DBMS Assignment 1 Report

Team Details :

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Problem Statement :

Stock Exchange, a web application which simulates the Stock Market by allowing the users to buy and sell virtual stocks of companies by fluctuating the prices of the stocks by a computer program thereby simulating the fluctuation of prices of stocks in real world according to the news and other factors like supply-demand ratio. On the frontend the list of investments of the user are shown in a tabulated form which are calculated on the backend by joining multiple relational database tables and performing arithmetic operations on them. A graph will be shown to the user which shows how his portfolio is performing over different time scales. On the backend all the buy-sell entries of the user are recorded in relational tables which are further linked to other tables by various constraints to properly manage the data of the user. Other than stock equity various other investment products like mutual funds, bonds, commodities like gold,silver,crude oil etc. are provided to the user so he can get well versed in trading and investments strategies and options before diving into the world of stock market and exploring the unlimited opportunities and potential the stock market presents.

Requirements:

1. Authentication of users and displaying the user's investment portfolio along with a graph which shows the trends in his investments.

2. A user interface which provides an option to view, buy and sell the virtual stocks, Mutual Fund, Bonds and other investment products of various companies whose prices are fluctuated by computer program.

3. Intuitive Graphs showing Market Fluctuation and equities to give an overall idea about the market and the potential risks involved if an investment is made based on the pattern of the graphs.

4. Users can look at their transaction details showing details of stocks that were purchased or traded.

5. Relational Database Tables to record the details of the users ranging from their personal details to their stock portfolio and other information like details about the brokers and type of transactions made.

6. Real time updation of the Tables linked by various constraints if any of the details of the users change.

7. Cascade delete if any ambiguities or any errors are recorded in tables which may lead to data discrepancy.

8. Role based access to the database and displaying different views to each.

Assumptions:

1. Google based login to the users which gives a unique identification token which is then used as the unique and not null Investor and Trader ID across the tables.

2. Company names and Stock prices, Mutual Fund, Bonds, Commodities details and prices are added by the database admin.

3. Computer program needed to fluctuate the prices of the stocks at regular intervals in order to simulate the real world demand-supply of the stock market.

4. Mutual Funds are a group of stocks only recorded in the database, bonds and its details are compiled from the internet and commodities prices may or may not match the real world prices.

5. Bank and transaction details are recorded to record any fraudulent transactions which are checked based on the constraints set on the respective attributes. (For example a check constraint on bank account number which limits the bank account number to minimum 9 and maximum 18 digits)

6. Various Broker options are given to the user to select the broker with minimum brokerage fees which does not happen in the real world where the user needs to do his own part of research to find the appropriate broker and trading platform.

7. Having Stock ID (S_ID) as a primary key in the stock entity table, instead of stock name which happens in the real world, where the stocks are identified by their names.

8. Providing default money in Margin Available attribute using default constraint so the user can use it to buy and sell the virtual stocks presented to him on the application.

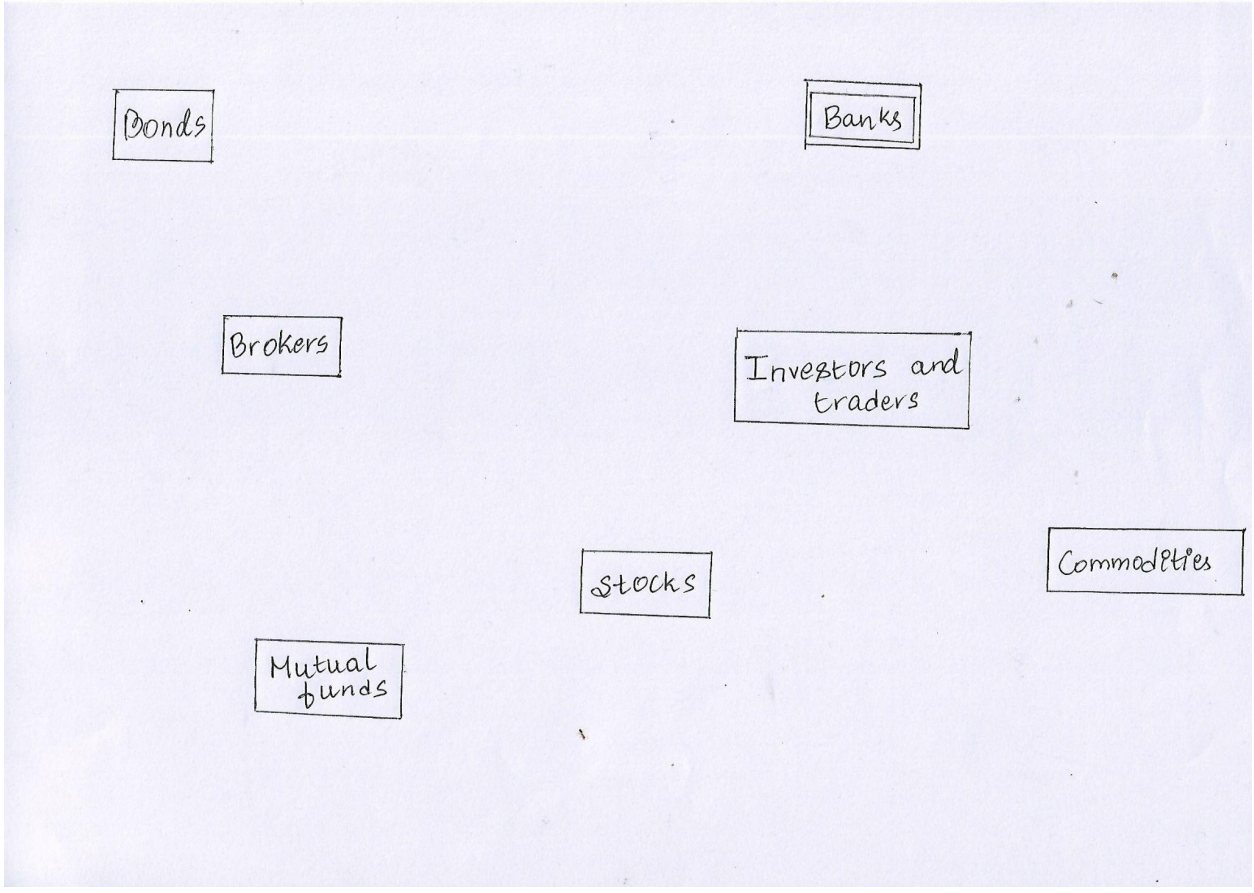
Constraints in MiniWorld:

1. Investors and Traders have **unique and not null** I_ID, composite attribute Address, DOB, derived attribute Age, Phone Number, Aadhar Number, Margin Available.
2. Investors and Traders can have only 1 Bank account, but a bank has many accounts.
3. Bank has Bank Name, Account numbers, Branch and IFSC code.
4. Investors and Traders can make many transactions and each transaction can only be made by 1 user.
5. Each Transaction has a unique T_Id, Amount, Mode of Transaction and Amount.
6. Investors and Traders can hold many stocks and stocks are held by at least 1 Investors and traders.
7. Stocks have unique S_ID, Company Name, Current Value, Total Quantity and multi valued attributes smallCap, midCap, largeCap.
8. Investors and Traders can hold many Mutual Funds and Mutual Funds are held by at least 1 Investors and traders.
9. Mutual Funds have unique M_Id, Name, S_ID, Percentage holding in stock.
10. Mutual Funds is a collection of many stocks and a stock can belong to only 1 Mutual Fund.
11. Investors and Traders can hold many bonds and bonds are held by at least 1 Investors and traders.
12. Bonds have unique Bond_ID, Coupon, Frequency, Face Value, YTM, Name, Price Per Unit and Tenure.
13. Investors and Traders can hold many Commodities and Commodities are held by at least 1 Investors and traders.
14. Commodities have unique C_ID, Name, Price and type.

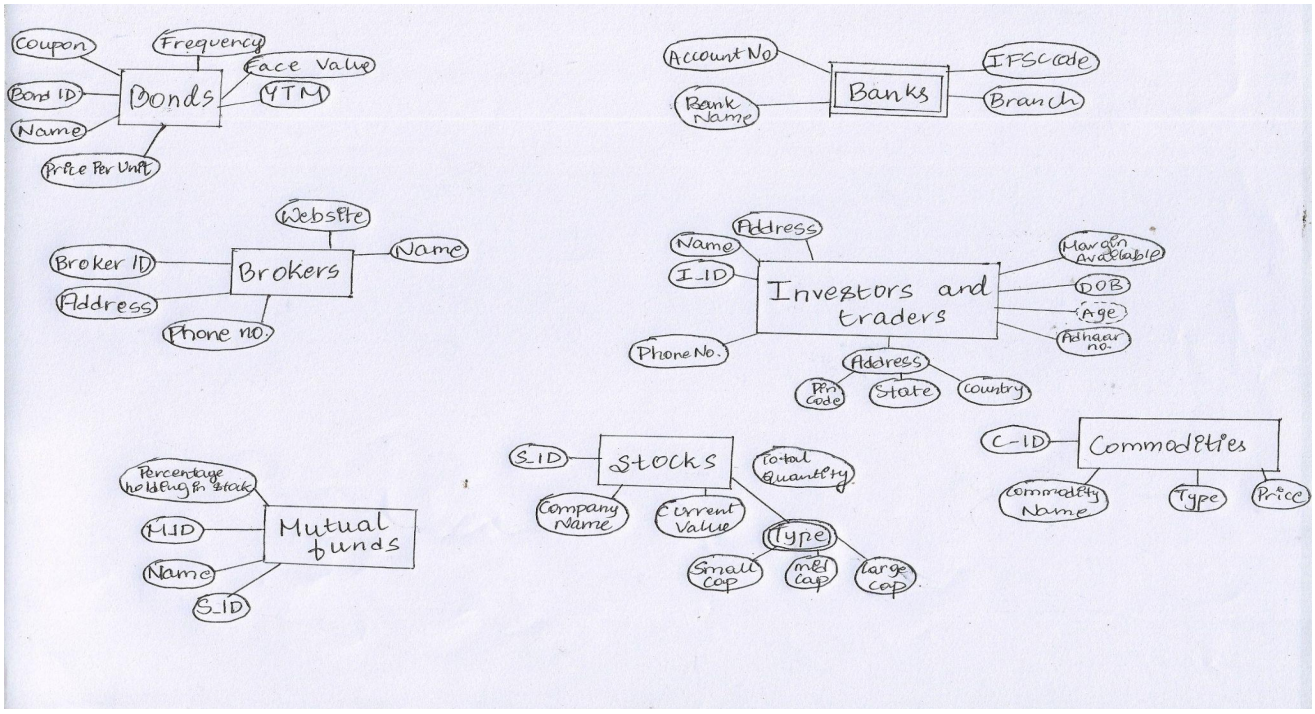
15. Investors and Traders can buy stocks, mutual funds, bonds and commodities from many brokers and brokers can exist without investors and traders.
16. Brokers have a unique B_ID, website, name, phone number, address.
17. Brokers buy and sell many stocks, bonds, mutual funds and commodities to investors and traders.
18. Every stock, bonds, mutual funds and commodities can be held by more than 1 broker.

Stages of ER Diagram:

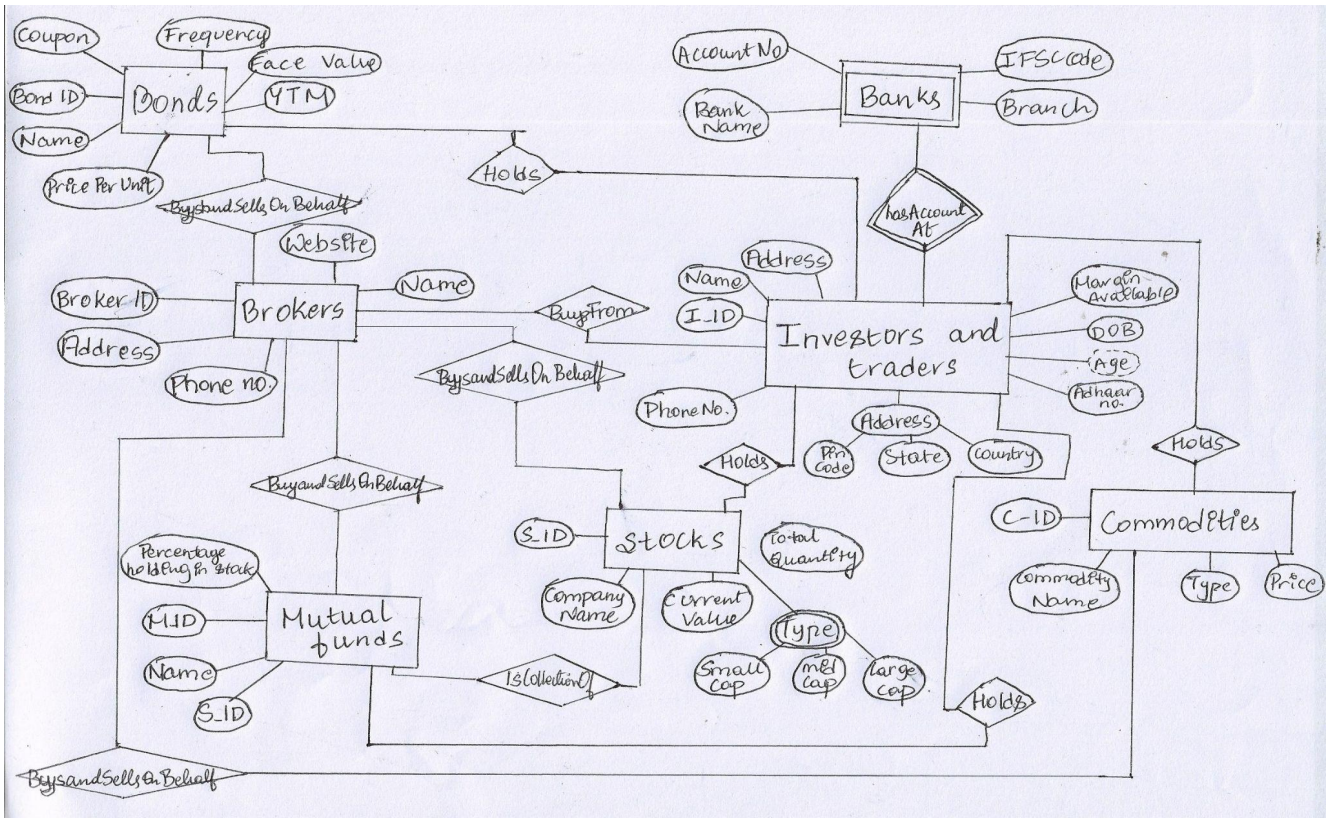
Entities



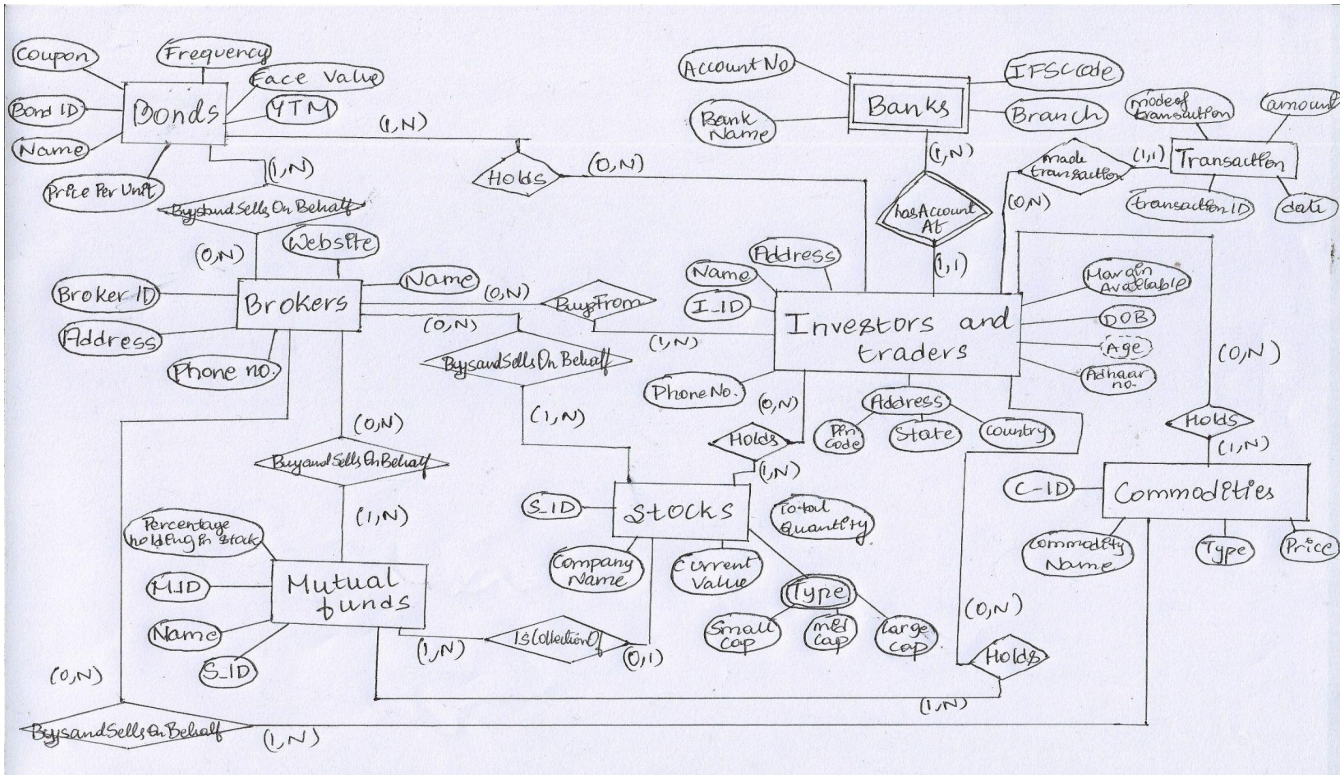
Entities with attributes



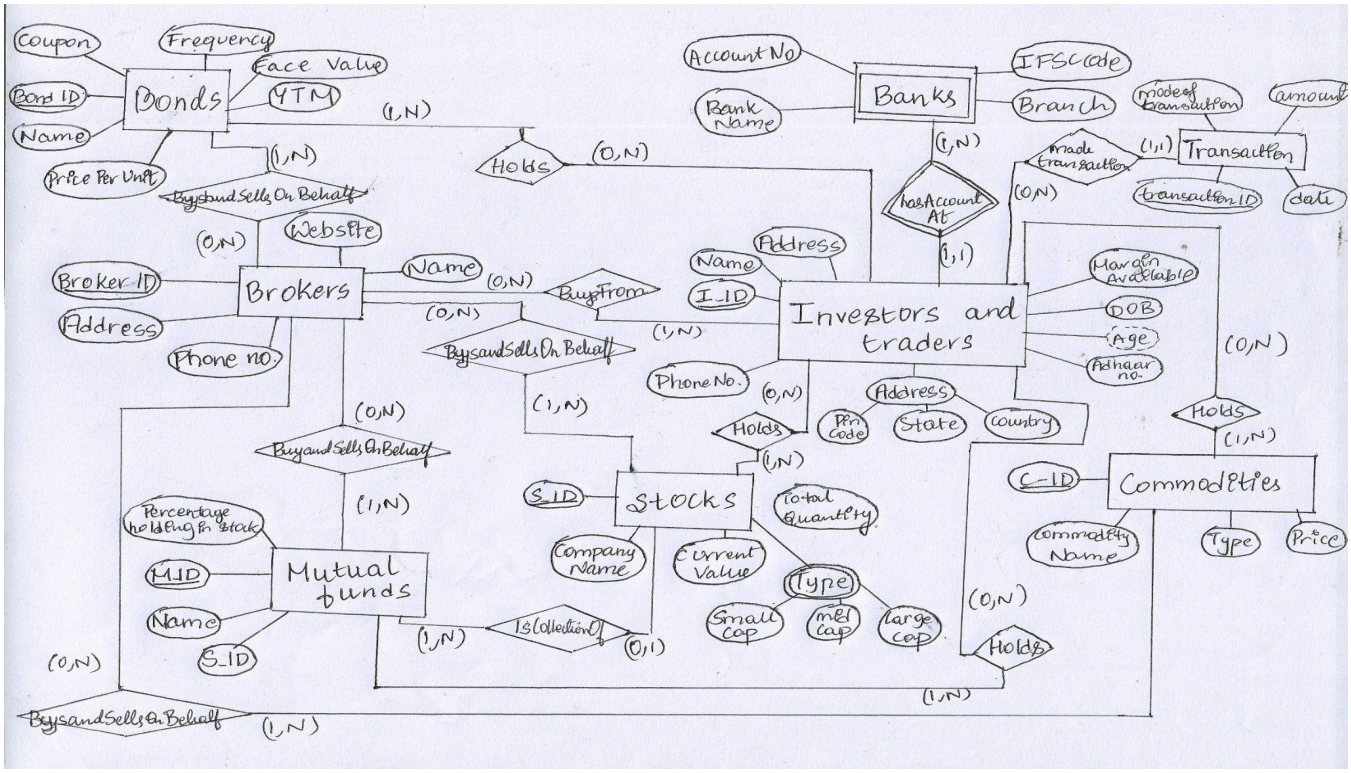
Relationships between entities



(Min,Max) notation



Primary Keys



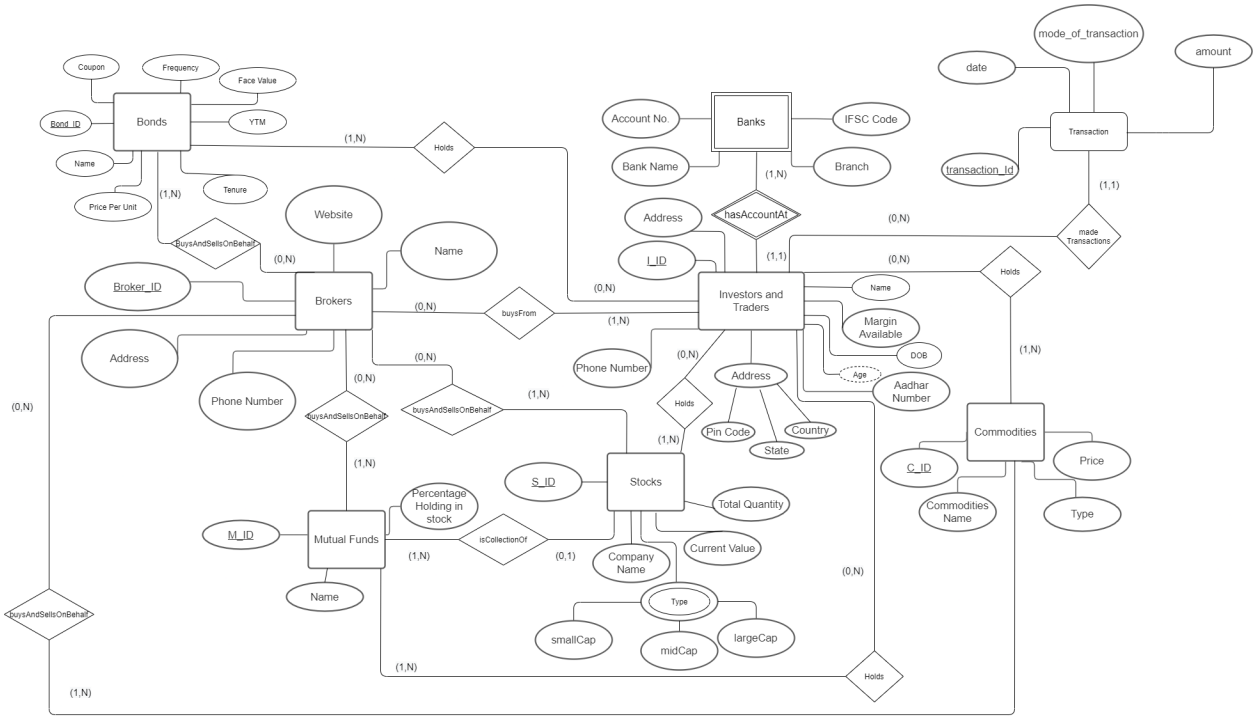
ER Tool Used:

draw.io :
diagrams.net (formerly draw.io) is **free online diagram software**. You can use it as a flowchart maker, network diagram software, to create UML online, as an ER diagram tool, to design database schema, to build BPMN online, as a circuit diagram maker, and more. draw.io can import .vsdx, Gliffy™ and Lucidchart™ files .

- An Online Tool for making flow charts, process diagrams and Entity Relationship Diagrams.
- Allows Collaboration between teams online.
- It's Open Source.
- Easy to add various types of entities, attributes and relationships.

Reference Links:
→ ER Diagram
→ ER Model
→ Cardinality Ratio
→ Participation Constraints
→ Notations used in ER diagram

Final ER Diagram:



Contribution and Time Spent:

Abhiram Puranik - Constructed ER diagram by hand and tool.
(4.5 hrs)
Abhishek Aditya BS - Report Making, coming up with (min,max) notation and relationships between entities.
(4 hrs)
Adithya M S - Domain (mini world) research and coming up with the ideas. (4 hrs)