name(s) of all Female Employees and their Date of birth.

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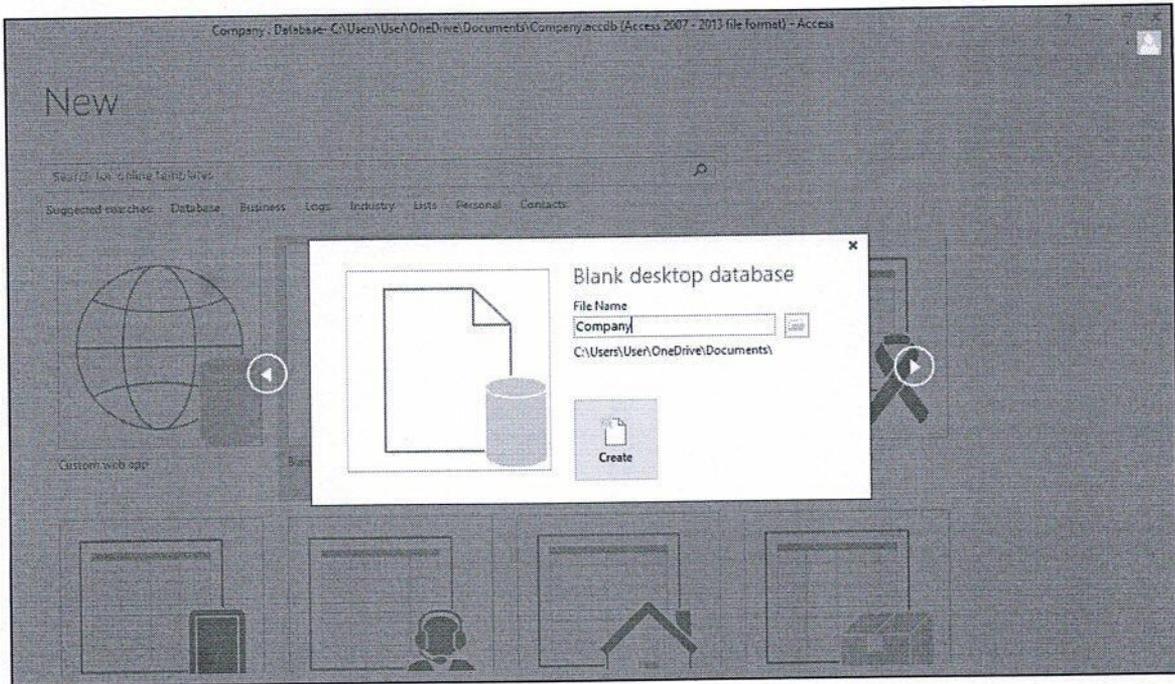
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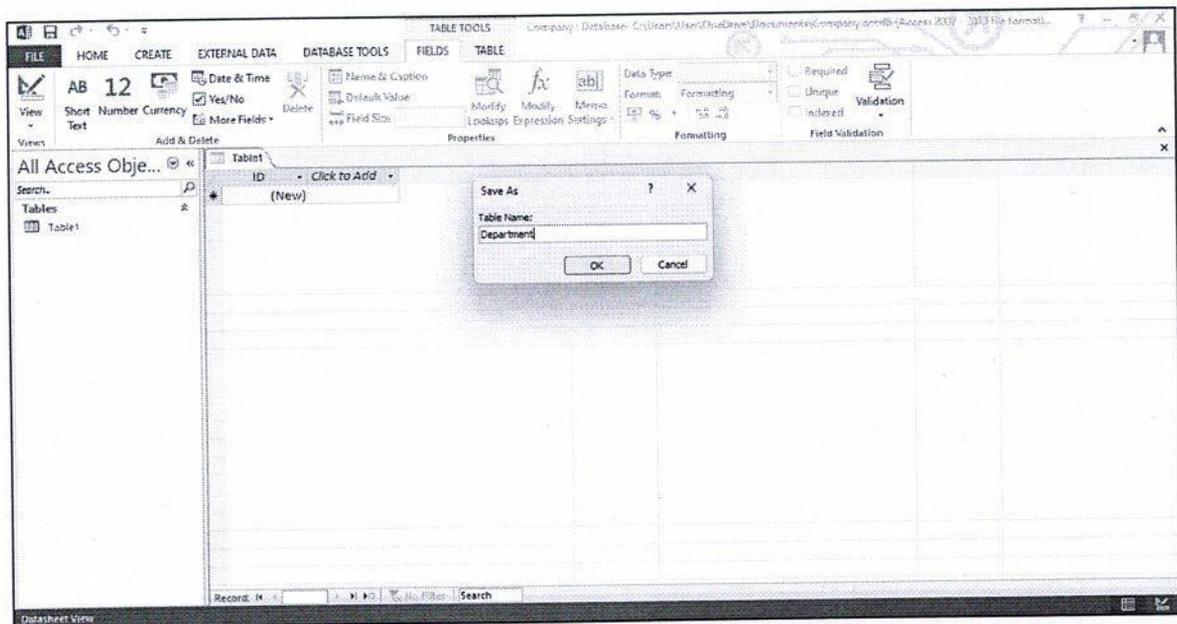
1) Table "Department" contains fields "Dept\_ID", "Dept\_Name", "Dept\_HeadOffice", "Annual\_Turnover".

a) Open Ms Access: Start > Ms Access > Select Blank Desktop Database

b) Create a Database and name it as Company:



c) Select Design View and set the Table as Department:

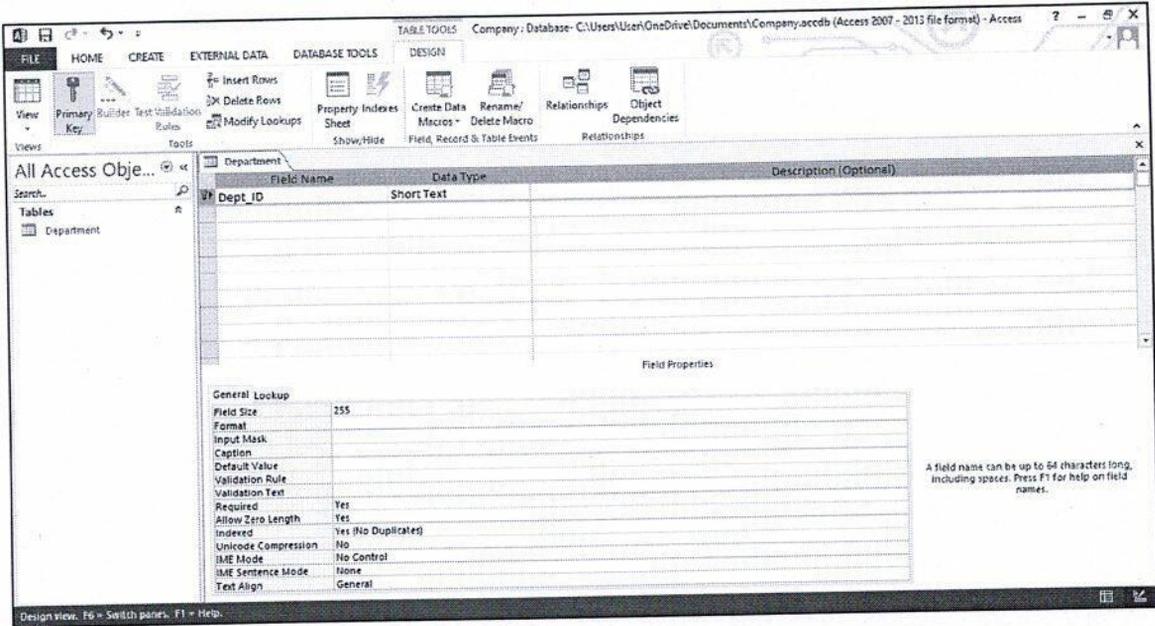


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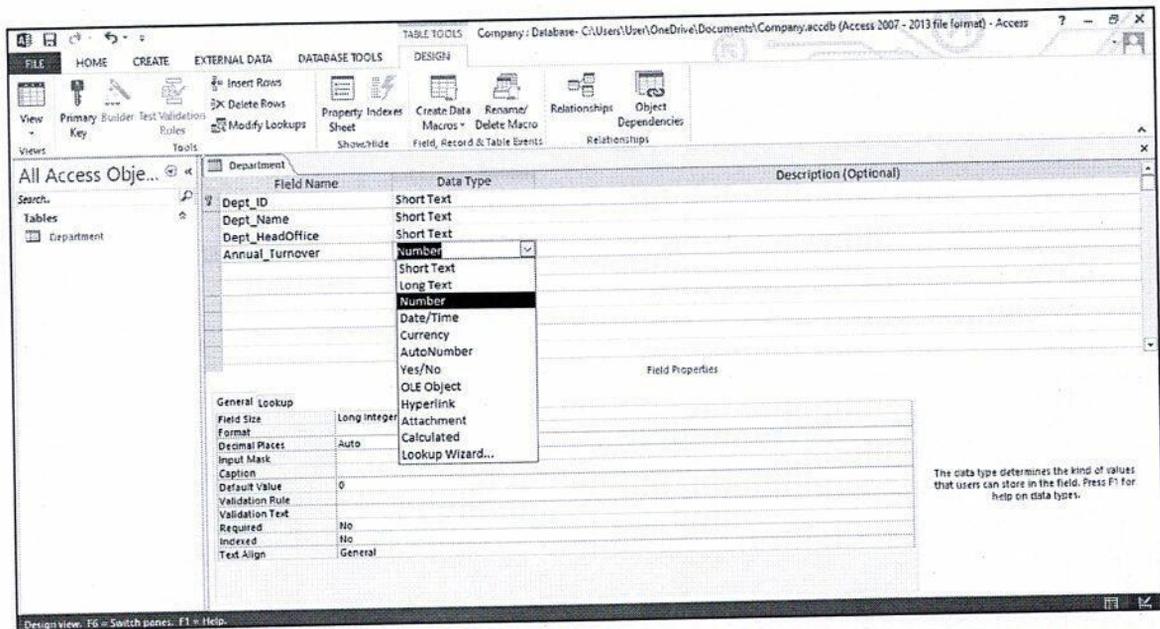
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d) Set Dept\_ID as Primary Key:



e) Fill the Fields as Dept\_Name, Dept\_HeadOffice, and Annual\_Turnover:



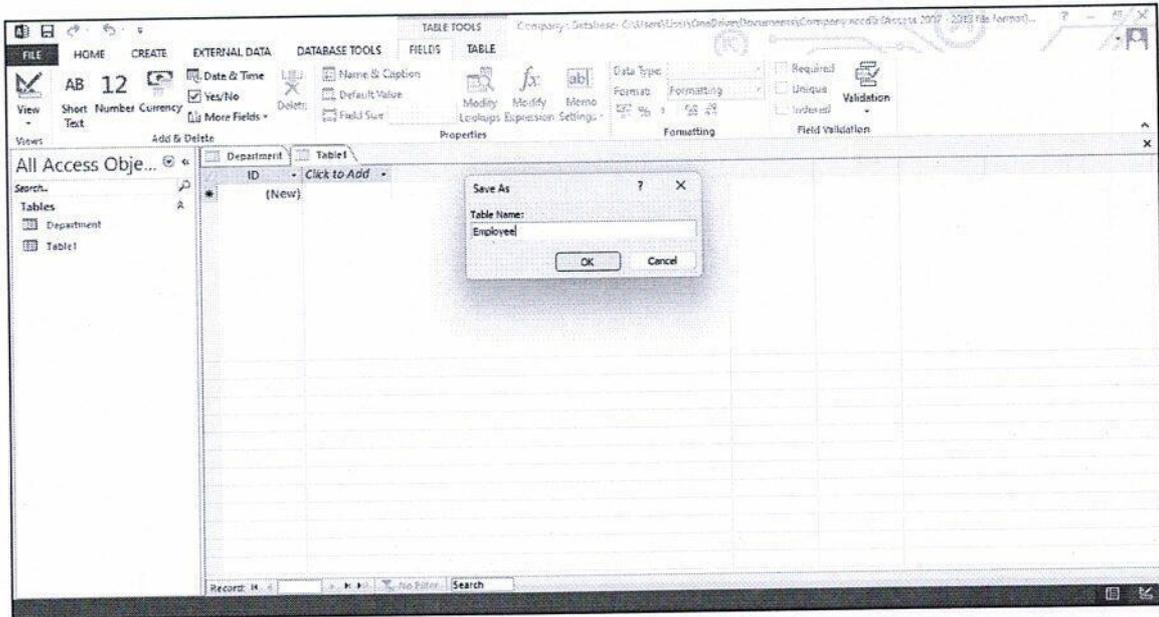
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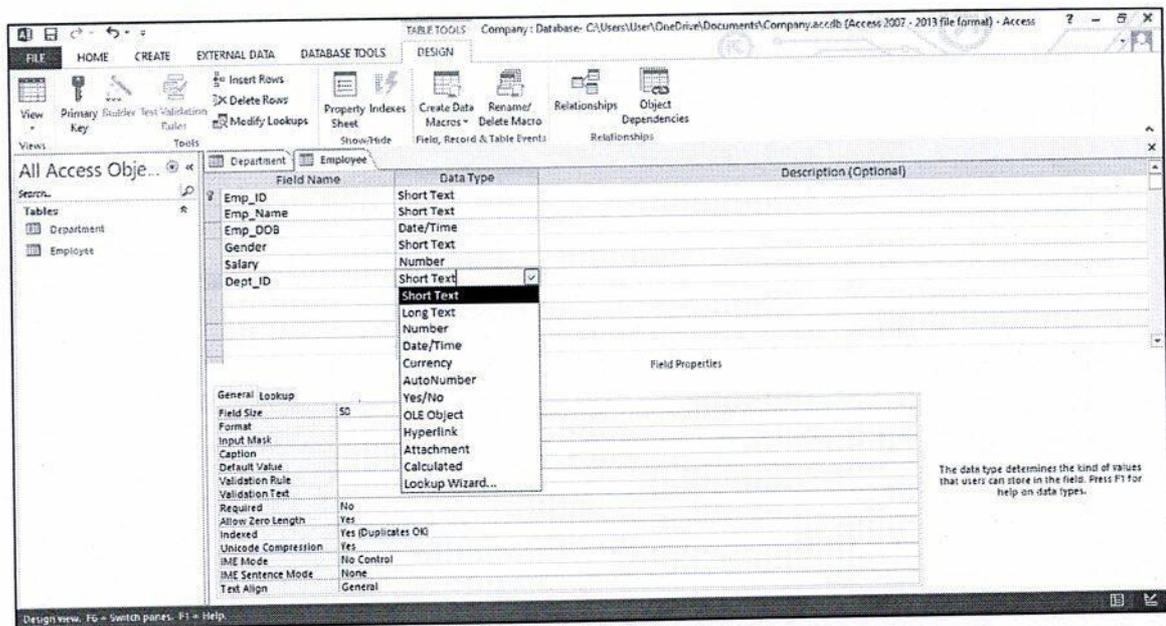
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2) Table "Employees" has fields " Emp\_ID ", "Emp\_Name", "Emp\_DOB", "Gender","Salary" and "Dept\_ID".

a) Create Tab > Table > Design View > Set the Table name as Employee:



b) Fill the Fields as Emp\_ID, Emp\_Name, Emp\_DOB, Salary, Gender, and Dept\_ID:

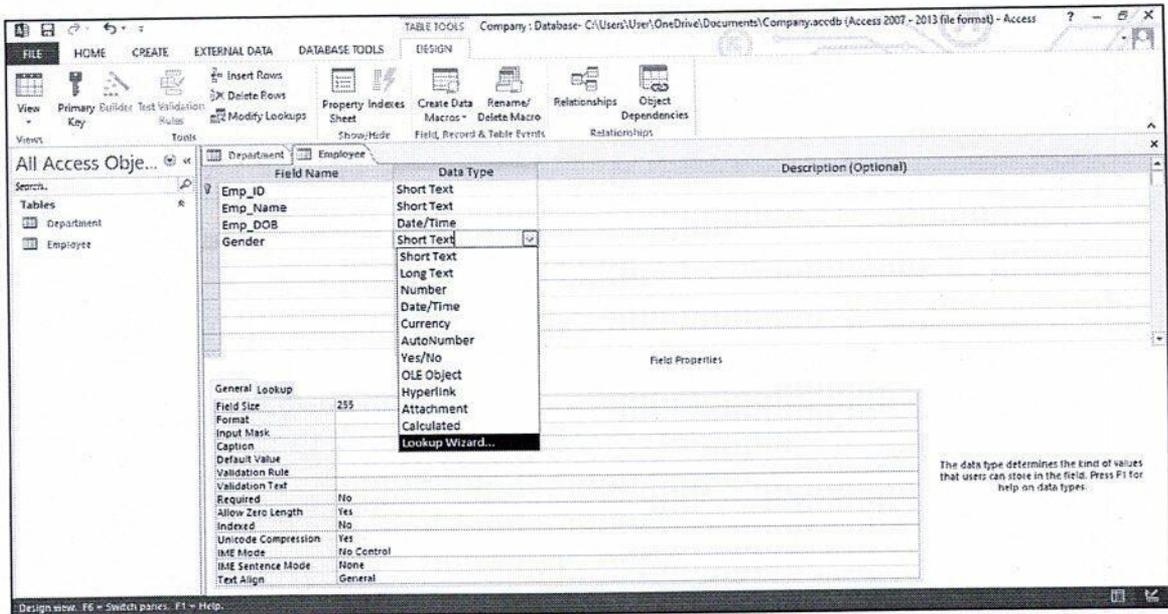


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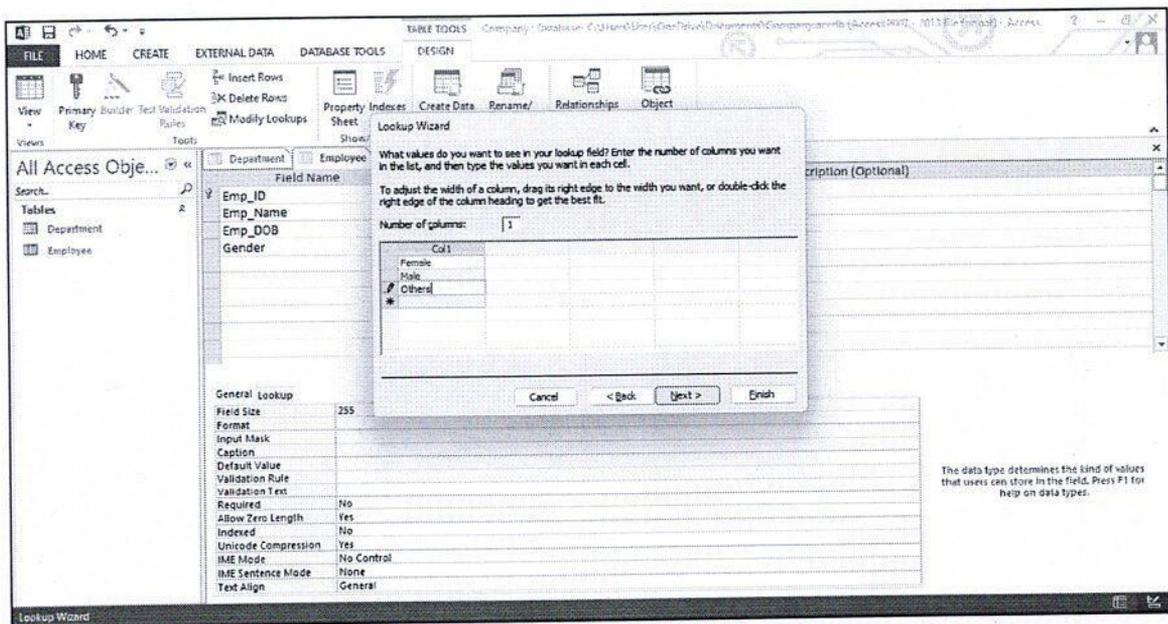
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c) Select Lookup Wizard to modify the Gender Data Type preferences:



d) Choose the second option from the appeared dialogue box > Next > Fill the lookup Field > Next:

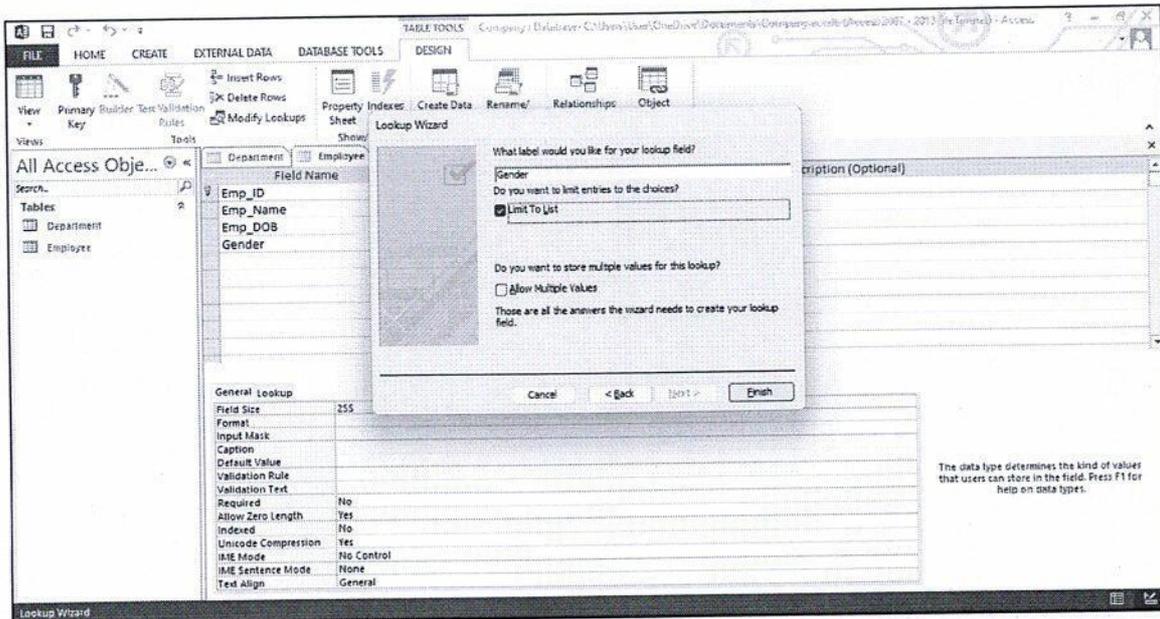


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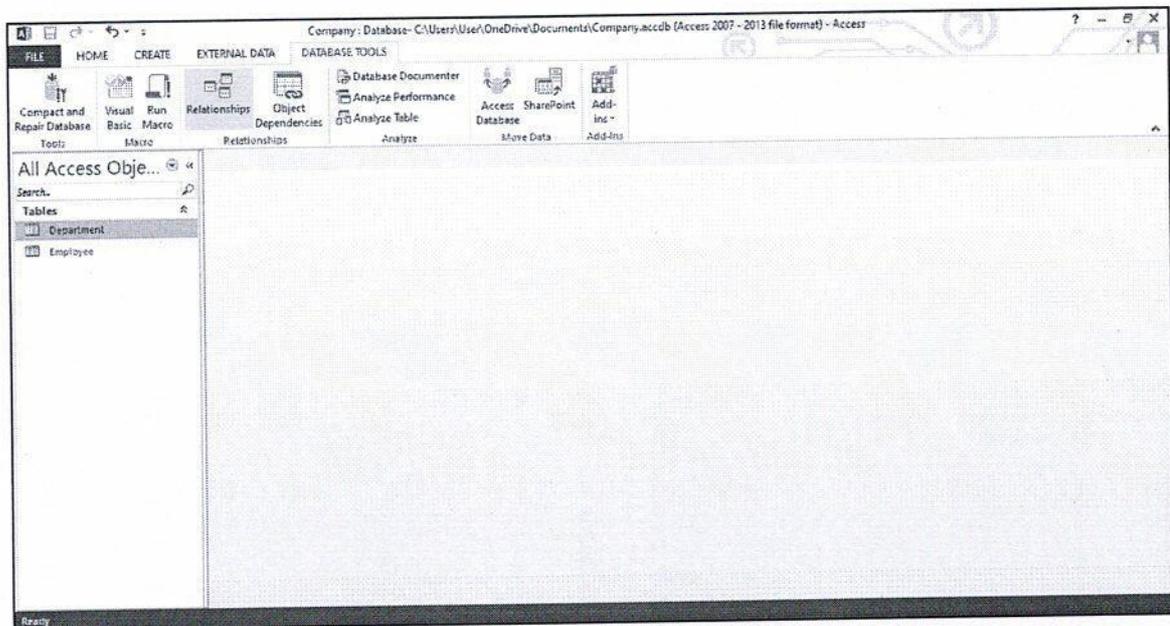
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e) Mark as Tick in Limit To List box and Finish the Lookup Process:



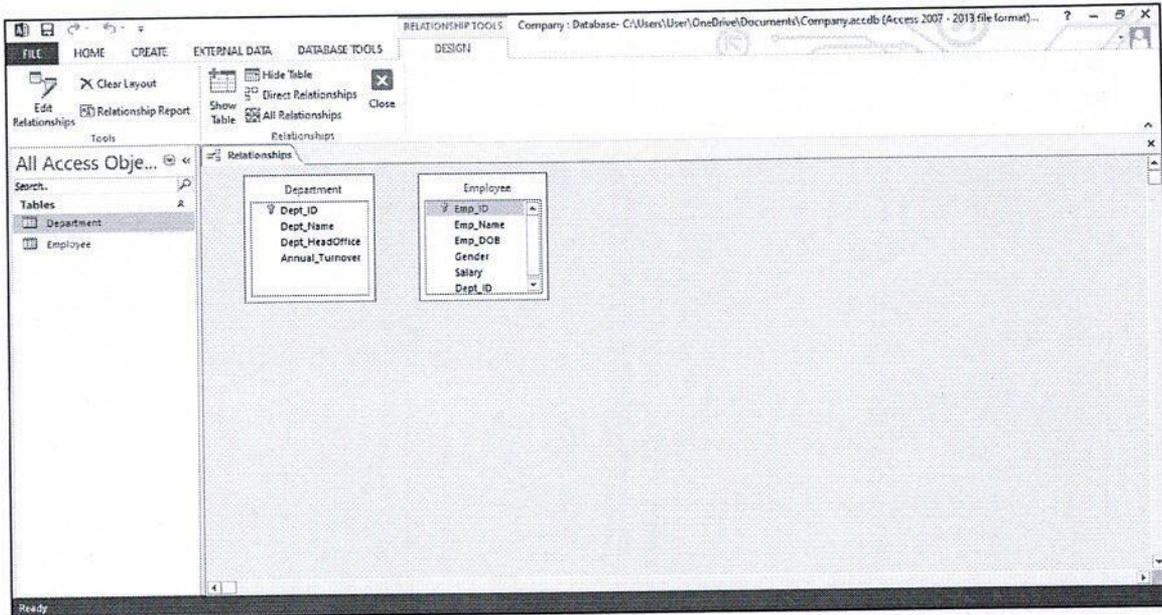
f) Save and close both the tables Department and Employee > Database Tools Tab > Relationships:



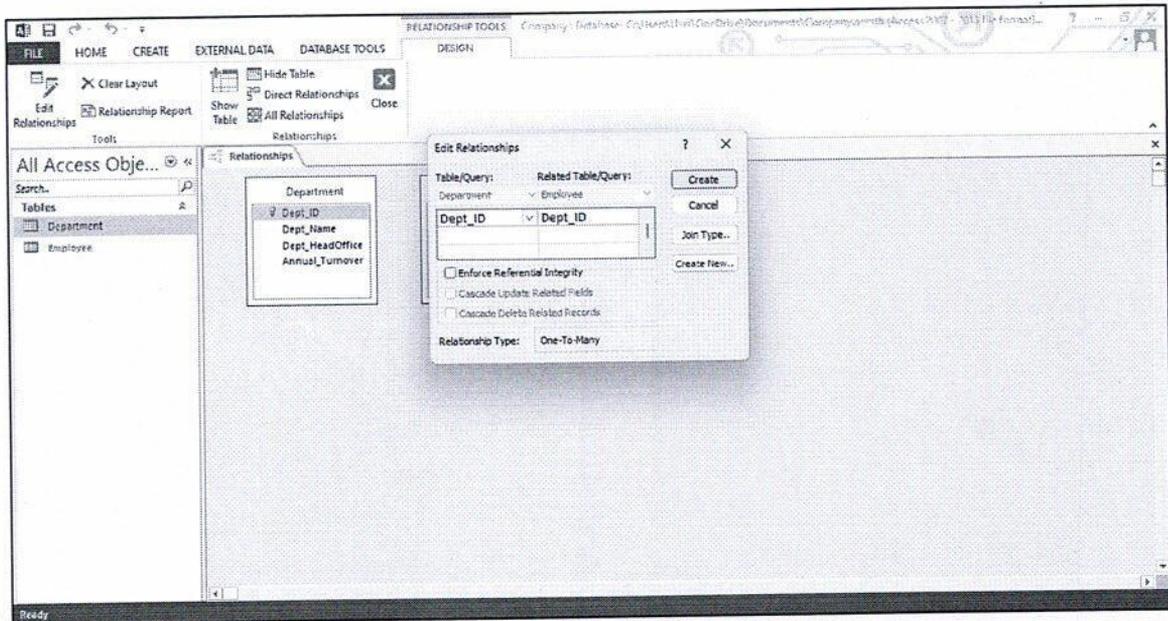
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g) Select Both > Add > Relationship between Department and Employee:



h) Drag and Drop the Dept\_ID of Department Table to Dept\_ID of Employee Table > Create:

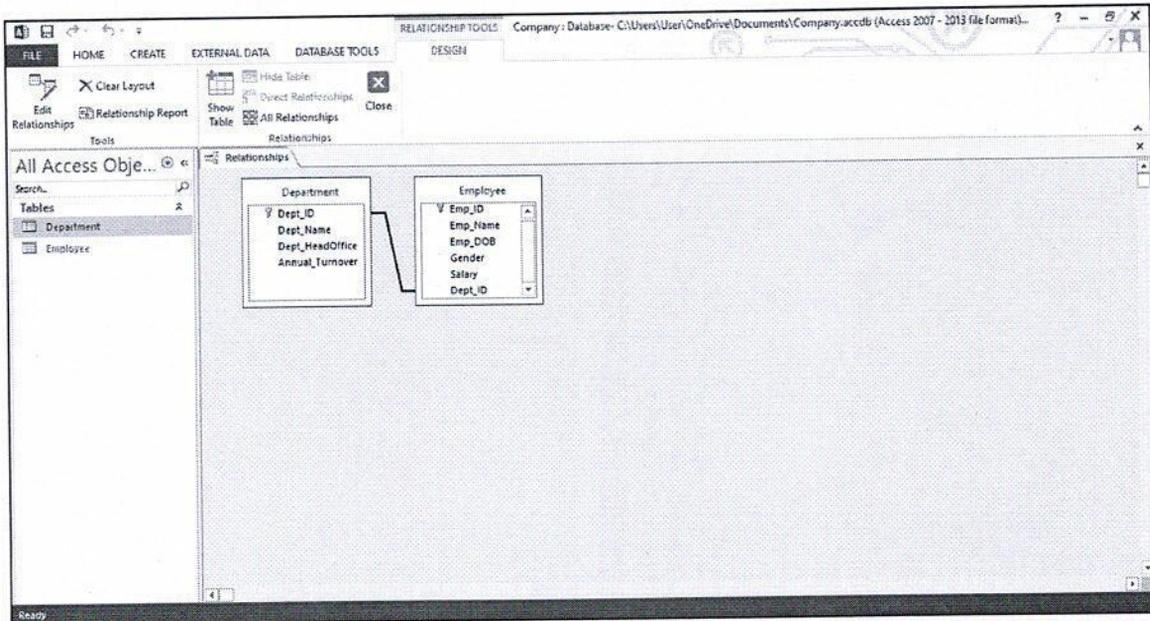


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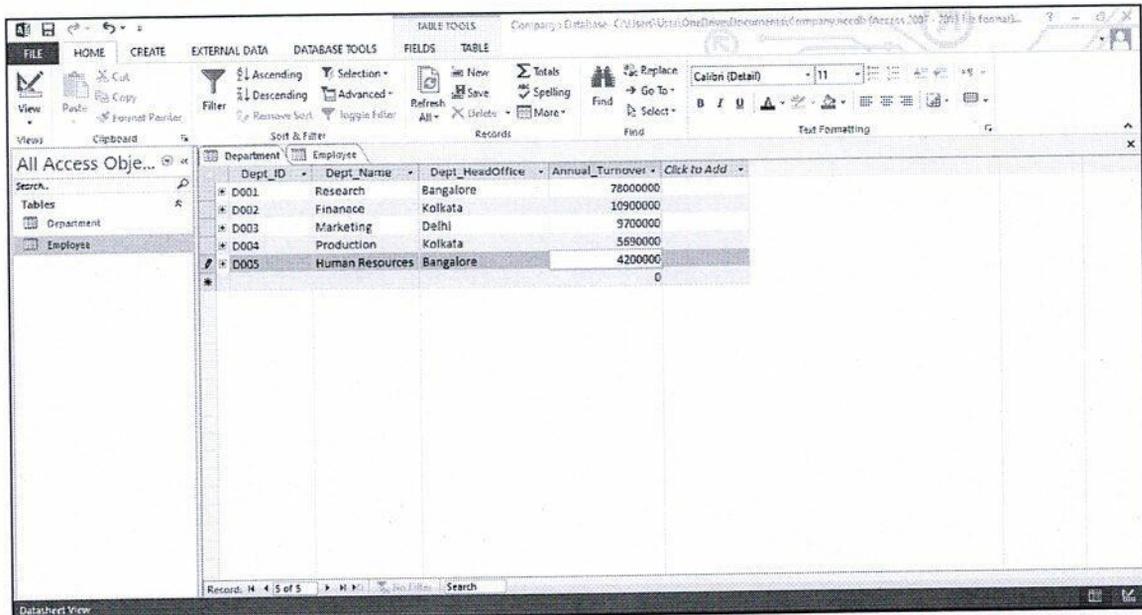
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i) Dept\_ID of Employee Table is now the Foreign Key of Department Table regarding its Dept\_ID > Save the Relationship > Close:



3) Insert at least 5 records in both the tables such that the queries given below generate some rows as results.

a) 5 records in the table Department:

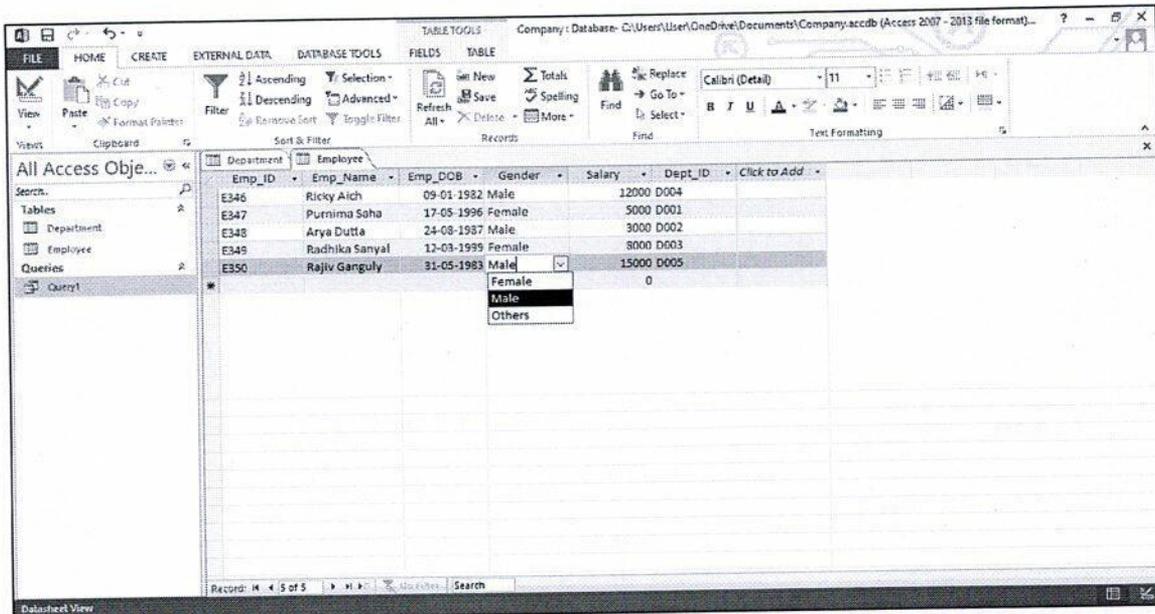


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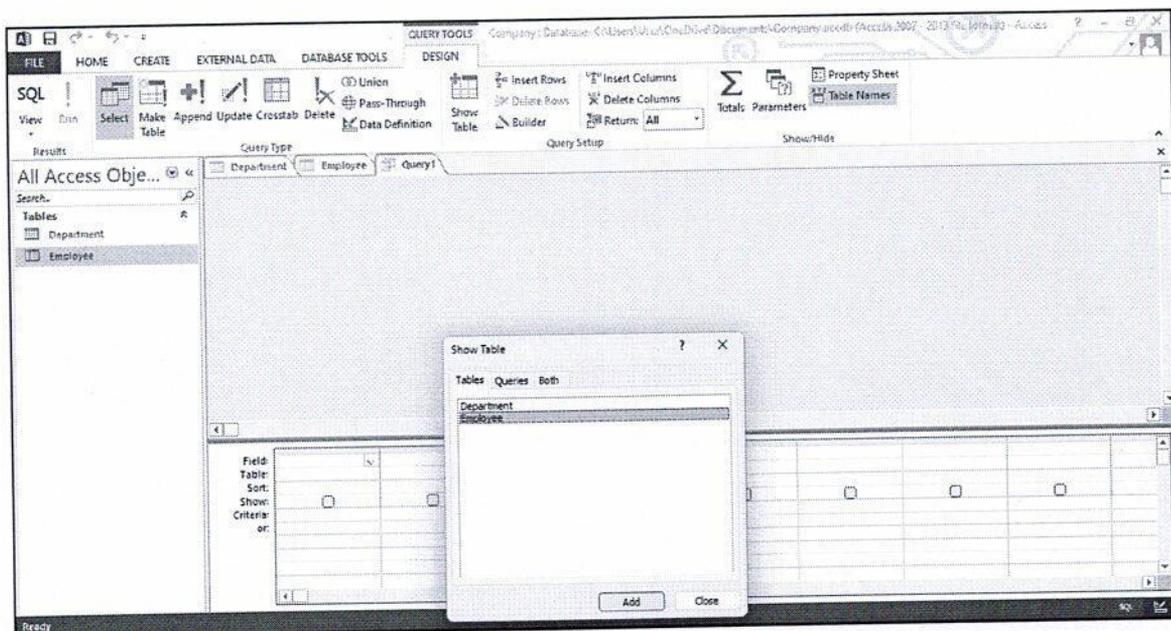
b) Enter 5 records in the table Employee:



4) Create queries for the following requirements:

A) Display all employee Names, Employee Id and Salary.

i) Create Tab > Query Design > Select Employee from Table > Add:

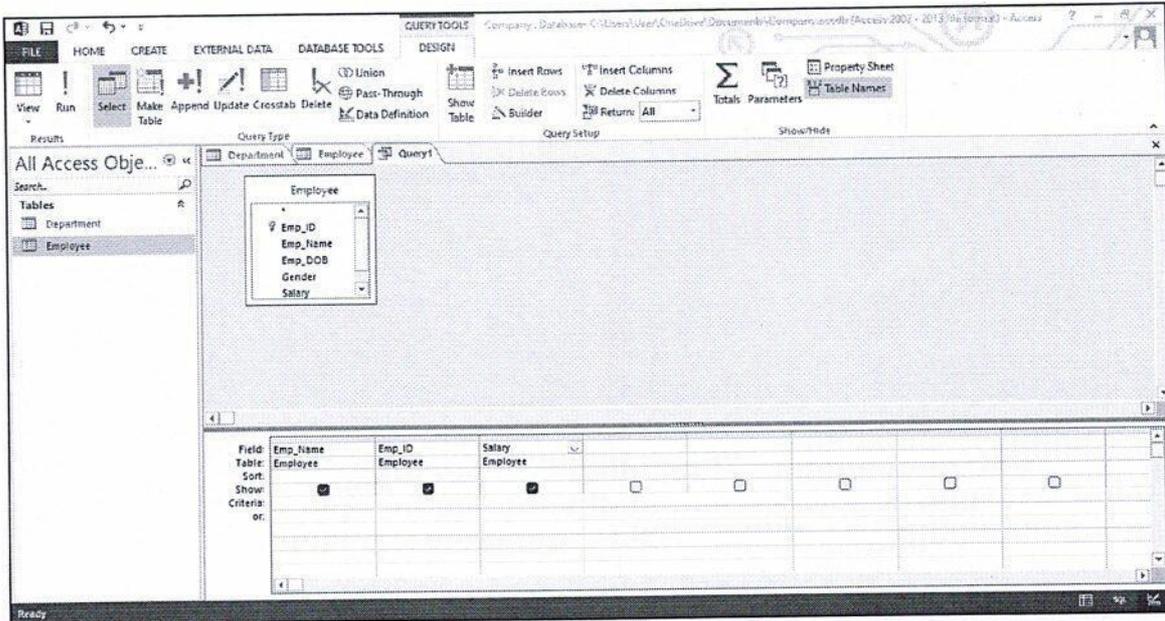


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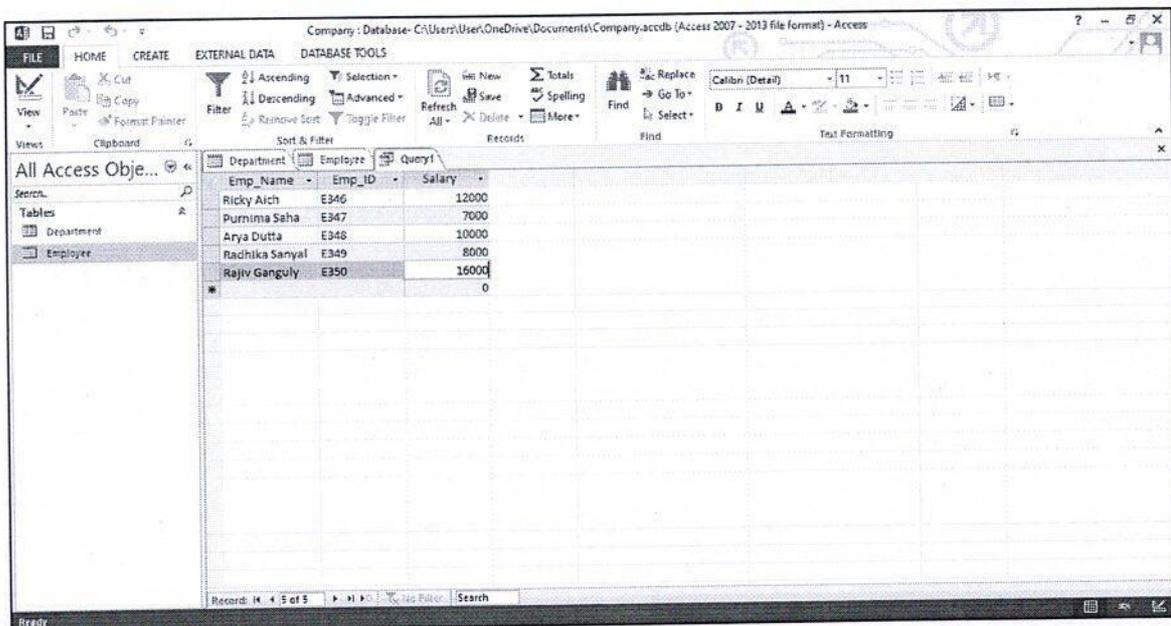
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ii) Fill the Field names as Emp\_Name, Emp\_ID, and Salary > Run:



iii) Query 1: displaying all Employee Names, Employee Id and Salary:



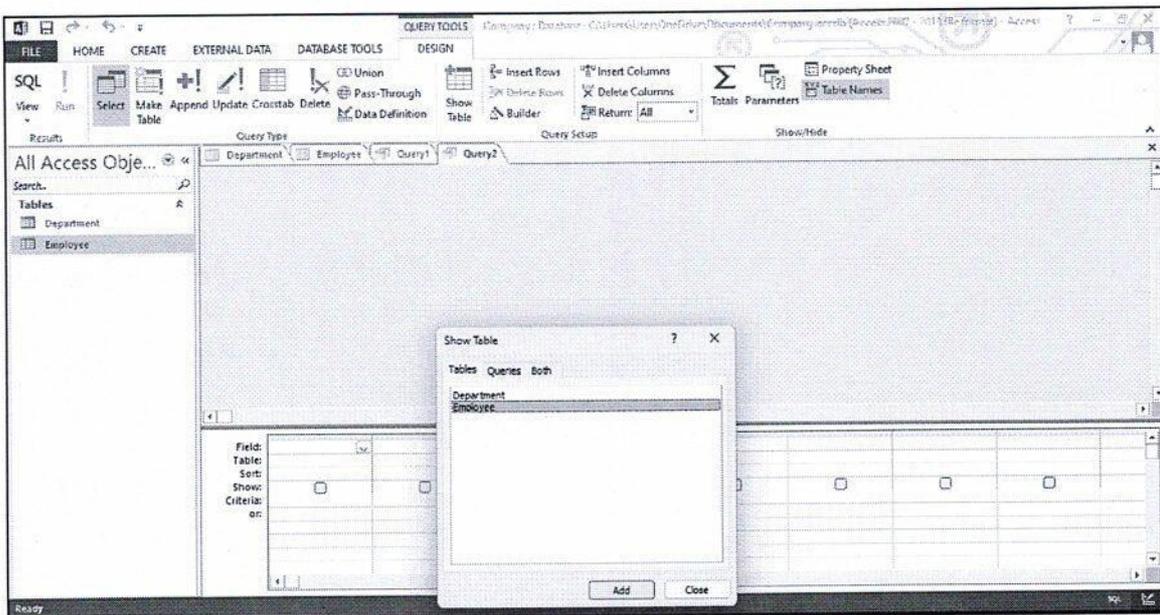
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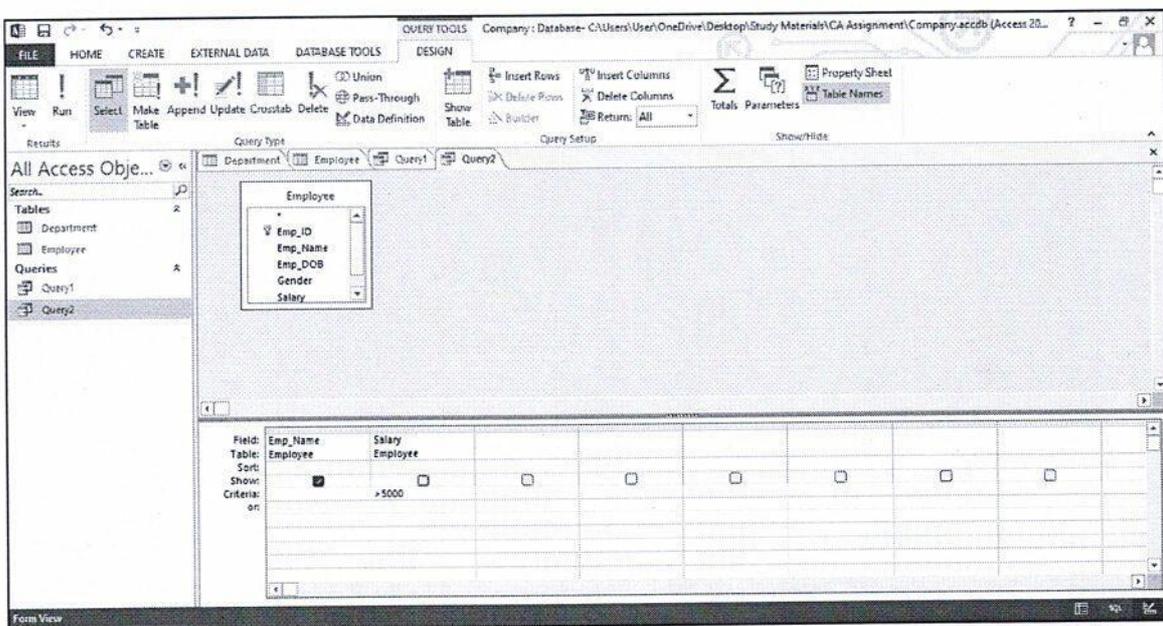
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B) Display name(s) of employees who earns more than Rs. 5000 per month salary.

i) Create Tab > Query Design > Select Employee from Table > Add:



ii) Fill the query field as Emp\_Name and Salary > Set the Criteria of Salary as [ $>5000$ ] > Remove the Blue Tick from Show > Run:

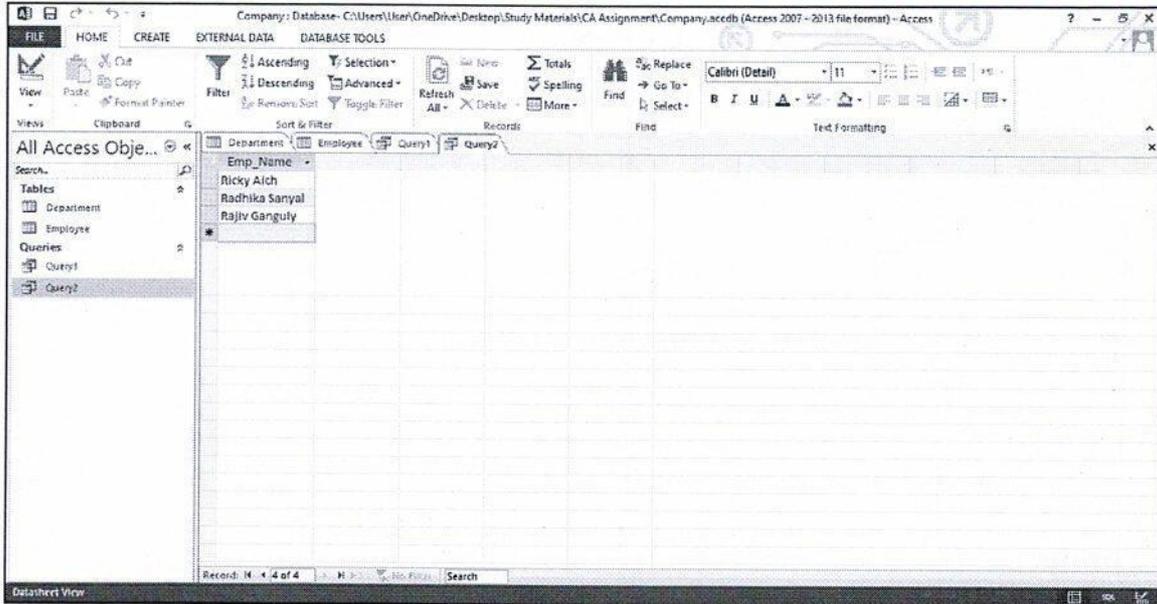


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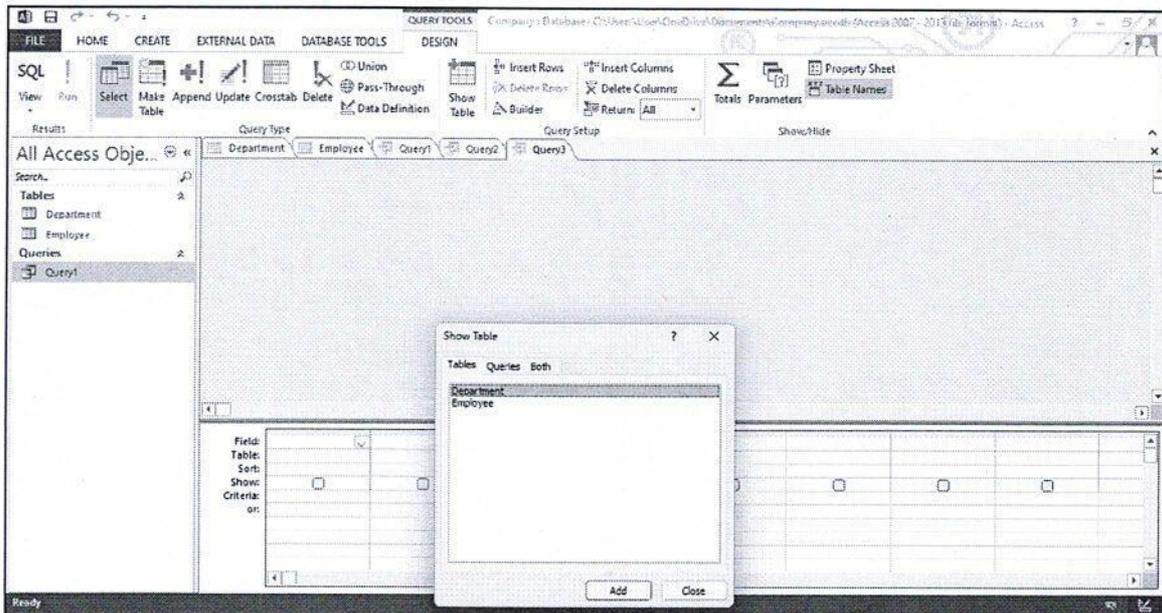
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iii) Query 2 for displaying only Names of the Employees who earns more than 5000:



C) Display all Department Names along with the Head Office City and Turnover.

i) Create Tab > Query Design > Select Department from Table > Add:

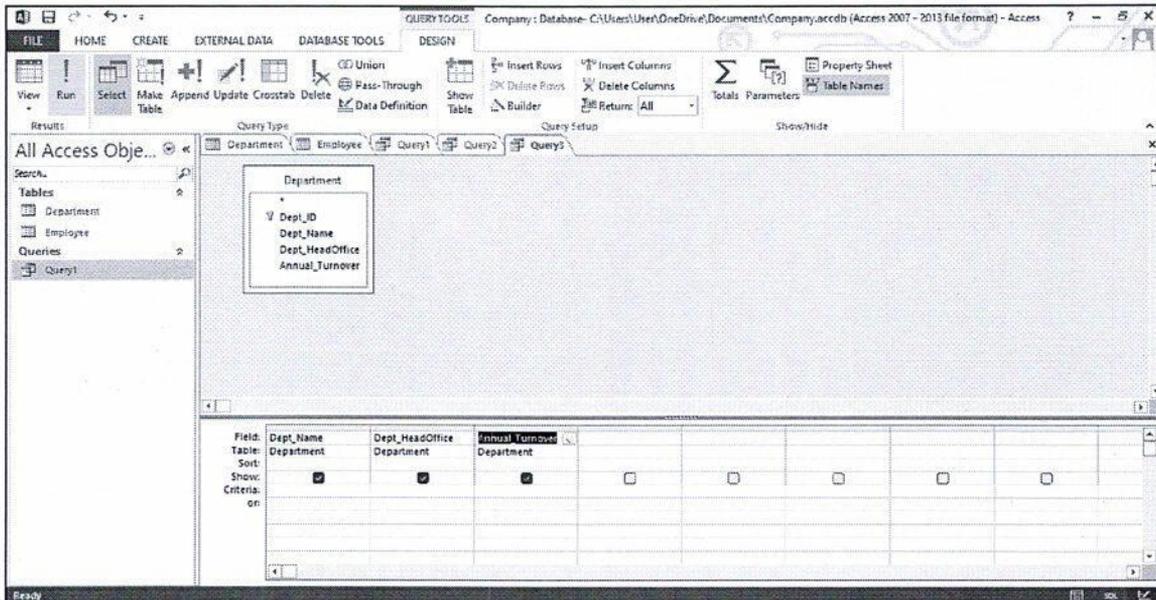


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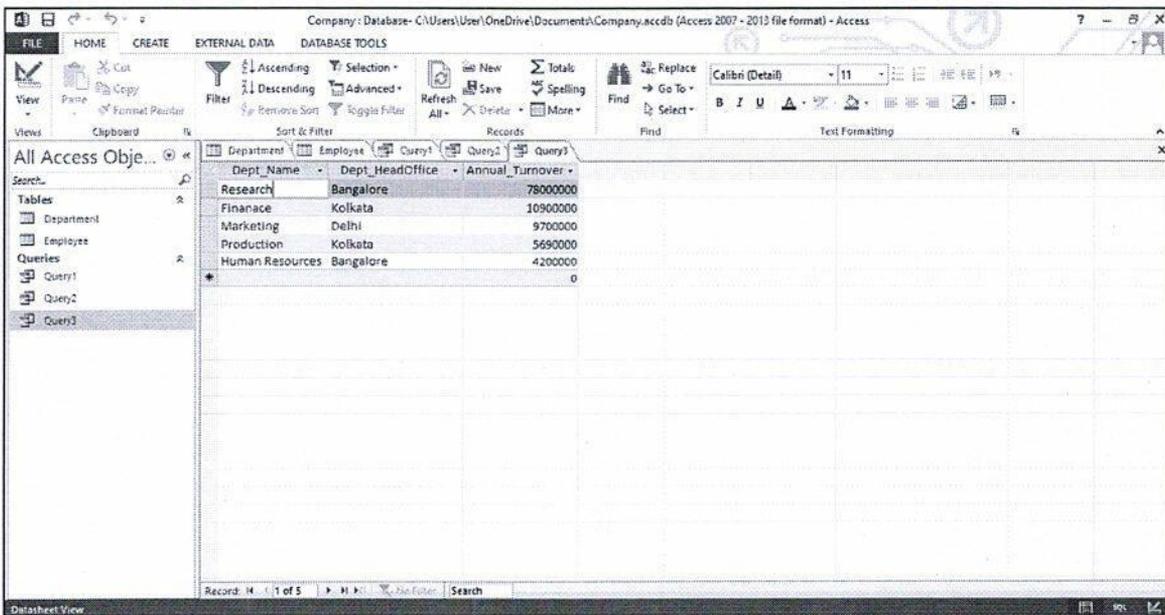
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iii) Fill the Fields as Dept\_Name, Dept\_HeadOffice, and Annual\_Turnover > Run:



iv) Query 3 for displaying Department Names along with the Head Office City and Turnover:



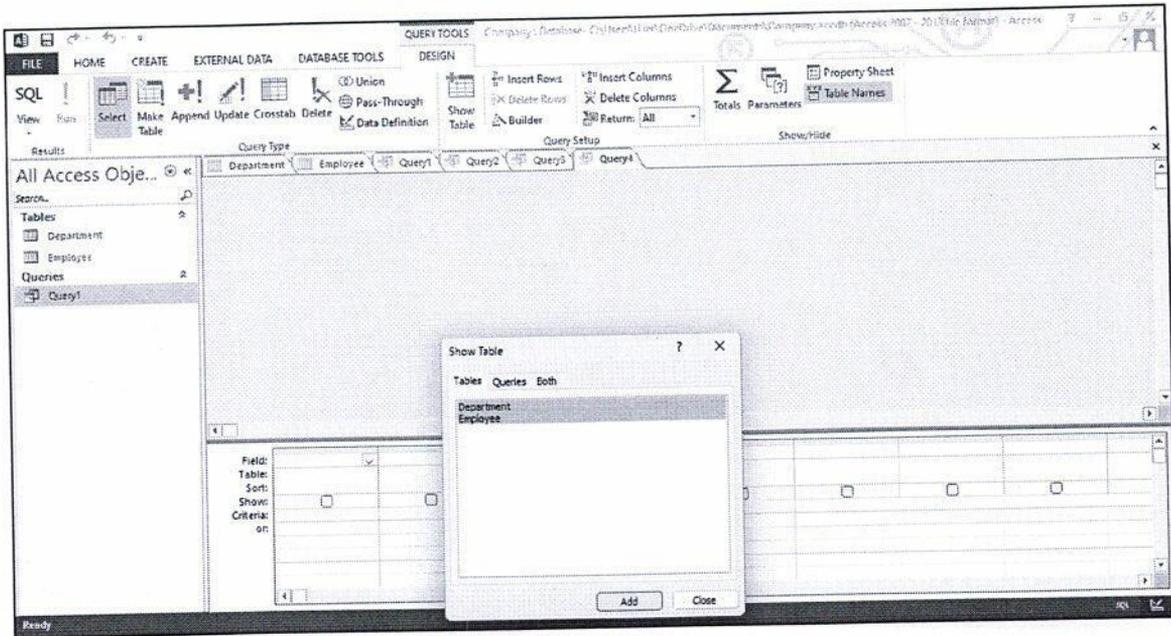
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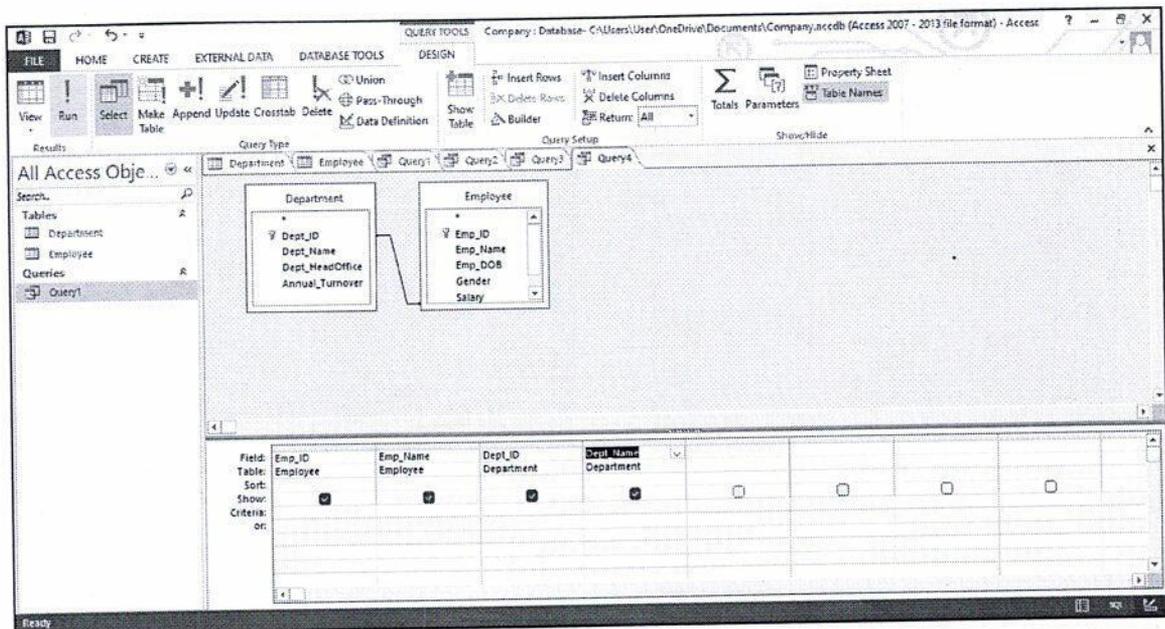
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D) Display Employee ID, Employee Name, Department ID, and Department Name of all employees.

i) Create Tab > Query Design > Department and Employee from Table > Add:



ii) Fill the fields as Emp\_ID, Emp\_Name, Dept\_ID, and Dept\_Name > Run:

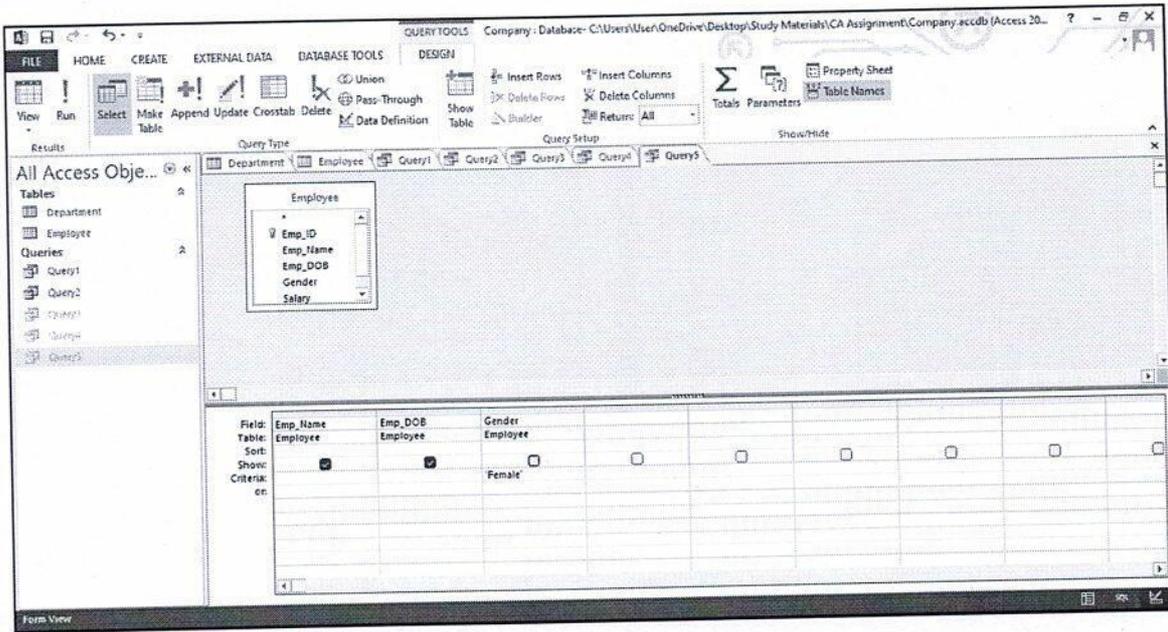


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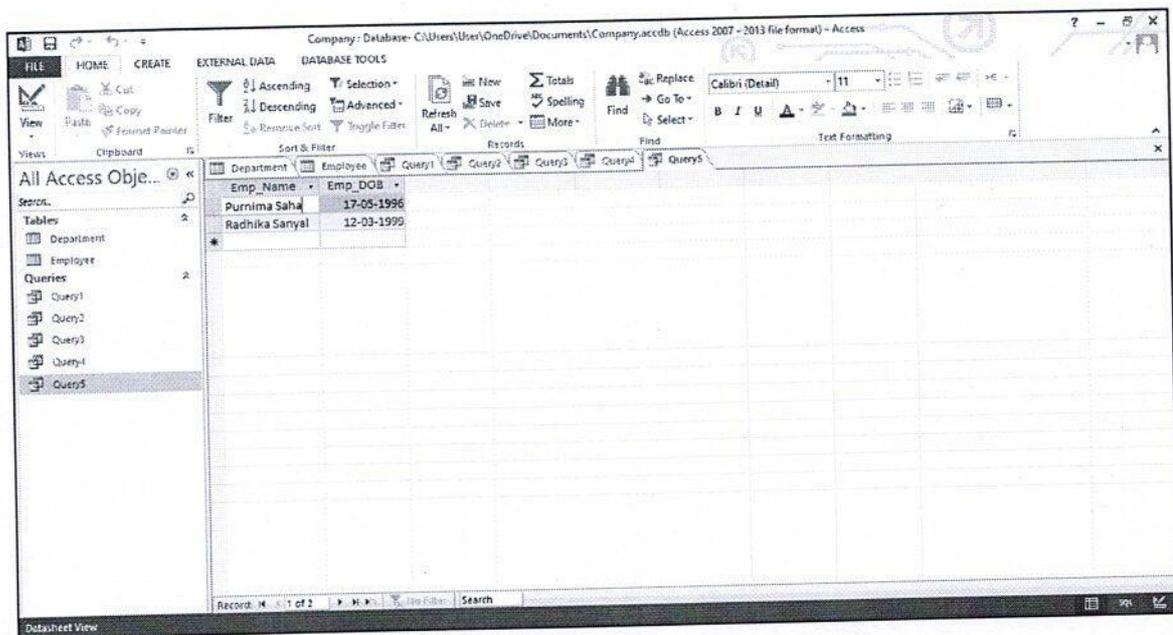
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ii) Fill the fields as Emp\_Name, Emp\_DOB, and Gender > Remove the Blue Tick from Show > write the criteria of Gender as 'Female' > Run:



iii) Query 5 to display Name(s) and Date of Birth(s) of all female employees:



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## Assignment 3: (MS ACCESS)

1) Create a table 'AccountList' with fields AccountID, AccountName, AccountGroupID.

Note:

- Data type of AccountID is number.
- Data type of AccountName is text. This is a primary key.
- Data type of AccountGroupID is text.

2) Create a table 'JournalTransaction' with fields VoucherNumber, DebitAccountName, DebitAmount, CreditAccountName, CreditAmount, Narration.

Note:

- Data type of VoucherNumber is text and is a primary key.
- Data type of DebitAccountName is text. This field is foreign key referencing AccountName of table AccountList.
- Data type of DebitAmount is number.
- Data type of CreditAccountName is text. This field is foreign key referencing AccountName of table AccountList.
- Data type of CreditAmount is number.
- Data type of Narration field is text.

3) Create appropriate data entry forms with two buttons 'Add record' and 'Save record' in both the forms to insert new record and save.

Note:

- The data entry form for 'JournalTransaction' should allow entry of account names from existing account names in table 'AccountList' for both the fields DebitAccountName and CreditAccountName.

4) Insert records in 'AccountList' table from the given data through data entry form created.

AccountID	AccountName	AccountGroup
1	CASH	ASSET
2	BANK	ASSET
3	PURCHASE	EXPENDITURE
4	CREDITOR	LIABILITY
5	MACHINERY	ASSET
6	SALARY	EXPENDITURE
7	POWER & FUEL	EXPENDITURE
8	LOAN TO APU	ASSET
9	INVESTMENTS	ASSET
10	INTERST RECIVED	INCOME
11	SALES	INCOME
12	DISCOUNT RECEIVED	INCOME
13	CLOSING STOCK	ASSET
14	DEPRECIATION	EXPENDITURE
15	CAPITAL	LIABILITY
16	PROFIT & LOSS A/C	LIABILITY

*U.S.S.*

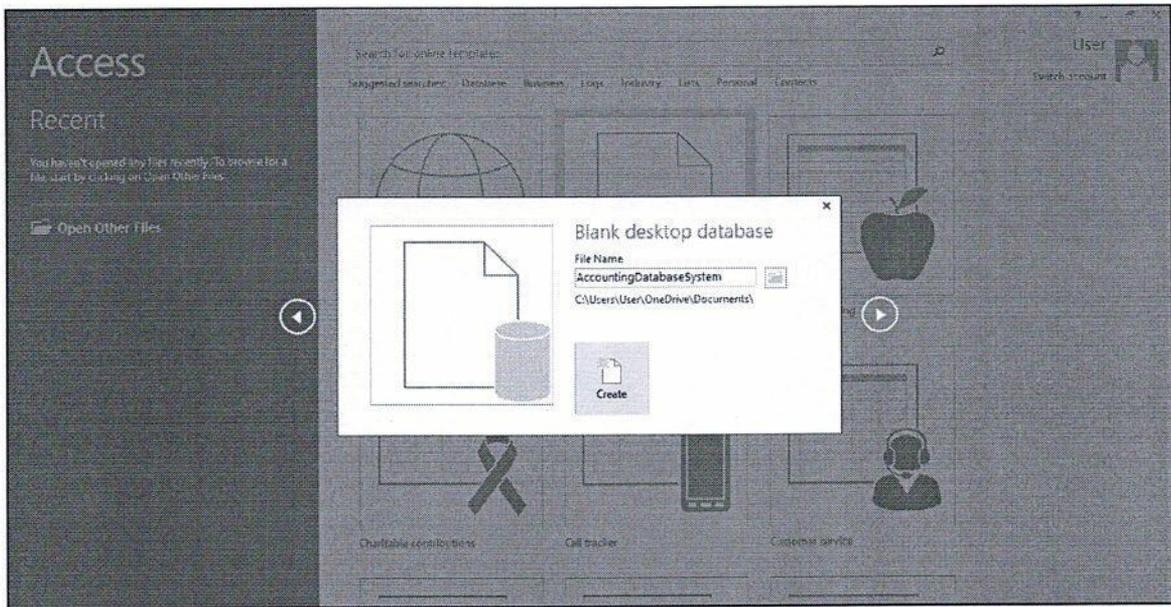
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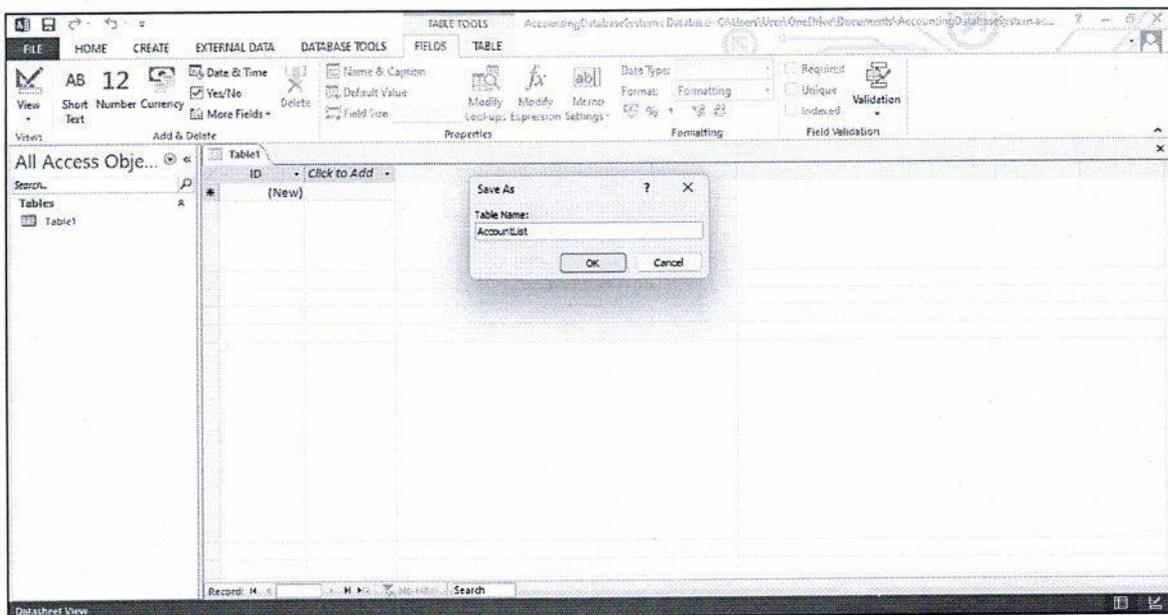
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1) Create a table 'AccountList' with fields AccountID, AccountName, AccountGroupID.

i. Start > Ms Access > Blank desktop database > Create a database as AccountingDatabaseSystem > Create.



ii. Create a table as 'AccountList'

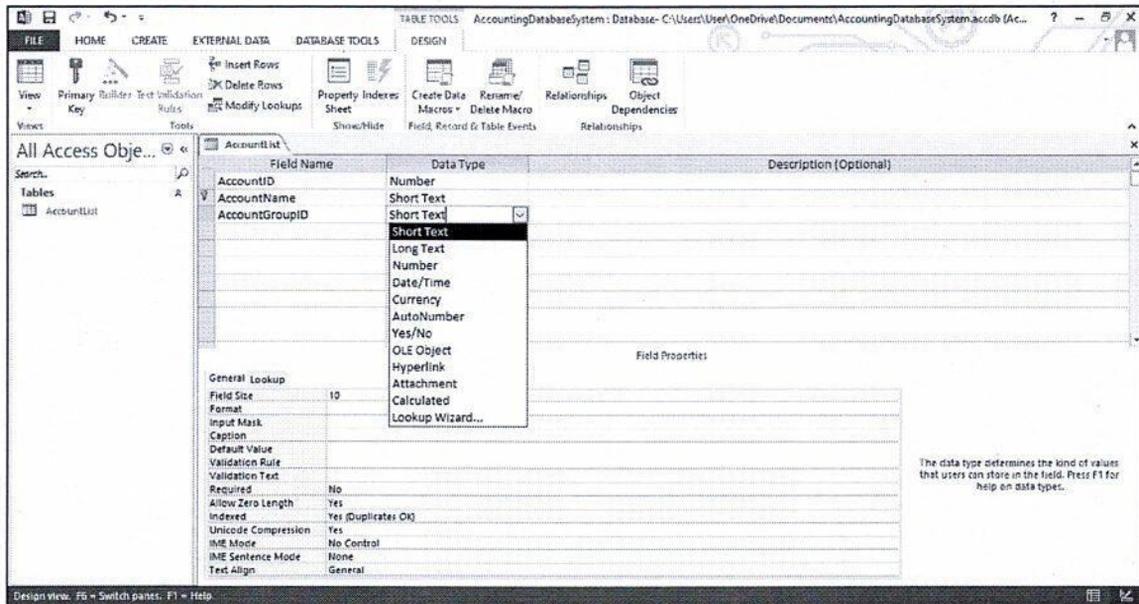


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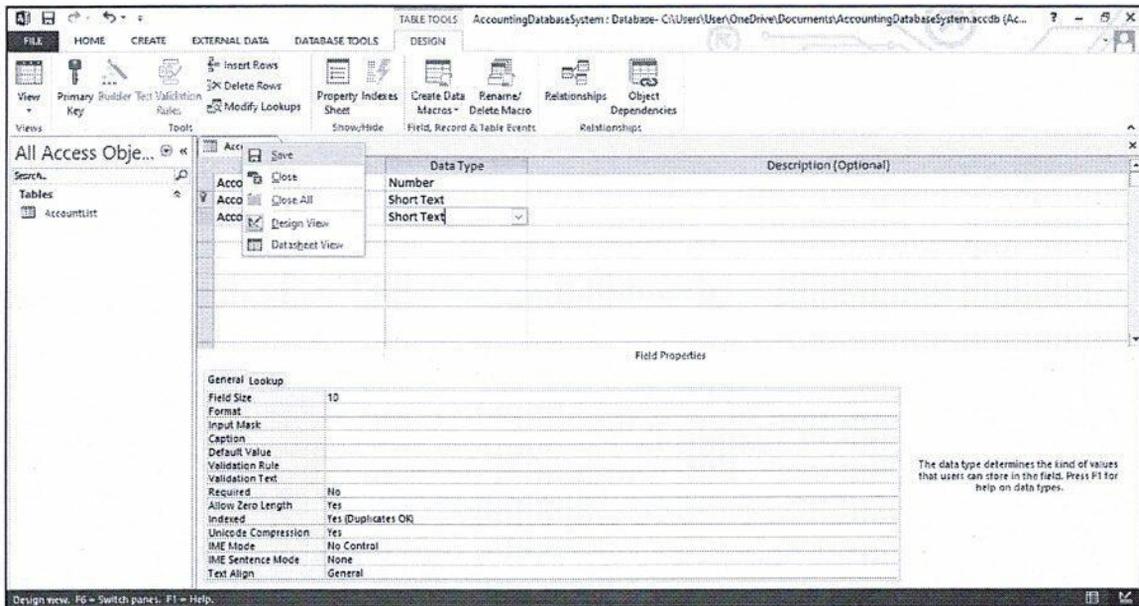
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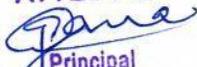
iii. The Table named 'AccountList' with the field 'AccountID', 'AccountName', 'AccountGroupID' respectively.



iv. Save the table 'AccountList'

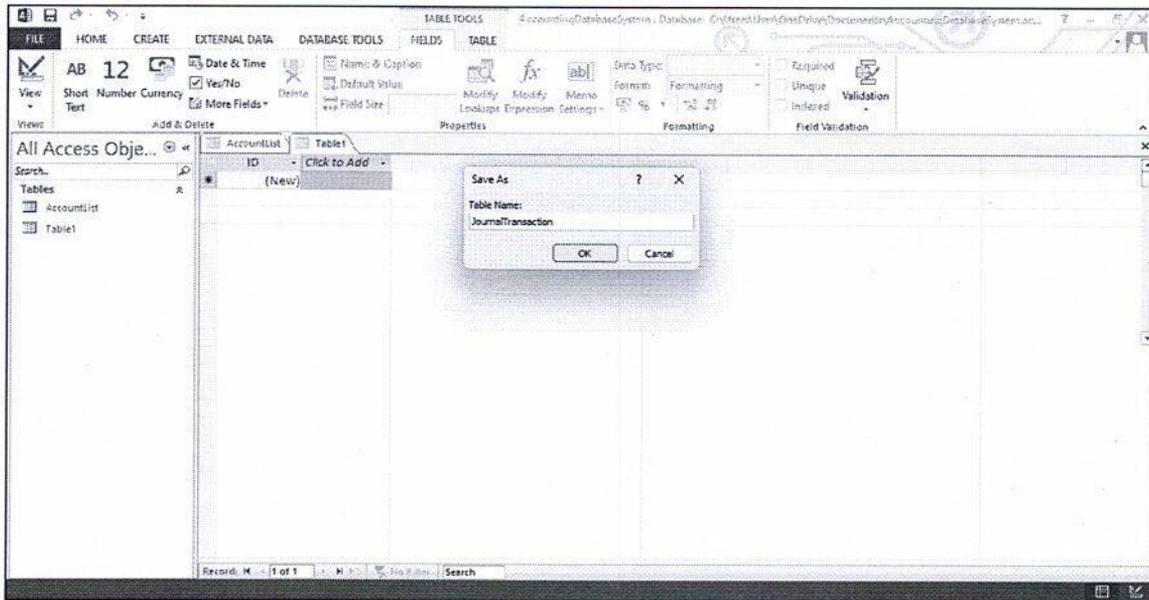


  
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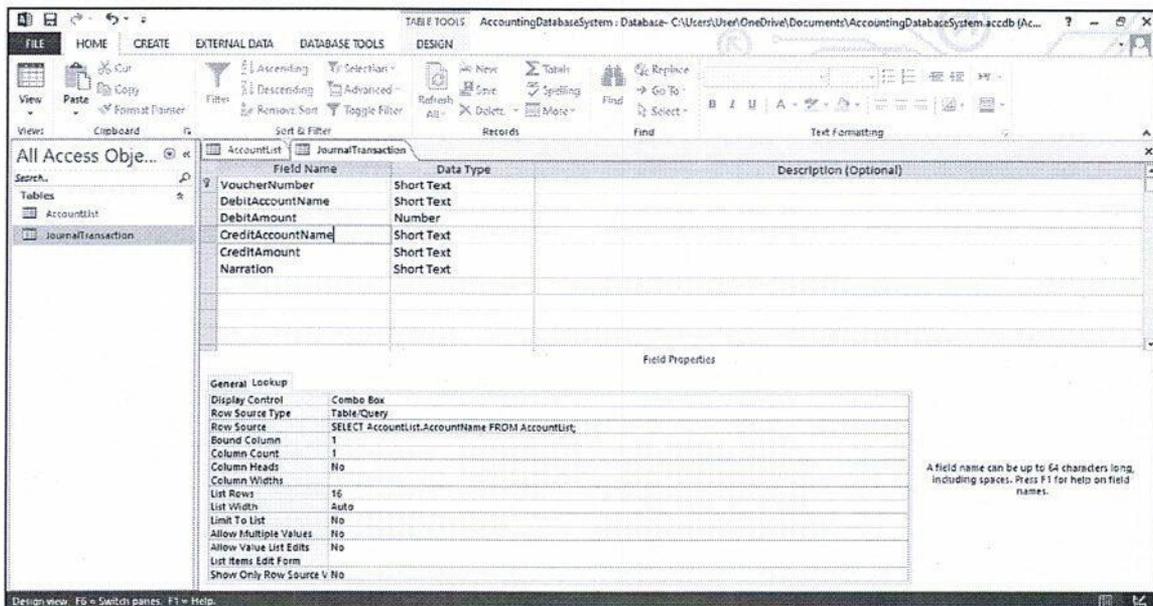
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2) Create a table 'JournalTransaction' with fields VoucherNumber, DebitAccountName, DebitAmount, CreditAccountName, CreditAmount, Narration.

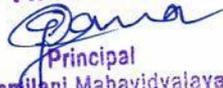
i. Create tab > Table > Name the table as 'JournalTransaction'



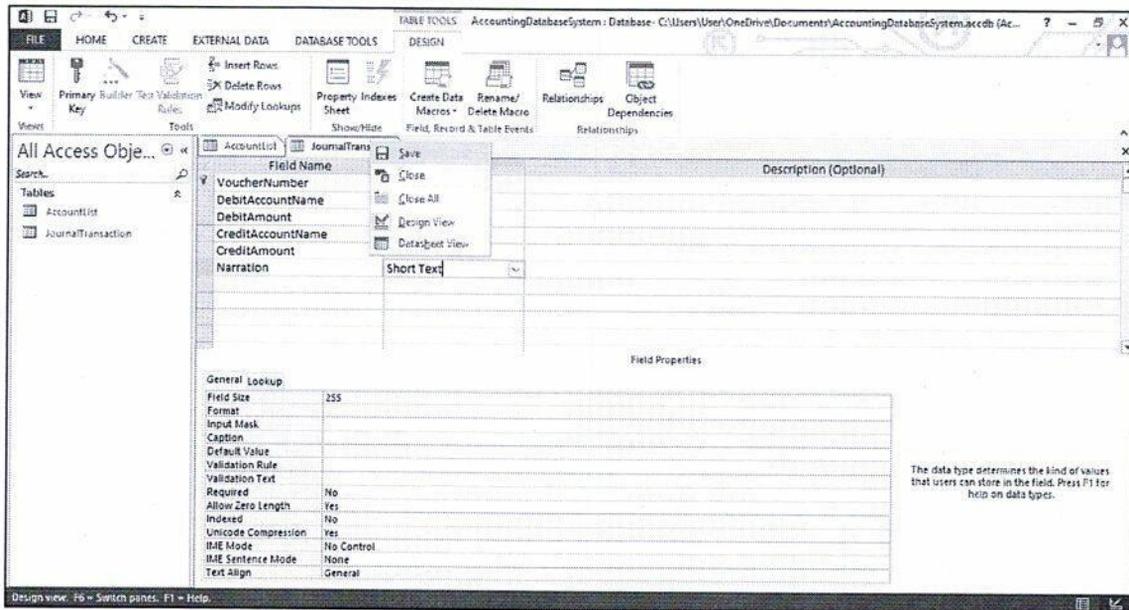
ii. The table 'JournalTransaction' with fields 'VoucherNumber', 'DebitAccountName', 'DebitAmount', 'CreditAccountName', 'CreditAmount', 'Narration' respectively.



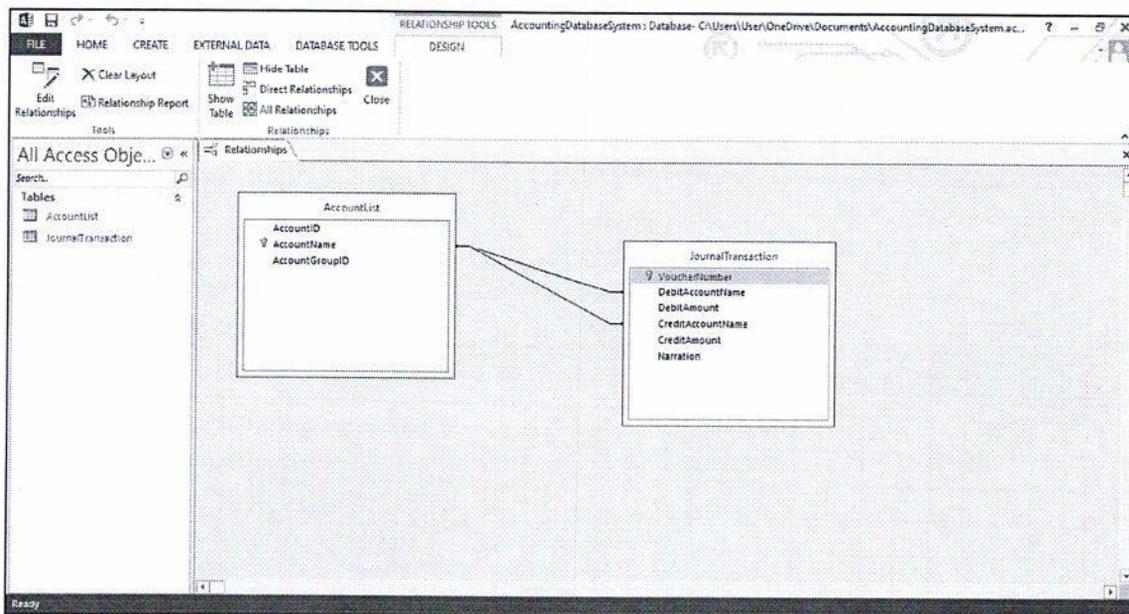
  
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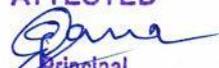
iii. Save the table 'JournalTransaction'



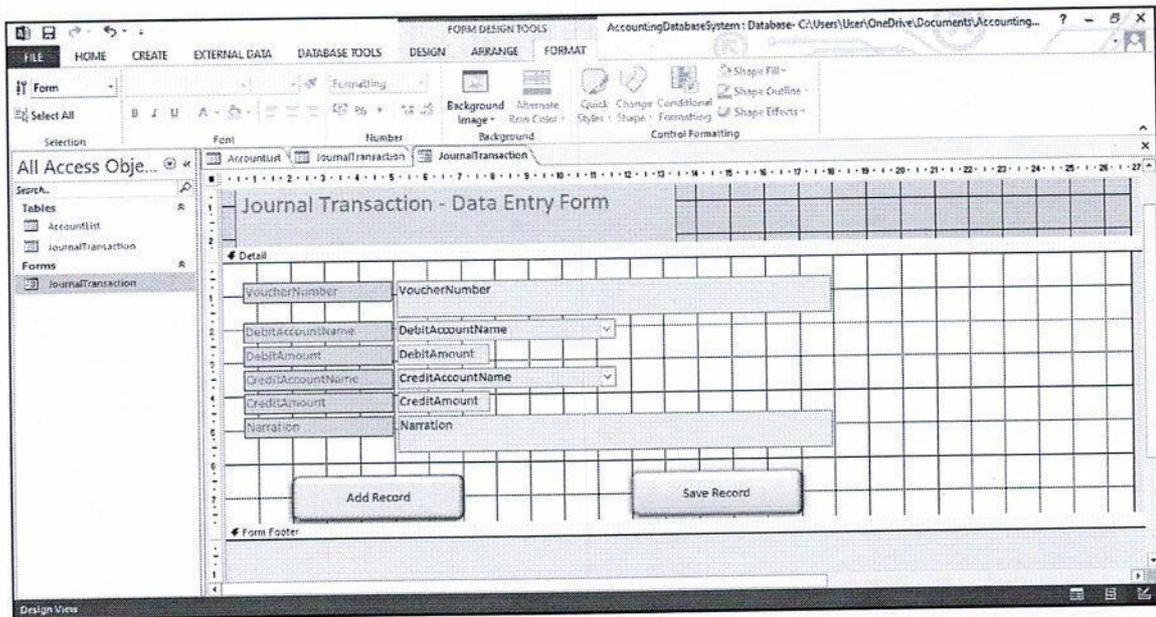
iv. Relationship between 'DebitAccountName' and 'CreditAccountName' of table 'JournalTransaction' with 'AccountName' of table 'AccountList' as foreign key referencing.



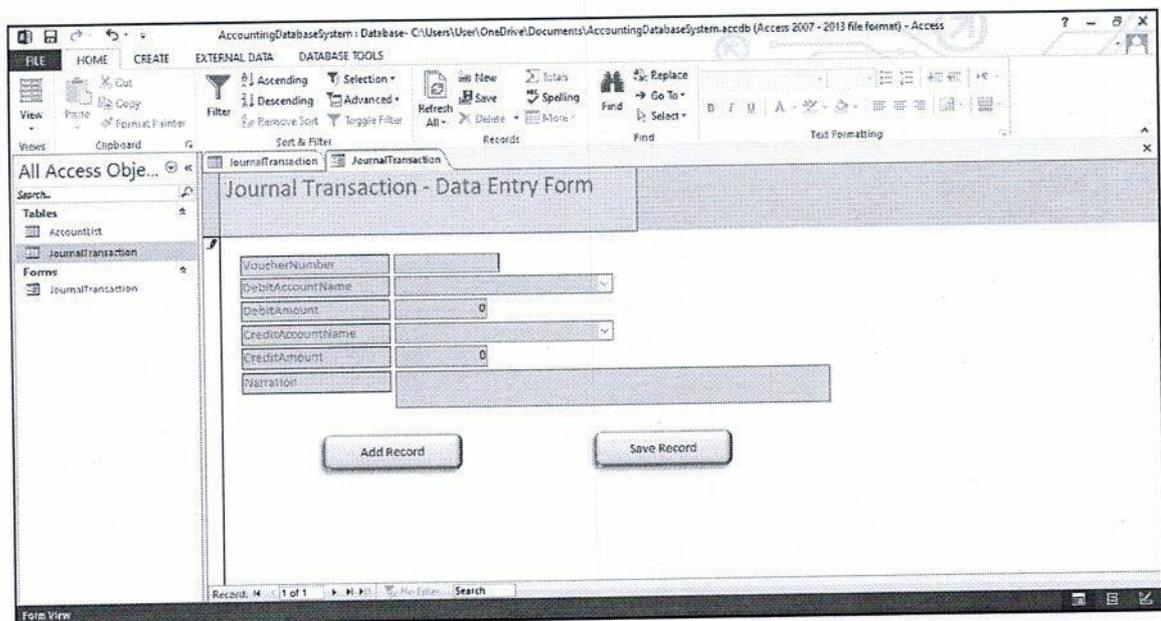
  
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iii. Drag and drop the button [xxx] > Record Operations > Save Record > Next > Select 'Text' > Next > Finish



iv. Click on Save > Select Form View > Journal Transaction Data Entry Form.

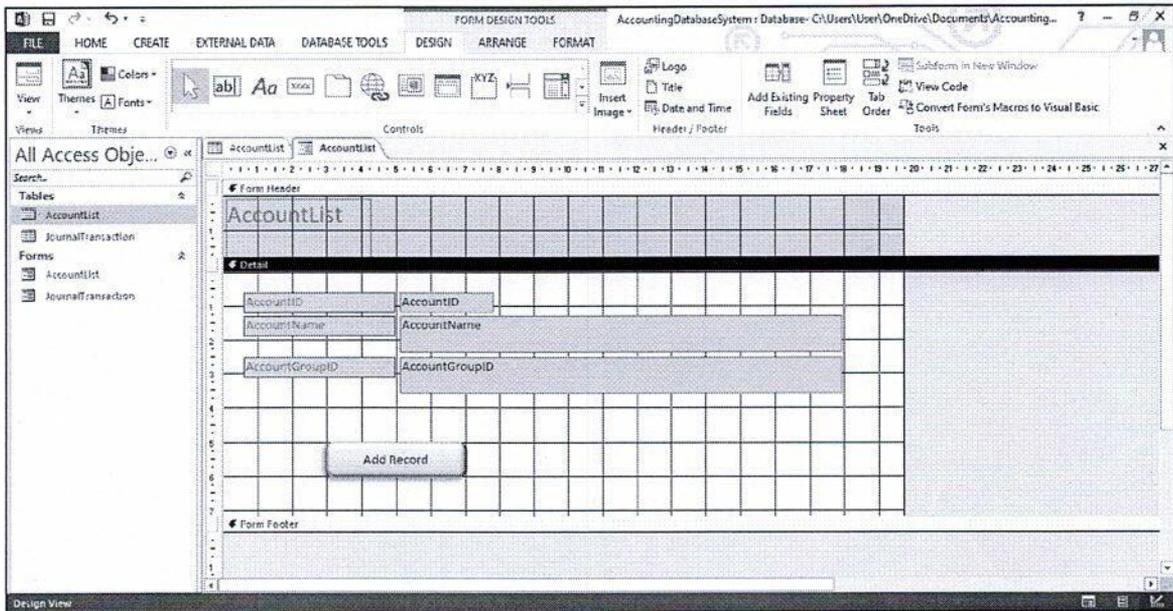


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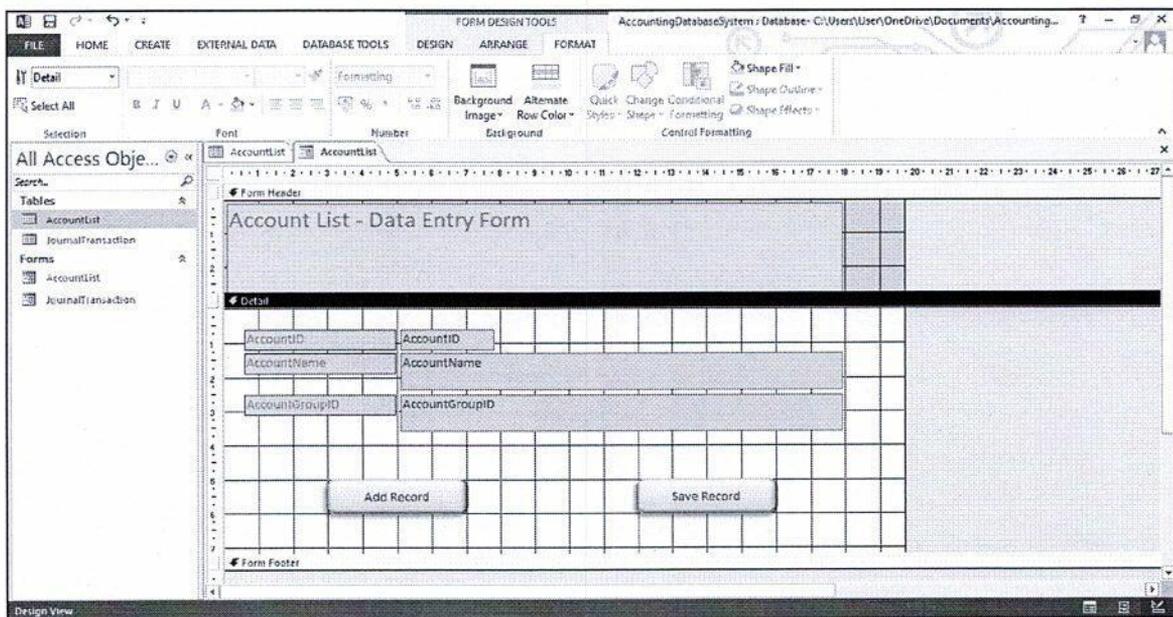
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v. Layout View > Form Layout Tools > Design > Drag and drop the button [xxx] > Record Operations > Add New Record > Next > Select 'Text' > Next > Finish.



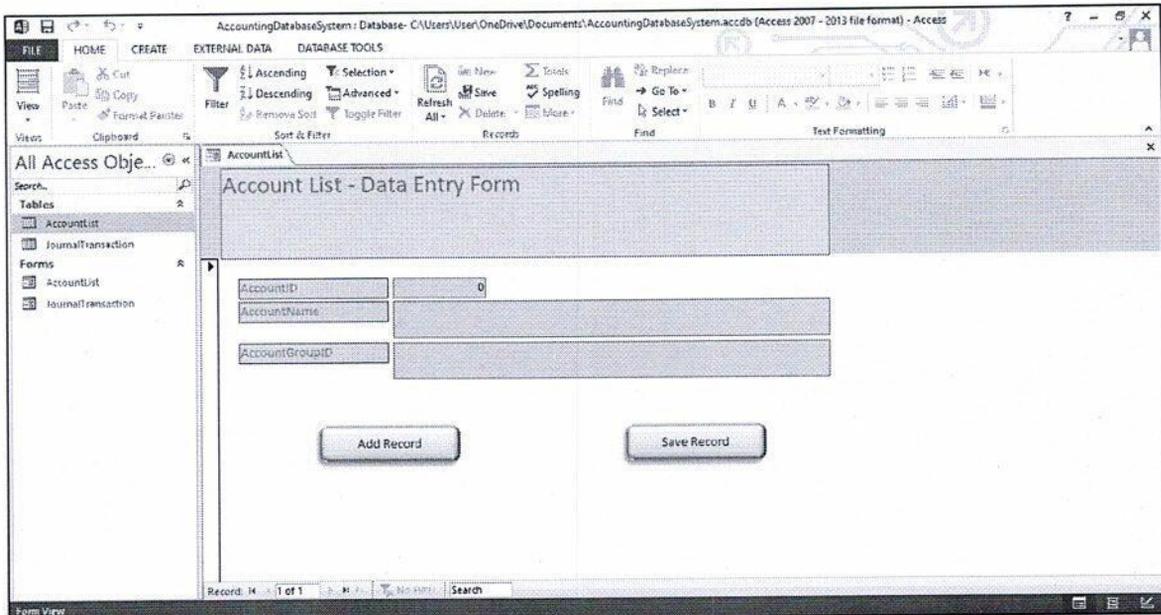
vi. Drag and drop the button [xxx] > Record Operations > Save Record > Next > Select 'Text' > Next > Finish.



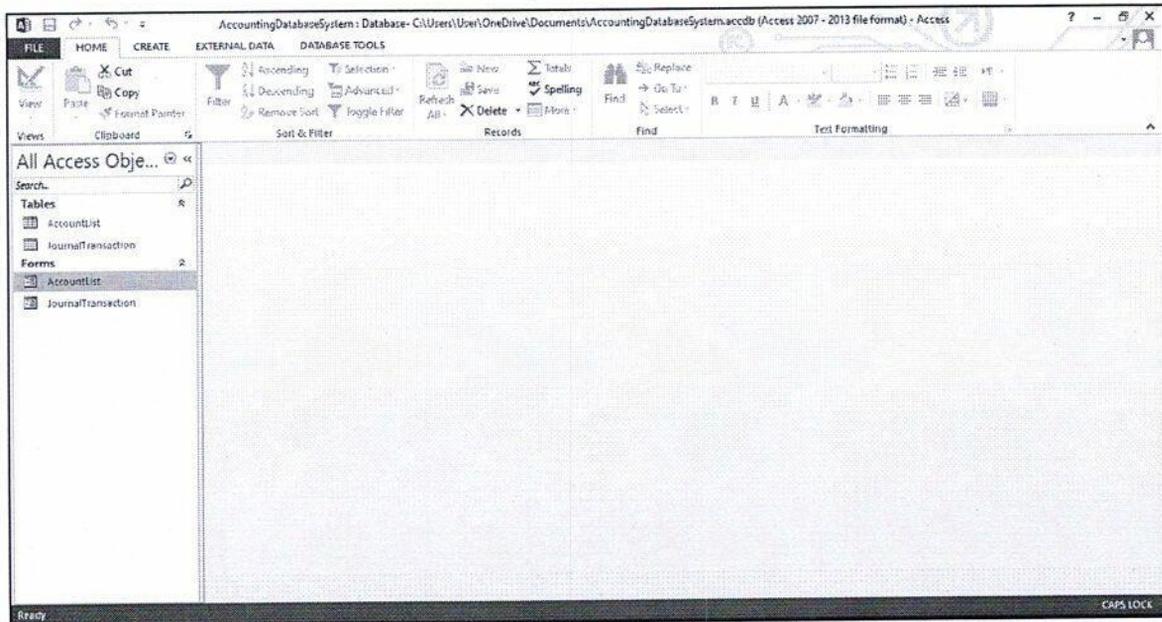
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vii. Click on Save > Select Form View > Account List Data Entry Form.



vii. Save and Close all Forms and Tables.

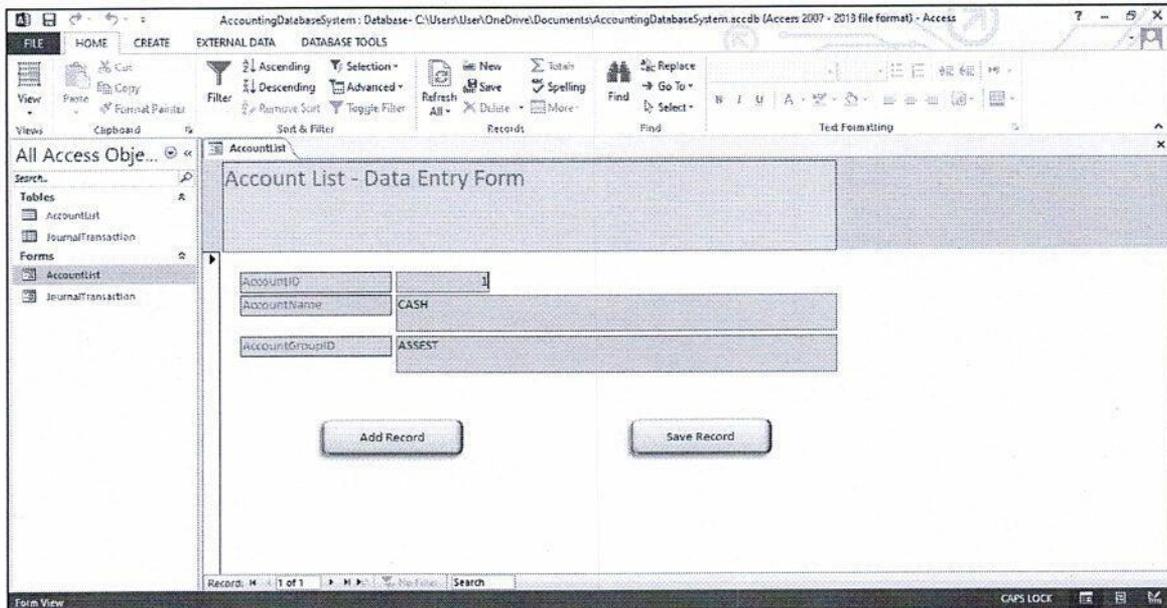


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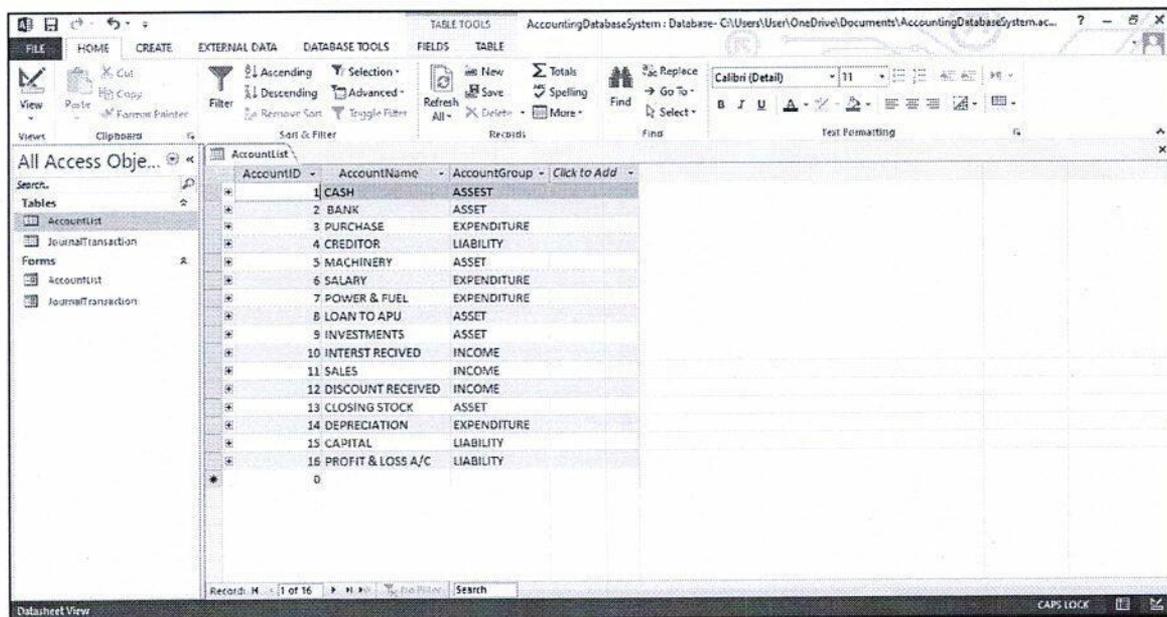
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4) Insert records in 'AccountList' table from the given data through data entry form created.

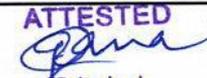
i. Fill the Account List Form with given data.



ii. Records into table 'AccountList' from data given through Data Entry Form.



  
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5) Insert records into table 'JournalTransaction' from data given through data entry form created.

i. Fill the Journal Transaction Form with given data.

Journal Transaction - Data Entry Form

VoucherNumber: 1

DebitAccountName: CASH

DebitAmount: 80000

CreditAccountName: CAPITAL

CreditAmount: 80000

Narration: Started Business with cash of ₹ 80,000

Buttons: Add Record, Save Record

ii. Records into table 'JournalTransaction' from data given through Data Entry Form.

VoucherNumber	DebitAccountName	DebitAmount	CreditAccountName	CreditAmount	Narration
1	CASH	80000	CAPITAL	80000	Started Business with cash of ₹ 80,000
2	BANK	40000	CAPITAL	40000	Started Business with ₹ 40,000 in Bank Account
3	PURCHASE	14250	CAPITAL	14250	Purchased goods from Creditor, trade discount being 5%
4	MACHINERY	40000	CASH	40000	Purchased Machinery in Cash
5	SALARY	12000	BANK	12000	Paid Salary by Cheque
6	POWER & FUEL	5000	CASH	5000	Paid for power and fuel in cash
7	LOAN TO APU	7000	BANK	7000	Loan given to Mr. Apu
8	DEPRECIATION	4000	MACHINERY	4000	Depreciation on Machinery
9	INVESTMENT	10000	BANK	10000	Invested in shares of Mukherjee Pvt. Ltd
10	BANK	500	INTEREST RECEIVED	500	Income on investments credited to bank
11	CASH	50000	SALES	50000	Cash sales
12	CREDITOR	9600	SALES	9600	Settled ₹ 10,000 with Creditor
0		0		0	

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# **FIELD REPORT**

## INTRODUCTION

A field trip or a visit to the zoological garden is actually an inseparable component of any student or person interested to in the study of nature, specifically the fauna and its astounding diversity. The exposure to wild life, whether in its in situ or ex situ status, provides a first hand, audio –visual information to the observer.

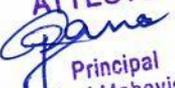
Needless to say, a visit to a biodiversity zone or a national park is the best way to observe nature and wild life in its exclusive environment where its behaviour and interaction are not compromised by the restrictions of diverse types as found in ex situ conservation.

Of all the different dimensions of the biology of animals, perhaps the aspect of ethology is most intriguing; the interactions of animals, with their conspecifics as well as other species, with the environment, and of course with visitors when interacting in close confinements of a zoological garden are most unique.

Interestingly, the aspect of animal behaviours extremely diverse, as we often come across behaviour patterns that are stereotypes but also those that are completely different specifically in pet animals of different species when reared together .It appears as if the behaviour patterns alter when resources are plentiful and typical interactions are not that pronounced.

In a nutshell, the zoological garden or a field trip provides an unique opportunity to study and know about the diverse flora as well as fauna, while providing the basic inputs of animal survival strategies and of course aspects of ethology or animal behaviour .

  
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## THE ZOOLOGICAL GARDEN, ALIPORE

The Zoological Garden, Alipore (also informally called the Alipore Zoo or Kolkata Zoo) is India's oldest formally stated zoological park. It has been open as a zoo since 1876 and covers 18.811 ha (46.48 acres).

It is probably best known as the home of the Aldabra giant tortoise Adwaita, who was reputed to have been over 250 years old when he died in 2006. It is also home to one of the few captive breeding projects involving the Manipur brow-antlered deer.

Laid out on 45 acres (18 ha) of land, the Calcutta zoo has been unable to expand or modify its layout for over 50 years, and thus has a rather backdated plan. It contains a Reptile House (a new one has been built), a Primate House, an Elephant House, and a Panther House which opens out onto the open air enclosures for the lions and tigers.

The place becomes the most crowded during the winter months which are the peak tourist season in West Bengal and footfall includes visitors from all

over the country. The presence of several migratory birds also attracts visitors and bird lovers alike.

It also boasts of a glass-walled enclosure for tigers, the first of its kind in India. A separate Children's zoo is present, and the central water bodies inside the zoo grounds attract migratory birds.

The Calcutta Aquarium lies across the street from the zoo, and is affiliated to the zoo.



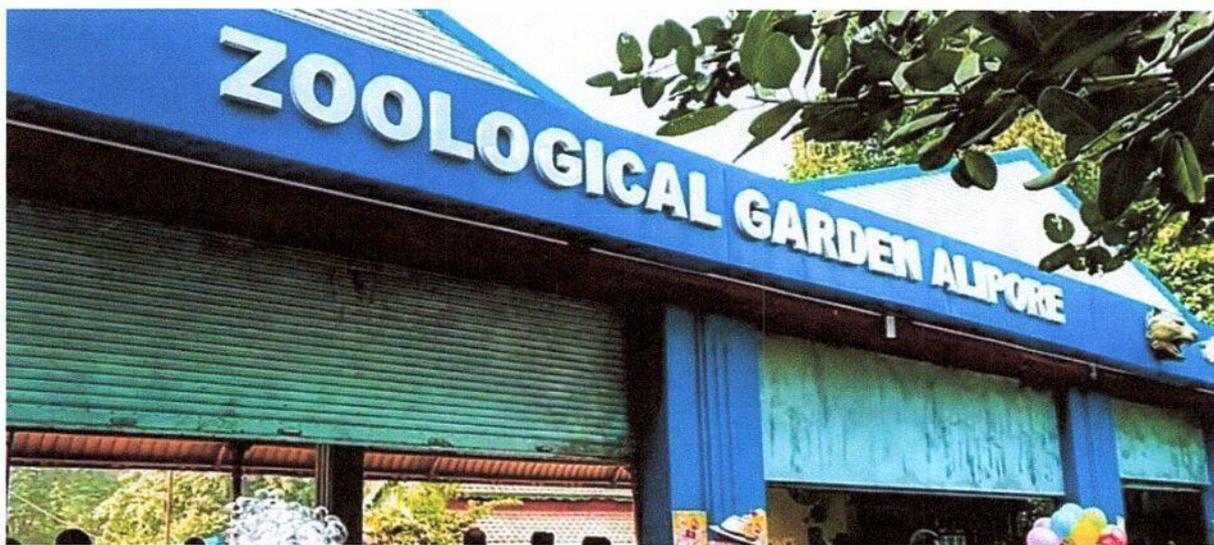
  
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## LOOKING BACK IN TIME....

The zoo was formally opened in Alipore - a posh Kolkata suburb, and inaugurated on 1 January 1876 by Edward VII, then Prince of Wales. (Some reports place the inauguration on an alternate date of 27 December 1875).

The initial stock consisted of the private menagerie of Carl Louis Schwendler (1838 – 1882), a German electrician who was posted in India for a feasibility study of electrically lighting Indian Railways stations. Gifts were also accepted from the general public.



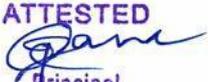
The initial collection consisted of the following animals: African buffalo, Zanzibar ram domestic sheep, four-horned sheep, hybrid Kashmiri goat, Indian antelope, Indian gazelle, sambar deer, spotted deer and hog deer.

The mention of Alipore Zoological Garden remains incomplete without the mention of Rai Bahadur Ram Brahma Sanyal, the first Superintendent of the garden, who dedicatedly worked towards the improvement and maintenance of animals in the zoo. His contribution towards the captive breeding carried out at the zoo became a strong success story in an era when these initiatives were rarely heard of.

## MIGRATORY ATTRACTIONS OF THE KOLKATA ZOOLOGICAL GARDEN

The zoo is also home for wintering migratory birds such as ducks, and sports a sizeable wetland inside the zoo grounds. Since the zoo is enveloped by urban

  
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settlements for miles, the zoo wetlands are the only resting spot for some of the birds and are a focus of conservationists in Kolkata.

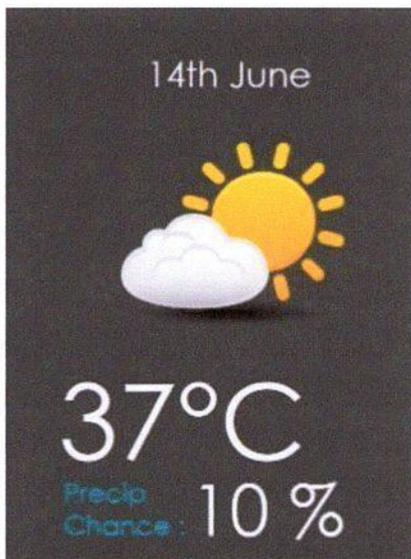
However, the number of migratory bird visiting the zoo dropped from documented highs by over 40% in the winter of 2004–2005. Experts attribute the causes of the decline to increased pollution, new construction of high-rises in the area, increasing threats in the summer grounds of the birds and declining quality of the water bodies at the zoo.

We, the students of the Zoology advanced 6th semester visited the zoological park as per requirement of our syllabus in June.

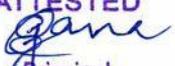
**DATE OF JOURNEY : 14TH JUNE, 2023**

**CLIMATIC CONDITIONS :**

- TEMPERATURE : 37°C
- PRECIP CHANCE : 10%



  
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## OBJECTIVE OF THE VISIT TO ZOOLOGICAL PARK

- To understand the general concepts that govern the manner in which animals behave throughout their lives i.e. maximizing 'fitness' through essential selfish actions.
- To appreciate the range of mechanisms by which animals adapt to their environmental conditions using behavioural actions.
- To achieve competence in the skills required to conduct scientifically meaningful studies of animal behaviour.

## ANIMAL BEHAVIOUR

Behaviour can be defined as an expressed course of action produced in organisms in response to stimulus from a given situation. It could simply be considered as what the animal does. The fundamental explanation of behavioural activity must begin with a stimulus and end with a response.

Stimulus: Any change in the biotic and abiotic environments capable of eliciting or causing some sort of reaction or response in a living organism. Examples include temperature, pressure, radiation, gravity, or activities of other organisms within the immediate environment.

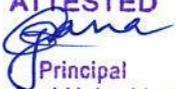
## GENERAL TYPES OF ANIMAL BEHAVIOUR A. STEREOTYPED

### BEHAVIOR :

Stereotyped behaviours also called innate or inborn or inherent behaviour, are repetitive behavioural acts without any apparent adaptive function. A wide range of animals, from canaries to polar bears to humans can exhibit stereotypes. Common examples include –

- Crib-biting and wind- sucking in horses,
- Eye-rolling in veal calves,
- Sham-chewing in pigs, and jumping in bank voles,
- Pacing (animal walking in a distinct, unchanging pattern within its cage),

  
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- In man : Finger tapping, hair-twirling, tapping feet, nail biting, smoking, organizing, playing sports, and watching TV.

Alternatively, stereotypies in typical infants and toddlers often resemble behaviors seen in individuals with autism across the lifespan .

### CHARACTERISTICS :

- They are complex in origin and are predictable.
- They are initially stimulus dependent.
- They do not results as a consequence of experience.

Cause: caused by artificial environments that do not allow animals to satisfy their normal behavioural needs.

Modes of stereotyped behavioural pattern:

1. Spatial orientation (Kinesis & Taxis)
2. Reflexes
3. Instincts
4. Motivation

### 1. ORIENTATION :

Orientation can be defined as special adjustment of animals in response to various stimuli. It involves single animal. Orientation is of two types- Kinesis and Taxis.

### TAXIS

The motion or orientation of a cell , organism, or a part in response to external stimulus. It's a directional movement, locomotion or movement may be towards (positive taxis), away from (negative taxis) or at a fixed angle to the source of the stimuli.

### TYPES OF TAXIS:

#### PHOTOTAXIS :

  
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Oriented locomotory movement caused by the light either towards a source or away from it is called phototaxis. **E.g. Euglena** .

### THERMOTAXIS :

The response of animals to temperature is known as Thermotaxis. Animals thrive to remain in an optimum temperature range. **E.g. Paramecium** (24-28°C), **Amoeba** (20-25°C) which is a positive thermotaxis.

An avoiding reaction (negative thermotaxis) is shown to temperature higher or lower than this.

CHEMOTAXIS : Animals showing response to the chemical substances is called chemotaxis. It is negative in most of the cases. **E.g. Amoeba** shows negative chemotaxis to strong solutions of alkalis and to sugars.

### GEOTAXIS :

Animal's response to gravity is called geotaxis.

Some of the animals show negative responses to gravity while other show positive response. **E.g Amoeba** exhibits mostly positive response at it drops to the bottom of the container filled with water whereas Paramecium shows negative geotaxis.

### RHEOTAXIS :

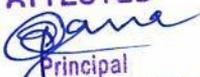
Response to current of air or water is called rheotaxis.

Some of the fish are also positively rheotactic. **E.g. Trouts** living in stream, not swept away by the water current. In winds, birds and insects mostly fly upward although they may go in any direction.

### THIGMOTAXIS :

Response to contact or touch is called thigmotaxis.

  
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**Paramecium** when moves slowly and comes in contact with any object like algae or a plant stem, becomes quiet. However, it shows an avoiding reaction when its anterior end is strongly touched with a solid object.

### GALVANOTAXIS OR ELECTROTAXIS :

Movement of an organism or any of its parts in a particular direction in response to an electric current is called galvanotaxis or electrotaxis. In positive galvanotaxis, animals move towards the negative pole or cathode when a weak electric current is supplied. **E.g. Paramecium**, when exposed to weak electric current moves towards cathode.

### HYDROTAXIS :

Movement (of an organism or organ) in response to water. An **earthworm** moving towards moisture to avoid desiccation is positive hydrotaxis.

**Periwinkles** move up the shore as the tide rises, maintaining their position relative to water, to avoid exposure to seawater showing negative hydrotaxis .

### KINESIS

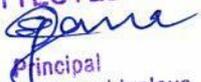
Kinesis is the undirected movement in response to a stimulus, which can include orthokinesis (related to speed) or klinokinesis (related to turning). In kinesis, an organism changes its movement in a non-directional way—e.g., speeding up or slowing down—in response to a cue. Kinesis is directionally not oriented, i.e. the movement can be in any direction or may be at random. **E.g. woodlice** move faster in response to temperatures that are higher or lower than their preferred range.

### TYPES OF KINESIS :

#### ORTHOKINESIS :

Orthokinesis is a form of kinesis in which the speed of movement of the individual depends upon the intensity of the stimulus. An increase in the speed of movement is a positive orthokinesis whereas a decrease in the speed is referred to as negative orthokinesis.

  
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E.g. **woodlice** , increase their speed of movement when exposed to high or low temperature.

### KLINOKINESIS :

It is another type of Kinesis where the rate of turning or frequency is directly proportional to stimulus intensity.

## 2. REFLEXES :

A reflex is an involuntary and relatively stereotyped response to a specific sensory stimulus. Two features of the sensory stimulus are particularly important in shaping the reflex response. First, the precise location of the stimulus determines in a fixed way the particular muscle that contract to produce the reflex response.

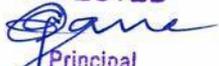
## 3. INSTINCT / INNATE AND BEHAVIOR :

Instinctive or innate behaviors that are closely controlled by genes with little or no environmental influence that occur naturally in all members of a species whenever they are exposed to a certain stimulus. It not learned or practiced. An instinct is the ability of an animal to perform a behaviour the first time it is exposed to the proper stimulus.

## B. LEARNED BEHAVIOUR :

Learned behaviour are not under genetic control and occur by exposure to stimulus form environmental that occur by exposure to the stimulus without any genetic control .There are neither rigid or flexible and can alter with change of stimulus and modified to suit changing conditions. Such behaviours increase adoptability. **E.g.- playing of young animals , gorilla using a walking stick, Japanese macaques using hot water springs in winter to keep warm, crows using tools for food collection, rats avoiding electric shock in a maze, problem solving, etc.**

### FIXED ACTION PATTERN(FAP) :

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A fixed action pattern is an instinctive behavioural sequence that is highly stereotyped and species-characteristic. Fixed action patterns are said to be produced by the innate releasing mechanism, a “hard-wired” neural network, in response to a sign/key stimulus or releaser.

### **Characters –**

- It is same in all members of a species .
- The behaviour is performed correctly even the first time without any experience.
- It is stimulated by a sign acting as stimulus .
- Once started, it will complete without any pauses.

**E.g. - Egg rolling reflex by greylag geese.**

### **HABITUATION :**

Habituation is defined as a decrement in response as a result of repeated stimulation not due to peripheral processes like receptor adaptation or muscular fatigue. Habituation is a form of behavioural plasticity that results in an animal learning to ignore repetitive stimuli in its environment, allowing it to focus attention on potentially more relevant stimuli.

**E.g.- Squirrels** in a park can be initially sensitive to presence of human beings closely, but with time, it becomes habituated to the human presence except in close encounters.

### **IMPRINTING :**

According to Hess, E.H. (1959), imprinting is the early practical experience in life that determines the social imprints, attitudes, and behaviour of biological organisms in their latter parts of life.

It can be explained as a method by which the environment interacts with heredity involving . According to Konrad Lorenz (1935), imprinting is the principle of attachment between a newly born organism and its caretaker.

  
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The input here is a stimuli, while the output is the response of that organism to that specific stimuli. This interaction is not witnessed all through life, but in a defined “critical period”.

## **APPROACHES TO BEHAVIOURAL STUDIES**

### **I. VITALISTIC APPROACH**

Behavioural activities are explained in terms of what animals are seen to do in relation to changes in the environment. It involves total rejection of any study of the animal outside its natural environment. The technique is nonscientific since all the observations relate to past events which cannot be tested experimentally.

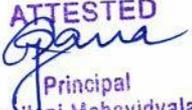
### **II. MECHANISTIC APPROACH**

It is an experimental approach and involves the study of particular aspects of behaviour under controlled conditions in a laboratory. It was pioneered by Pavlov and used extensively in psychological study. It may be criticized on the basis of the artificiality of the experimental conditions and the way in which results are interpreted.

### **III. ETHOLOGICAL APPROACH**

Ethology is the scientific study of animal behaviour. It explains responses observed in the field in terms of stimuli eliciting the behaviour. This was pioneered by Lorenz, von Frisch and Tinbergen. Ethnologists have so far tried to answer questions about animal behaviour from such studies.

  
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# ANIMAL BEHAVIOUR IN CONFINEMENT OR ZOOLOGICAL GARDENS

Animals have evolved over millennia and their physical, physiological and behavioural traits are specifically adapted to their natural habitat.

However, life in captivity differs substantially from life in the wild. Space, social interactions, diet, climate, presence of humans and many more aspects of their life may be completely alien compared to what they would encounter in the wild. Captive animals cannot choose their environment, or carry out behaviours necessary to enhance their welfare or survival.

Rather than having a safe and easy life in captivity, animals may face a number of challenges which evolution has not prepared them for. This can result in Zoochosis, a phrase used to describe the stereotypic behaviour that is exhibited by captive animals.

## ZOOCHOSIS

If the captive environment does not fully cater for the species-specific needs of an animal, or if it imposes unnatural stress or frustration, there can be deterioration in the animal's physical and mental health. This may manifest in the development of physical disease or abnormal behaviour.



1992, Bill Travers MBE, Co-Founder of Born Free, first coined the term 'zoochosis' to describe this obsessive, repetitive behaviour, and described

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zoo animals behaving abnormally as 'zoochotic'.

Abnormal behaviour in captive animals can include stereotypic behaviours – highly repetitive, invariant, functionless behaviour, such as repetitive pacing, swaying, head-bobbing, bar-biting, over-grooming or excessive licking. These behaviours result from “the frustration of natural behaviour patterns, impaired brain function, or repeated attempts to deal with some problem”.

## TYPES OF ZOOCHOSIS :

### PACING & CIRCLING



Pacing & circling

Continuous walking back and forth or in a circle, following the same path. Signs of regular pacing include definite paths worn in the ground.

Seen in many captive animals, especially **big cats** and **canids** (for example, **wolves**).

### TONGUE-PLAYING & BAR-BITING

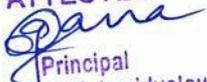
The continual licking, sucking or biting of walls, bars or gates in an enclosure. Often seen in **giraffe** and **primates**.



Tongue-playing & bar-biting

### NECK-TWISTING

  
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Neck twisting

Unnatural twisting and rolling of the neck, often flicking the head around or bending the neck back. It is often combined with pacing behaviour.

Seen in, for example, **giraffe, llama, bears and primates.**

### HEAD-BOBBING, WEAVING & SWAYING



Head bobbing, weaving and swaying

Standing in one place swaying the head and shoulders – even the whole body – from side to side. Moving the head up and down, or weaving to and from continuously.

Seen in, for example, **bears and elephants.**

### ROCKING

Sitting, sometimes hugging the legs, rocking forwards and backwards. Seen in, for example, **captive ape species.**

### OVER-GROOMING & SELF-MUTILATION



Over-grooming and self -mutilation

Self-inflicted physical harm such as biting for chewing tail or leg, or hitting a head against a wall. Grooming to an excessive extent, pulling out hair or feathers, often leaving bald patches, irritated and broken skin. Seen in, for example, **apes, bears, parrots and big cats.**

  
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## VOMITING & REGURGITATING

A form of bulimia, the repeated vomiting, eating of vomit and regurgitation. May be linked to the captive diet. Seen in, for example, **captive ape species**.

## COPROPHILIA & COPROPHAGIA

Playing with and eating excrement (in species that do not naturally do this) or smearing faeces on enclosure walls and glass.

Seen in, for example, **captive primate species**.



Coprophilia and Coprophagia

## CAPTIVITY SUPPRESSES THE NATURAL INSTINCTS OF WILD ANIMALS

Animals suffer permanent frustration because they have no freedom of choice and cannot behave as they would do in their natural environment. This leads to a tendency toward genetic, physical and behavioural degeneration. In the wild, an animal's stress-response system helps it escape from danger. But captivity traps animals with almost no control over their environment.

These situations foster learned helplessness, negatively impacting the **hippocampus**, which handles memory functions, and the amygdala, which processes emotions.

## ETHOGRAM

An ethogram is a primary tool in ethology. Ethology is a zoological, evolutionary approach to animal behaviour that includes examination, generally under natural conditions, of the proximate causes and development of behaviour as well as the ultimate evolution and adaptive value.

  
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The ethogram is a catalogue or dictionary of the discrete behaviors typically employed by a species. The included behaviors are sufficiently stereotyped that an observer may record the number of acts, or the amount of time engaged in the behaviors.

The ethogram may include drawings (or photographs) in addition to a written description of each discrete behaviour. In an ethogram, behaviors are described without explicit reference to their purpose. For example, although a specific movement may represent a putative threat display it should be given an objective name such as “head forward” or “bracing display”, and not “head forward threat” or “bracing threat”.

The definition of the display as a component of antagonistic interactions arises from the context and surrounding behaviors in which the display is observed. Ethograms often represent an early stage of investigating the behaviors of a species and the contexts in which they occur, but may also be the basis of formal scientific research.

In the early years of animal behaviour, the primary goal of many studies was the description of behaviour. Although complete ethograms are rarely published anymore in behaviour literature, they are often used by zoos to describe normal behaviour and monitor captive behaviour in order to identify pathology due to illness or poor animal care.

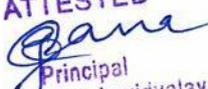
Ethograms also serve as a valuable tool for many lab and field experiments on both model organisms and ecological studies .As a tool the ethogram usually describes only a small portion of the complete behavioural repertoire.

Ethograms can be used to detect the occurrence or prevalence of abnormal behaviours (e.g. **stereotypies, feather pecking, tail-biting**), normal behaviours (e.g. **comfort behaviours**), departures from the ethogram of ancestral species and the behaviour of captive animals upon release into a natural environment.

The zoo setting also offers the possibility to repeatedly obtain physiological measures or hormone samples from the same individual, making captive animals a great resource for understanding animal biology.

## METHOD OF PREPARING AN ETHOGRAM

  
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Deciding upon the list of behaviors to record, or ethogram, there are some general principles to follow. These primarily apply to recording behaviors using interval and continuous methods but are helpful to consider for any sampling approach.

○ *Behaviors should be mutually exclusive:*

When recording behaviour, the observer should only be recording one behaviour at a time. If an animal is performing several behaviors, for instance walking and eating, the observer needs to define which behaviour is the more important to record and stay consistent with that priority.

○ *Behaviour list should be exhaustive :*

The observer should always be able to score something and should never intentionally leave missing values when recording behaviour. This can frequently happen when animals go out of sight or perform a behaviour not previously defined. To address this, the observer should include other and not Visible choices in the ethogram.

○ *Behaviour definitions should be objective :*

Defining the behaviour should be primarily based on the physical description of behaviour and not on the perceived (and potentially subjective) context. Even play behaviors, which often appear similar to hunting or social behaviors, typically have subtle physical differences to distinguish these contexts.

## DEFINING BEHAVIOUR CATEGORIES

It is helpful to define broad behaviour categories to conceptually group an ethogram. Ethogram generally includes Inactive, Feeding/ Foraging/ Drinking, Locomotion, Undesirable, Other Solitary, Social, and Not Visible.

Behaviour categories can be helpful for highlighting relationships between different types of behaviors and making an ethogram with many behaviors feel more manageable. In addition, the observer might need to add or remove behaviors during the study. In order to study and create the ethogram we used the following behaviour lists for different animals studied.

## ANIMAL SELECTED FOR ETHOLOGICAL STUDY

**ZEBRA (*Equus bruchelli*):**



**DISTRIBUTION:** South western Angola Namibia and South Africa. **HABITAT:** They occur in a variety of habitats such as grasslands savannas woodlands thorny scrublands mountains and coastal hills.

**BEHAVIOUR AND FOOD HABIT:** They are generally social animals that live in small harems to large herds. Zebras communicate with each other with high-pitched barks and whinnying. The unique stripes of zebras make them one of the animals most familiar to people. Their diet consists of grasses, but they may occasionally eat shrubs, herbs, twigs, leaves and bark.

**FOOD SERVED:** Soaked gram soaked maize crushed maize vegetables mixture of pumpkin onion and garlic.

### **BRIEF DESCRIPTION:**

1 **BODY LENGTH**-2 to 2.6 m

2. **BODY WEIGHT**-350 kg

3. **BODY COLOUR**-Body with back ground colour is black with white stripes.

**LIFE-SPAN:** About 23 years.

**THREAT:** Habitat loss due to ranching and farming and competition for water with livestock. They are also hunted for their skins.

**CONSERVATION STATUS:** Exotic mammal. IUCN Red List 2016 3.1  
Vulnerable.

## BEHAVIOUR SELECTION

### BASIC TEMPLATE FOR PATTERNS OF BEHAVIOUR FOR STUDY

  
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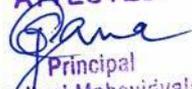
## IN ANIMALS

Type of Behavior	Behavior	Code	Description of Behavior
<i>Solitary</i>	Sleep	S	Animal assumes species-specific position for sleep. stays in one place and is not alert to environmental changes.
	Rest	R	Animal stays in one place but may be roused easily by environmental changes.
	Groom Self	GS	Animal engages in washing or smoothing its own fur or hair using tongue or forelimbs.
	Maintenance	M	Animal urinates or defecates.
	Travel	T	Animal moves from place to place.
<i>Food Related</i>	Eat	E	Animal consumes food it finds in its environment.
	Drink	D	Animal consumes water or other liquids found in its environment.
	Look for Food	LF	Animal searches the environment for food items.
<i>Social</i>	Groom Others	GO	Animal engages in washing or smoothing the fur or hair of another animal in its environment.
	Play	P	Animal engages in interactions with other that may involve locomotion, climbing, manipulating objects or other activities that show a relationship between two or more interacting animals.
	Contact	C	Animal comes in contact with another animal while engaging in a solitary behavior.
<i>Aggressive</i>	Fight	F	Animal engages in physical conflict with another animal in its environment.
	Steal Food	SF	Animal approaches another animal that has located food in the environment and either by physical force or distraction, removed that food item from the vicinity of the other animal.
<i>Off Exhibit</i>	Off Exhibit	O	Animal is not visible in exhibit.

## BEHAVIOUR CHARACTERISTICS TEMPLATE FOR STUDY OF ZEBRA AND BEHAVIOUR

Active Non- Forage	Locomote	Movement from one location to another and excludes locomotor play
	Bend	Animal lowers head to the ground for drinking, grazing, or investigating items on the ground
	Stand Alert	Animal is standing in one position, head is up and attentive to surroundings
	Stand Non-Alert	Animal is standing in one position, head is up or down, but eyes are closed and animal is not paying attention to surroundings
	Play	Animal is engaging in social (e.g., chasing), solitary (e.g., jumping/bucking) or object play (e.g., playing w/ object)
	Social Positive	Animal is engaging in grooming or affiliative contact with another individual
	Social Negative	Animal is engaging in head butt, head slap, kick or stomp behavior including chasing if preceded or followed by another aggressive behavior
	Explore/Interact Enrichment	Licking (for less than 5 seconds), sniffing, manipulating enrichment object (non-permanent, non-food) within the exhibit
	Explore/Interact Environment	Licking (for less than 5 seconds), sniffing, manipulating environment including urine/feces but not including enrichment (non-permanent, non-food)
	Self-Maintenance	Animal is engaging in grooming self, urinating or defecating; includes rubbing against exhibit features

  
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## STUDY OF ZOOCHRONY IN ZEBRA (*Equus bruchelli*)

In order to study the captive behaviour we selected the *Equus bruchelli* as the subject of study and began our observations based on the behaviour template as provided.

We arrived at the Zoological Gardens Alipore at 9.00 a.m. in the morning and moved out to the area of the animal to be observed. At first we went to the Zebra enclosure for behavioural study.

There were a few spectators outside the cage, approximately 10 visitors.

There were 3 Zebras who walking inside the enclosure and doing many activities. There were several trees in the enclosure. The trees were full of leaves. They wandered around the trees for a while and licked the trees. They ate grasses. Then they were drinking water, due to they were feeling thirsty, because of the heat.

In that mid time when they were moving around the whole area they show many behaviour like parental care, locomotion, playing, neck bending, sniffing, engaging with other and licking the net of the enclosure.

We documented the observed behaviours in an ethogram.

  
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## DISCUSSION AND INTERPRETATION

In the course of animal behaviour in the zoo, we observed different animal's and their stereotypes behaviour according to the behaviour templates. We could not observe a diverse range of animals and document their behaviours due to time constrains and other logistic and technical factors but were concentrated on the four observational animals namely the helmeted curassow, Zebra, Giraffe and the Swamp deer.

We tried to document their behaviour on the basis of the behaviour templates and enlist the different types on an ethogram. From a observational point of view, we have tried to develop a null hypothesis and also an alternate hypothesis for the cause of the behaviours we have observed.

We can consider a Null hypothesis like the following that the animal behaviours observed in the zoo are same as the natural behaviour of the animals observed .In contrast, the alternate hypothesis would be that the animal behaviours observed in the zoo are partially different from natural behaviour of the animals observed and reflect the impact of confinement showing zoochosis.

However, if we consider the behaviour patterns that were observed in the four different animals, it did speak for natural behaviours like walking, running, resting, grooming that are solitary in nature .In addition to these we also found feeding and drinking behaviour, as well as play contact, grooming and specially we were fortunate to observe parental care in both cases of giraffe as well as zebra .

Such observations seems to indicate in favour of the null hypothesis, but analysing deeply ,we also found stereotypic behaviours like licking the railings with the tongue, rubbing the head against the railing, which point out towards change from normal behaviour from wild. We were in no position to experiment to prove anything, but it appears that at least such changed behaviours do appear to support the alternate hypothesis and occurrence of zoochosis.

  
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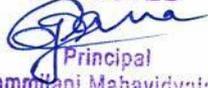
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## DISCUSSION AND INTERPRETATION

In the course of animal behaviour in the zoo, we observed different animal's and their stereotypes behaviour according to the behaviour templates. We could not observe a diverse range of animals and document their behaviours due to time constrains and other logistic and technical factors but were concentrated on the four observational animals namely the helmeted curassow, Zebra, Giraffe and the Swamp deer.

We tried to document their behaviour on the basis of the behaviour templates and enlist the different types on an ethogram. From a observational point of view, we have tried to develop a null hypothesis and also an alternate hypothesis for the cause of the behaviours we have observed.

We can consider a Null hypothesis like the following that the animal behaviours observed in the zoo are same as the natural behaviour of the animals observed .In contrast, the alternate hypothesis would be that the animal behaviours observed in the zoo are partially different from natural behaviour of the animals observed and reflect the impact of confinement showing zoochosis.

However, if we consider the behaviour patterns that were observed in the four different animals, it did speak for natural behaviours like walking, running, resting, grooming that are solitary in nature .In addition to these we also found feeding and drinking behaviour, as well as play contact, grooming and specially we were fortunate to observe parental care in both cases of giraffe as well as zebra .

Such observations seems to indicate in favour of the null hypothesis, but analysing deeply ,we also found stereotypic behaviours like licking the railings with the tongue, rubbing the head against the railing, which point out towards change from normal behaviour from wild. We were in no position to experiment to prove anything, but it appears that at least such changed behaviours do appear to support the alternate hypothesis and occurrence of zoochosis.

  
Head, Department of Zoology  
Sammilani Mahavidyalaya

ATTESTED  
  
Principal  
Sammilani Mahavidyalaya  
E.M. Bypass, Baghajatin  
Kolkata-700094

# **INTERNSHIP DOCUMENTS**



# Sammilani Mahavidyalaya

( NAAC ACCREDITED B++ )

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Ref.No.....

Date ..... May 04, 2023

## NOTICE

Students of B. Com. Semester VI are being directed to carefully note the following information for enrolment in the One Month Internship Programme and Training on Computerised Accounting with Tally Prime and e-filing of Income Tax and GST Returns, arranged by the Department of Commerce in collaboration with the Institute of Computer Accountants (ICA). Certificates will be given to all students on successful completion of the Programme and Training. Enrolment in the Programme and regular attendance in the Training classes is **mandatory for Hons. students.**

### Classes will be held at:

29/1/1, Raja S. C. Mallick Road, Kolkata-700032 at Sukanta Setu crossing or Sulekha crossing near Lokenath Baba Mandir beside Shyamapalli Shyamasangha Club

### Contact person:

Mr. Tapas Kumar Hudait (#9088011066)

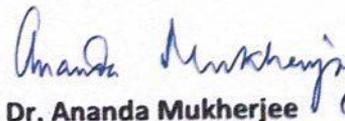
### Document required for enrolment:

Photocopy of Aadhaar card

### Enrolment fees:

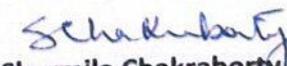
Rs. 200/- (Rupees Two hundred only) to be paid in cash only at the time of enrolment on May 08, 2023

**\*\*\* Enrolment will be done on Monday, May 08, 2023 from 11:30 a.m. to 2:00 p.m. in the Department of Commerce \*\*\***

  
Dr. Ananda Mukherjee 04/05/23  
Head  
Department of Commerce

Head  
Department of Commerce  
Sammilani Mahavidyalaya  
Baghajatin, E.M. By-Pass, Kolkata-94

  
Principal  
Sammilani Mahavidyalaya  
E.M.Bypass, Baghajatin  
Kolkata - 700 094

  
Dr. Sharmila Chakraborty  
Teacher-in-Charge

Teacher-In-Charge  
Sammilani Mahavidyalaya  
E.M. Bypass, Baghajatin  
Kolkata-700094



CLASS - 2

21/06/2015 to 27/06/2015

SLNO	NAME	M.B.NO	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10
1	Palash Ray	9832628409	AD									
2	Deepayan Das	743992935	AD									
3	Arnab Das	6291062451	AD									
4	Sahid Mishy	7988516411	AD									
5	Avik Manojatra	743052130	AD									
6	Omkar Holder	912331150	AD									
7	Gourab Bhosumick	891059928	AD									
8	Saumen Das	987533578	AD									
9	Mousumi Geyron	6291841674	AD									
10	Kulloil Fedha	7939898492	AD									
11	Ashik Roy	704477441	AD									
12	Dipon Adhikary	6290967535	AD									
13	Ashut Ray	7044	AD									
14	Sikhi Ghosh	9339028802	AD									
15	Sourav Ghim	747892298	AD									
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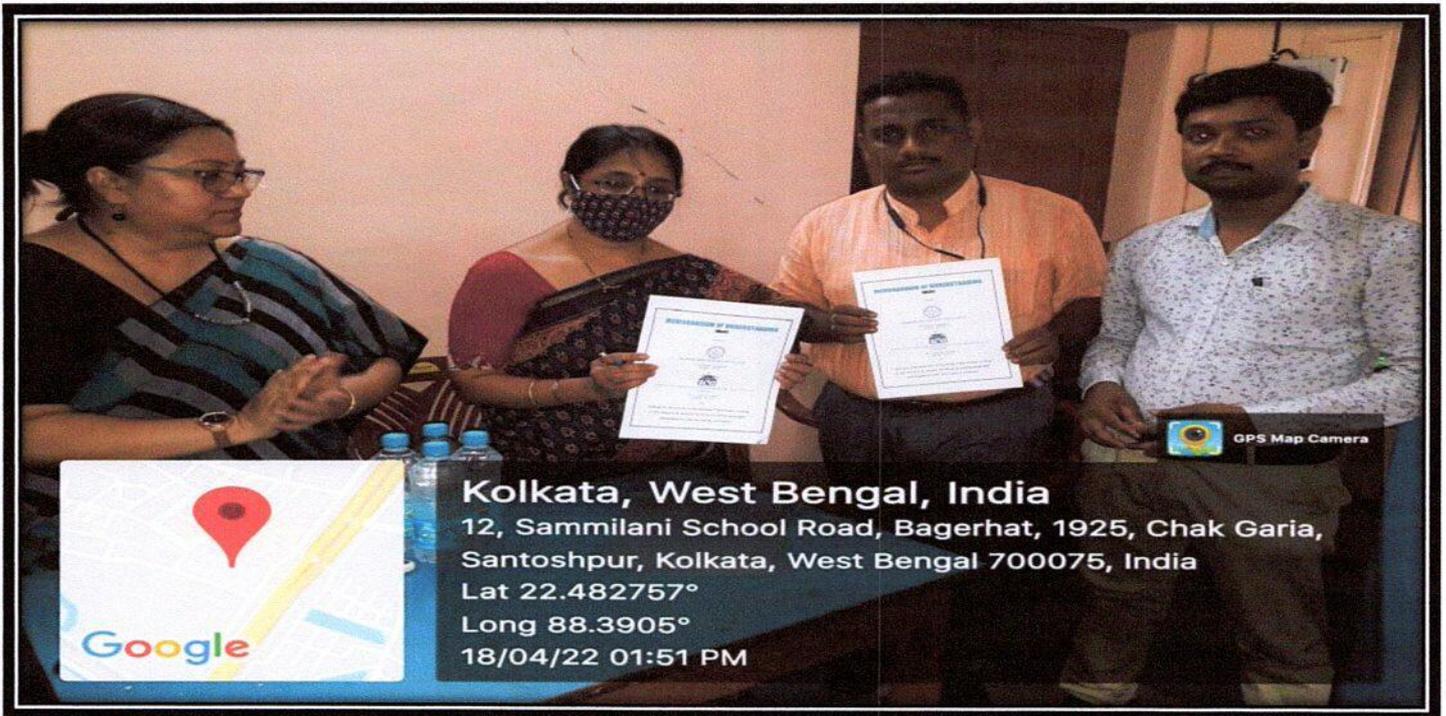
20/06/2015

CLASS - 3

NAME	NO	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10
1. Sujan Sikder	6205089907	S. Sikder									
2. RAJKUMAR MONDAL	7864011824	R. Mondal	K. Mondal	R. Mondal							
3. PARADH MAJTY	9330711823	P. Majty	R. Majty	P. Majty							
4. <del>PRADHAN</del>	<del>8335982625</del>	<del>P. Pradhan</del>									
5. <del>SMIT HOJIMDRA</del>	<del>987031460</del>	<del>S. Hojindra</del>									
6. <del>Smit Hojindra</del>	<del>6251147644</del>	<del>S. Hojindra</del>									
7. Soma Saha	9248011878	S. Saha									
8. Suresh Dasen Saha	7605860143	S. Saha									
9. Manisha Saha	7439641301	M. Saha									
10. Subhoyid Saha	7890929803	S. Saha									
11. <del>Manoj Ghosh</del>	<del>7803070837</del>	<del>M. Ghosh</del>									
12. Shreya Sarkar	8420703411	S. Sarkar									
13. Oyojita Chakravarti	8016315933	O. Chakravarti									
14. Anshika Ghosh	7980812580	A. Ghosh									
15. <del>Subhrajit Pan</del>	<del>9062940534</del>	<del>S. Pan</del>									
16. Suramendra Mondal	9062940534	S. Mondal									
17.											
18.											
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Teacher: *[Signature]*

## Geo-tagging photo of Mou signing



## Geo-tagging photos of Internship Certificates Distribution



E journal - E book 21-22

# Sammilani Mahavidyalaya

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www.sammilanimahavidyalaya.org

12.04.2022

Date .....

Ref.No.....

## Notice

A meeting of the Internal Quality Assurance Cell (IQAC) will be held on Tuesday, April 19, 2022 at 2.30 p.m. in the IQAC Room to consider the agenda mentioned below. All the esteemed members are requested to attend the meeting at the appointed time and date.

1. Confirmation of the minutes of the first meeting of the reconstituted IQAC held on 7<sup>th</sup> February 2022.
2. Report of the Coordinator on the progress of AQAR 2020-21 preparation including status of different criteria as submitted by the respective Advisors and team members, for submission to NAAC within 15.05.2022.
3. More collaborations/linkages with Academia and Industry through signing of MoU.
4. Procurement of various e-journals, e-books and e-resource in the library of the college.
5. Introducing of Green Audit and Energy Audit in the college.
6. Procurement of branded computers with original operating system and a projector for IQAC room.
7. Miscellaneous, if any.

*Srikanta Malakar*

Dr. Srikanta Malakar

(Coordinator, IQAC)

Coordinator  
IQAC

Sammilani Mahavidyalaya  
E. M. By Pass, Baghajatin  
Kolkata-700 094

*Sharmila Chakraborty*

Dr. Sharmila Chakraborty

(Teacher-in-Charge)

Teacher-in-Charge

Sammilani Mahavidyalaya

E.M. Bypass, Baghajatin  
Kolkata-700094

462-6869  
E-mail :  
gmail.com  
yalaya.org  
Website :  
yalaya.org

.2022

Members present :

19, 2022 at  
esteemed  
held on 7<sup>th</sup>  
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1. Shaila Chakraborty
2. Smita Ghosh Bhowmik
3. Nirmal Kr. Sanyal
4. Ananda Mukherjee
5. Malay Roy
6. Banani Gangopadhyay
7. Samita Chakraborty
8. Bapan Kumar Maity
9. Rajyeshwar Sarda
10. Sumita Das
11. Soukanta Malakar
12. Ak.

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Website :

www.sammilanimahavidyalaya.org

Ref.No.....

Date .....19.04.2022.....

## Minutes of the second meeting of the IQAC held on Monday, 19<sup>th</sup> April, 2022 at 2.30 p.m. in the IQAC Room

The meeting commenced with the Teacher-in-Charge taking the chair..The agenda were taken up for discussion one by one and the following resolutions were adopted.

1. The minutes of the last meeting held on 07.02.2022 were read and confirmed.
2. Dr. Srikanta Malakar, Coordinator of the IQAC, reported on the progress of AQAR 2020-21 preparation including status of different criteria as submitted by the respective Advisors and team members, for submission to NAAC within 15.05.2022. He expressed his hope that the AQAR 2020-21 would be submitted within the stipulated time.

After a thorough discussion regarding the progress in preparing the AQAR 2020-21, the members expressed their satisfaction and appreciated the Coordinator for his leadership. It was resolved unanimously that the Coordinator be requested to carry on with the diligent effort so that the submission of AQAR 2020-21 might be done within the stipulated time.

3. The members agreed to the proposal of the Coordinator regarding the necessity of more collaborations/linkages for Faculty exchange, Student exchange, Internship of students, Field trip, On-the- job training, Research, etc. with Academia as well as Industry, and resolved that the Teacher-in-Charge be requested to take necessary initiative in this regard including signing of Memorandum of Understanding (MoU) with other institutions/industry, wherever required.

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4. Resolved unanimously that the proposal of Dr. Bapan Kumar Maity, Librarian of the college, for procurement of various e-journals, e-books and e-resources in the library, be approved and he be entrusted with the responsibility of carrying out the procurement process.
5. Resolved unanimously that conducting Green Audit, Energy Audit, Water Audit and Environment Audit in the college, be approved and Sri Debasish Roy, Head, the Department of Zoology, be requested to initiate the necessary process as soon as possible.
6. Resolved unanimously that the procurement of two branded desktop computers with original operating system and a projector for the IQAC room, be approved; and Dr. Malay Roy, Bursar of the college, be entrusted with the responsibility of carrying out the procurement process.
7. Resolved unanimously that the proposal of Sri Nimal Kumar Samanta, Headmaster, Ghutiari Sharif B M Vidyapith (HS) and an external member in the IQAC, of opening a new YouTube Channel of the college for uploading college-related audio, video, webinars, etc., be approved.

As there was no other agendum to discuss, the meeting ended with a vote of thanks to the chair.

*Srikanta Malakar.*

Dr. Srikanta Malakar  
(Coordinator, IQAC)

*Coordinator*  
**IQAC**  
Sammilani Mahavidyalaya  
E. M. By Pass, Baghajatin  
Kolkata-700 094

*Sharmila Chakraborty*  
Dr. Sharmila Chakraborty

(Teacher-in-Charge)

Teacher-In-Charge  
Sammilani Mahavidyalaya  
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Kolkata-700094



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www.sammilanimahavidyalaya.org

Ref.No.....

06.06.2022

Date .....

## Report of the Coordinator regarding compliances to the Resolution adopted in the IQAC Meeting held on 19.04.2022

1. Memoranda of Understanding (MoUs) with Institutions of national, international importance, other universities, industries, corporate houses etc. have been going on. The Department of Commerce has signed a MoU with Institute of Computer Accountants Edu. Skills Pvt. Ltd. (Jadavpur), 29/1/1 Raja S.C Mallick, Kolkata- 700032 to facilitate "Training in Computerised Accounting (Tally ERP 9), e-filing of GST & Income Tax Returns, and Related Skill Development; and Internship" for the students of B. Com. Stream of the college.
2. One Month Internship Programme and Training on Computerised Accounting with Tally Prime and e-filing of Income Tax and GST Returns, arranged by the Department of Commerce in collaboration with the Institute of Computer Accountants (ICA), has commenced on 12.05.2022 and will continue till 10.06.2022.
3. Procurement of various e-journals, e-books and e-resources in the library of the college has been entrusted to Dr. Bapan Kumar Maity, Librarian of the college.
4. The process for conducting Green Audit, Energy Audit, Water Audit and Environment Audit in the college has already been initiated and Sri Debasish Roy, Head, the Department of Zoology, has been entrusted with the job.
5. Procurement process for one branded computer with original operating system for the IQAC [Resolution no. 1(f) of the Finance Sub-committee meeting held on 05.05.2022] has already been initiated and Dr. Malay Roy, Bursar has been assigned the responsibility.

*Srikanta Malakar,*  
Dr. Srikanta Malakar

(Coordinator, IQAC)

Coordinator  
IQAC

Sammilani Mahavidyalaya  
E. M. By Pass, Baghajatin  
Kolkata-700 094

*Sharmila Chakraborty*  
Dr. Sharmila Chakraborty

(Teacher-in-Charge)

Teacher-In-Charge  
Sammilani Mahavidyalaya  
E.M. Bypass, Baghajatin  
Kolkata-700094



SAMMILANI MAHAVIDYALAYA  
E.M. Bypass, Baghajatin, Kolkata - 700 094



INSTITUTE OF COMPUTER ACCOUNTANTS EDU. SKILLS PVT. LTD.  
29, U.I. Raja S.C. Mallick Road, Kolkata - 700 032

### Certificate

This is to certify that

Miss/Mr. Silpi Ghosh .....

of Sammilani Mahavidyalaya (B.Com Semester VI 2023) has successfully completed  
the One Month Internship Programme (30 hrs.) on

**"Computerised Accounting with Tally Prime and e-filing of Income Tax and GST Returns"**

held from May 15, 2023 to June 18, 2023



In-Charge (Branch)

Institute of Computer  
Accountants Edu. Skills Pvt. Ltd

*Ananda Mukherjee*  
Head, Department of Commerce

Sammilani Mahavidyalaya  
HEAD  
DEPT OF COMMERCE  
Sammilani Mahavidyalaya  
E.M. Bypass, Baghajatin

*Shreeraj*  
Teacher-in-Charge

Sammilani Mahavidyalaya  
Teacher-in-Charge  
Sammilani Mahavidyalaya  
E.M. Bypass, Baghajatin  
Kolkata-700094

*Gana*  
Principal  
Sammilani Mahavidyalaya  
E.M. Bypass, Baghajatin  
Kolkata - 700 094



SAMMILANI MAHAVIDYALAYA  
E.M. Bypass, Baghajatin, Kolkata - 700 094



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29/1, 1st Bapp S.C. Mallick Road, Kolkata - 700 033

### Certificate

This is to certify that

Miss/Mr. *Ankita Ghosh* .....

of Sammilani Mahavidyalaya (B.Com Semester VI 2023) has successfully completed  
the One Month Internship Programme (30 hrs.) on

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In-Charge (Branch)

Institute of Computer  
Accountants Edu. Skills Pvt. Ltd

*Anande Mukherjee*  
Head, Department of Commerce

Sammilani Mahavidyalaya  
HEAD  
DEPT OF COMMERCE  
Sammilani Mahavidyalaya  
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*Sanku*  
Teacher-in-Charge

Sammilani Mahavidyalaya  
Teacher-in-Charge  
Sammilani Mahavidyalaya  
E.M. Bypass, Baghajatin  
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*Jana*  
Principal  
Sammilani Mahavidyalaya  
E.M. Bypass, Baghajatin  
Kolkata - 700 094



SAMILANI MAHAVIDYALAYA  
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### Certificate

This is to certify that

Miss/Mr. Ankan Halder

of Sammilani Mahavidyalaya (B.Com Semester VI 2023) has successfully completed  
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In-Charge (Branch)

Institute of Computer  
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Ananda Mukherjee  
Head, Department of Commerce

Sammilani Mahavidyalaya  
HEAD  
DEPT OF COMMERCE  
Sammilani Mahavidyalaya  
E.M. By Pass, Baghajatin

Sherkhaty  
Teacher-in-Charge

Sammilani Mahavidyalaya  
Teacher-in-Charge  
Sammilani Mahavidyalaya  
E.M. Bypass, Baghajatin  
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Gana  
Principal  
Sammilani Mahavidyalaya  
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