**DBMS Mini Project**

**E-R Diagrams**

MOCK STOCK

*By*

Team: *From the makers of Glutrix*

10IT02 Abhay Ramesh Chennagiri

10IT62 Prajwal R Prasad

10IT106 Suresh Alse

Problem Statement:

The online game “MOCK STOCK” can be played by registered USERS.

* Each USER has a unique ID (UID), name, password, email, age and virtual money
* USER *owns shares of* different COMPANY(s) and he *does* TRANSACTIONS i.e. he can buy shares from the virtual stock market or sell the shares owned by him.

The online game MOCK STOCK consists of list of virtual COMPANY(s)

* Each COMPANY has a name, Company ID(CID), Locations(s), total number of shares it has and description of the company which includes the type of the company, its historical background and its net worth.
* The COMPANY can distribute its shares among the USERs who are willing to buy them..
* The price per share at different time instances are stored in STOCK RECORD

In the virtual stock market TRANSACTIONs occurs i.e buying and selling of shares occur.

* Each TRANSACTION has Total Price, time, number of shares, buy/sell
* The USER of given UID can buy/sell shares of a company with CID. This transaction is stored.

Each STOCK RECORD contains the price per share of a company at a given time instance.

In MOCK STOCK timely updated NEWS is provided

* Each news is assosciated with a time stamp at which it will be made available to the USER.
* News may be updates related to the virtual companies or news in general, which may influence the share prices.

Brief Explanation of entities and attributes

1. **USER**: A user is the one who has registered himself to play the online game, “MOCK STOCK”. He is provided with an initial virtual amount. He can buy or sell shares (do a transaction) of companies at the virtual stock market.

*Attributes:*

UID: unique ID of the user with which he does all his transactions

Email: e mail address of the user to which necessary updates are sent

Virtual money: Current available virtual amount with the user

Profit/Loss: Net profit or loss of the user which is a derived attribute

Name, age of the user

1. **COMPANY**: A company distributes its shares in the virtual market.

*Attributes:*

Name , locations of the company

Description: Description of the company which includes type of company, historical background, motive and net worth of the company

CID: Company ID by which it is identifiable in the virtual market

Total number of shares of the company

1. **TRANSACTION**: A transaction refers to an event where a user buys or sells shares of a company at particular time instance.

*Attributes:*

Time: time at which the transaction took place

Total price: Amount involved in the transaction

Buy/Sell: Whether shares were bought or sold

Number of shares: Number of shares involved in the transaction

1. **STOCK RECORD**: A STOCK RECORD contains the price per share of a company at a given time instance. The price per share of a company is time varying.

*Attributes:*

Time: Time instance of the record

Price per share: share price of a company

1. **NEWS**: Information that is provided to the user on a timely basis which may influence the rise or fall of share prices.

*Attributes:*

Time: T ime at which the event of news occurred or time at which news was made available to the user.

[News: Company](News:Company) updates and general news

*Preliminary Design of entity types for the MOCK STOCK database*

**USER**

Name (First name, Last name), UID , age , password , money , e mail , profit/loss ,

{owns shares of(Company, Number of shares)}

**COMPANY**

Name , CID , {Locations} , Total number of shares , Description( Type , History , Worth )

**TRANSACTION**

Total price , number of shares , Buy/sell , time

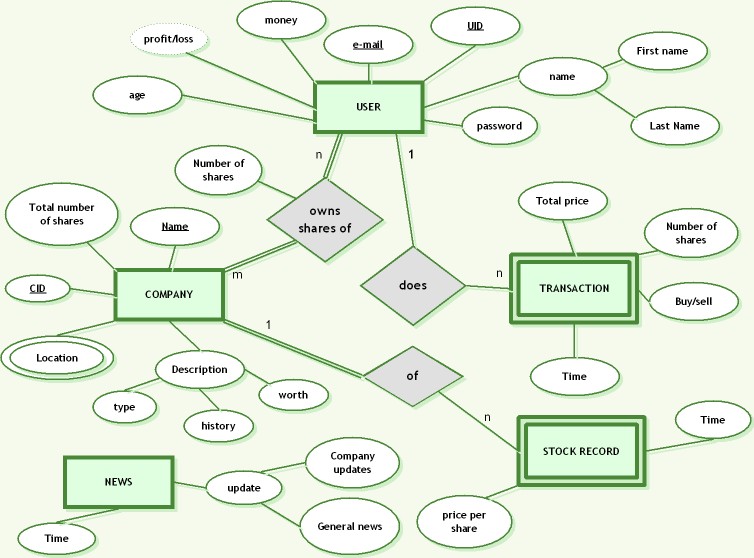
**STOCK RECORD**

Time , price per share

**NEWS**

Time , News( Company Updates , General news )

E-R Diagram of MOCK STOCK database



ER to Relational Mapping (7 step- algorithm ):

***Step1: Mapping of regular entity types:***

We create the relations USER, COMPANY and NEWS in the relational schema corresponding to the regular entities in the E-R diagram.

* UID is the Primary key for the relation USER.
* CID is the Primary key for the relation COMPANY.

USER:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| First Name | Last Name | Age | UID | Password | Money | Email |

COMPANY:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Total Number of shares | CID | type | history | worth |

NEWS:

|  |  |  |
| --- | --- | --- |
| Time | Company news | General news |

***Step2: Mapping of weak entity types:***

We create the relations TRANSACTION and STOCK RECORD corresponding to the weak entity types in the E-R diagrams.

* Primary key UID of USER relation is included as a foreign key attribute of TRANSACTION.
* Primary key CID of COMPANY relation is included as a foreign key attribute of STOCK RECORD.

TRANSACTION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time | Total price | Number of shares | Buy/sell | UID |

STOCK RECORD

|  |  |  |
| --- | --- | --- |
| Time | Price per share | CID |

***Step3: Mapping of binary 1:1 relation Types***

None

***Step4: Mapping of Binary 1:N relation types:***

* A USER *does* many TRANSACTIONs i.e. buying or selling of shares of COMPANY(s).The primary key of USER , UID , has already been included as foreign key attribute in Step 2. The primary key of COMPANY , CID , is included as a foreign key in the relation TRANSACTION.
* For the relationship type *of* which connects the entity types STOCK RECORD and COMPANY, CID which is the primary key of COMPANY had to be included as a foreign key in the relation STOCK RECORD. But this has already been achieved in Step 2.

TRANSACTION

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Time | Total price | Number of shares | Buy/sell | UID | CID |

***Step5: Mapping of Binary M:N relationship types:***

We create a new relation OWN\_SHARES\_OF to represent the m: n relationship *‘* USER *owns shares of* COMPANY*’.*

* The primary keys of the USER and COMPANY relations are included as foreign keys in OWNS\_SHARES\_OF.
* Attribute ‘number of shares’ in OWNS\_SHARES\_OF relation represents the ‘number of shares’ attribute of the relation type.
* The primary key of the OWNS\_SHARES\_OF relation is the combination of the foreign key attributes {UID,CID}

OWNS\_SHARES\_OF

|  |  |  |
| --- | --- | --- |
| UID | CID | Number of shares |

***Step6: Mapping of multivalued attributes:***

We create a new relation ‘COMPANY\_LOCATIONS’ where the attribute ‘Locations’ represents the multi valued attribute ‘locations’ of the entity type COMPANY, while CID as foreign key represents the primary key of the COMPANY relation.

* The primary key of the OWNS\_SHARES\_OF relation is the combination { CID , Locations }

COMPANY\_LOCATIONS

|  |  |
| --- | --- |
| CID | Location |

***Step7: Mapping of N-ary relation types:***

None

**Schema of a Relation**

1. **USER** (First Name, Last Name, Age, UID ,Password, Money, E-mail)

r(USER) C dom (First name)×dom (Last Name)×dom (Age) ×dom (UID) ×dom(password) ×dom(Money) ×dom(E-mail)

*USER1*

( Ramesh , Powar , 25 , 10RP25 , ram\_pawar , 50,000, ram\_pawar@gmail.com )

*USER2*

( Bharat, Kashyap ,19 , 10BK19 , bkkashi , 50,000 , kashyap123@gmail.com )

r(USER)

t1 = (Ramesh,Powar,25, 10RP25,ram\_pawar,50,000,ram\_pawar@gmail.com)

t2 = (Bharat, Kashyap ,19,10BK19,bkkashi,50,000,kashyap123@gmail.com)

1. **COMPANY**(Name, Total No of shares, CID, type, history, worth)

r(COMPANY) C dom( Name)×dom(Total no of shares)×dom(CID) ×dom(type) ×dom(history) ×dom(worth)

*COMPANY1*

( Bharat Aritel,25,000,COM10,Telecommunication,founded by Glutrix,200Crores) *COMPANY2*

(Nokiya, 50,000,COM6,Mobile,Founded by Charles Finn,3000Crores)

r(COMPANY)

t1 ( Bharat Aritel,25,000,COM10,Telecommunication,founded by Glutrix,200Crores) t2 (Nokiya,50,000,COM6,Mobile,Founded by Charles Finn,3000Crores)

1. **NEWS** (Time, Company News, General News)

r(NEWS) C dom(Time)×dom(Company News)×dom(General News)

*NEWS1*

(10/10/2011,NULL, Rupee devalued by 50ps)

*NEWS2*

( 5/6/2012,Srinivas B, a young enterpreneur to head Sumosung CO when he assumes the office on Sunday as the CEO of the company,NULL)

r(NEWS)

t1 = ( 10/10/2011-12:30,NULL, Rupee devalued by 50ps)

t2 = ( 5/6/2012-18:32,Srinivas B, a young enterpreneur to head Sumosung CO when he assumes the office on Sunday as the CEO of the company, NULL)

1. **TRANSACTION** (Time ,Total Price,No of Shares, Buy/Sell,UID,CID)

r(USER) C dom(Time)×dom(Total Price)×dom(No Of Shares) ×dom(Buy/Sell) ×dom(UID) ×dom(CID)

*TRANSACTION1*

(1/10/11-19:26, 1000, 10, Sell, 10KB02, COM2)

*TRANSACTION2*

(1/11/11-12:30, 500, 50, Buy, 10GH56, COM10)

r(TRANSACTION)

t1 = (1/10/11-19:26, 1000, 10,Sell, 10KB02, COM2)

t2 = (1/11/11-12:30, 500, 50, Buy, 10GH56, COM10)

1. **STOCK\_RECORD** (Time,Price per Share,CID)

r(STOCK RECORD) C dom(Time)×dom(Price per Share)×dom(CID)

*STOCK \_RECORD1*

(28/8/12-1:30,25,COM5) *STOCK \_RECORD2*

(26/8/12-13:38, 1800, COM10)

r(STOCK \_RECORD)

t1 = ( 28/8/12-1:30,25,COM5)

t2 = (26/8/12-13:38,1800,COM10)

1. **OWNS\_SHARES\_OF**(UID ,CID ,No of Shares)

r(OWNS\_SHARES\_OF) C dom(UID)×dom(CID)×dom(No of shares)

*OWNS\_SHARES\_OF1*

(10FT59,COM15 ,150)

*OWNS\_SHARES\_OF2*

(10IT62,COM20, 1000)

r(OWNS\_SHARES\_OF)

t1 = (10FT59 , COM15, 150)

t2 (10IT62, COM20, 1000)

1. **COMPANY\_LOCATIONS** (CID, Location)

r(COMPANY\_LOCATIONS) C dom(CID)×dom(Location)

*COMPANY\_LOCATIONS1*

(COM15, Bengaluru) *COMPANY\_LOCATIONS2*

(COM18, Hyderabad)

r(COMPANY\_LOCATIONS)

t1 = (COM15 , Bengaluru ) t2 = (COM18, Hyderabad)

**Constraints:**

**USER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| First Name | Last Name | Age | UID | Password | Money | Email |

**COMPANY**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Total Number of shares | CID | type | history | worth |

**NEWS**

|  |  |  |
| --- | --- | --- |
| Time | Company news | General news |

**TRANSACTION**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Time | Total price | Number of shares | Buy/sell | UID | CID |

**STOCK\_RECORD**

|  |  |  |
| --- | --- | --- |
| Time | Price per share | CID |

**COMPANY\_LOCATIONS**

|  |  |
| --- | --- |
| CID | Location |

**OWNS\_SHARES\_OF**

|  |  |  |
| --- | --- | --- |
| UID | CID | Number of shares |

*Referential Integrity Constraints*

1. USER
   1. Primary Keys:
      1. UID
   2. Super keys:
      1. UID
      2. Name
   3. NOT NULL:
      1. Email
      2. Age
      3. Name
      4. Password
   4. UNIQUE:
      1. Email
   5. Other domain Constraints:
      1. Age above 18 years
      2. Password length minimum 6 characters
      3. Money can’t become negative
2. COMPANY:
   1. Primary keys:
      1. CID
   2. Super Keys:
      1. CID
      2. Name
   3. NOT NULL:
      1. Name
      2. Total number of shares
3. TRANSACTION:
   1. Primary keys: None
   2. Foreign keys:
      1. USER.UID
   3. NOT NULL
      1. Time
      2. Total Price
      3. Number of shares
      4. Buy/sell
4. NEWs:
   1. Candidate keys: None
   2. Primary keys: None
   3. Foreign keys: None
   4. NOT NULL:
      1. Time
5. STOCK RECORD:
   1. Primary keys: None
   2. Foreign keys:
      1. COMPANY.CID
   3. NOT NULL
      1. Time
      2. Price per share