

# CSCE 5350-FUNDAMENTALS OF DATABASE SYSTEMS

## Assignment-1

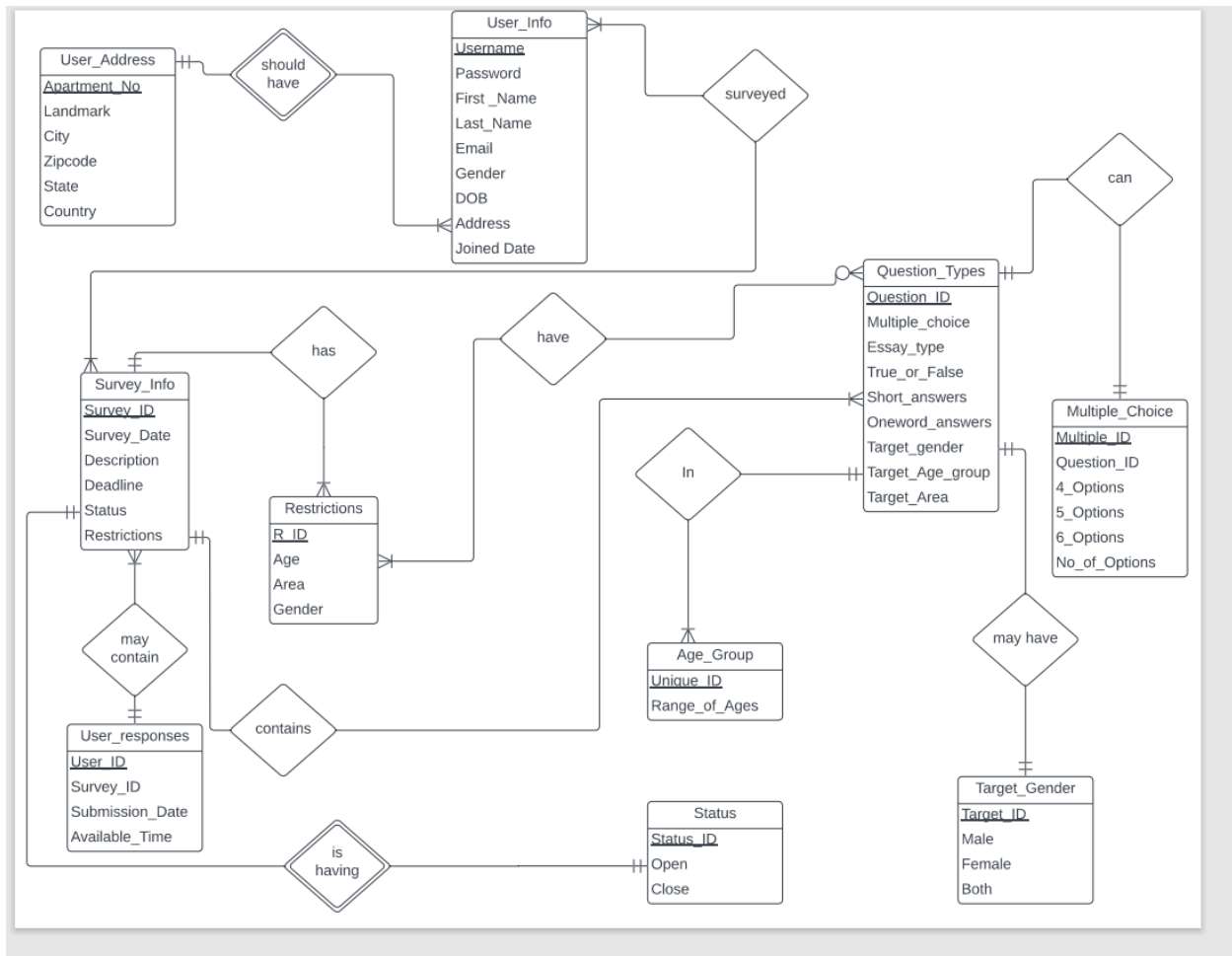
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### 1)Entity Relationship Model:



2a)

**i) Relational Schema:**

User\_Address (Appartment\_No, Landmark, City, Zipcode, State, Country)

User\_Info (Username, password, First\_Name, Last\_Name, Email, Gender, DOB, Address, JoinedDate)

Survey\_Info (Survey\_ID, Survey\_Date, Description, Deadline, Status, Restrictions)

Question\_Types (Question\_ID, Multiple\_Choice, Essay\_Type, True\_or\_False, Short\_Answers, Oneword\_Answers, Target\_Gender, Target\_Age\_Group, Target\_Area)

Multiple\_Choice (Multiple\_ID, Question\_ID, 4\_Options, 5\_Options, 6\_Options, No\_of\_options)

Restrictions(R\_Id, Age, Area, Gender)

User\_responses(User\_ID, Survey\_ID, Submission\_Date, Available\_Time)

Target\_Gender(Target\_ID, Male, Female, Both)

Age\_Group(Unique\_ID, Range\_of\_Ages)

Status(Status\_ID, Open, Close)

**ii) Cardinality:**

User\_Address-User\_Info → one to many

User\_Info-User\_Address → Many to one

User\_Info-Survey\_Info → Many to Many

Survey\_Info-Restrictions → one to Many

Survey\_info-User\_Responses → Many to One

Survey\_Info-Question\_Types → One to Many

Survey\_Info-Status → One to One

Restrictions-Survey → Many to One

Restrictions-Question\_Types → Many to Many

Question\_Types-Survey\_Info → Many to One

Question\_Types-Age\_Group → One to Many

Question\_Types-Multiple\_Choice → One to One

Question\_Types-Target\_Gender → One to One

**iii) Weak Entities:**

User\_Address

Status

**2b) Primary Keys:** Primary Keys are columns which are used to identify specific unique values in tables. It can't be NULL. Only the primary key may remain in a table.

User\_Address (Apartment\_No→Primary Key)

User\_Info (Username→Primary Key)

Survey\_Info (Survey\_ID→Primary Key)

Question\_Types(Question\_ID→Primary Key)

Multiple\_Choice(Multiple\_ID→Primary Key)

Restrictions(R\_Id→Primary Key)

User\_responses(Survey\_ID→Primary Key)

Target\_Gender(Target\_ID→Primary Key)

Age\_Group(Unique\_ID→Primary Key)

Status(Status\_ID→Primary Key)

**Foreign Keys:** A field in a table that is associated to a Primary Key in another table is known as a foreign key.

User\_responses(Survey\_ID→Foreign Key)

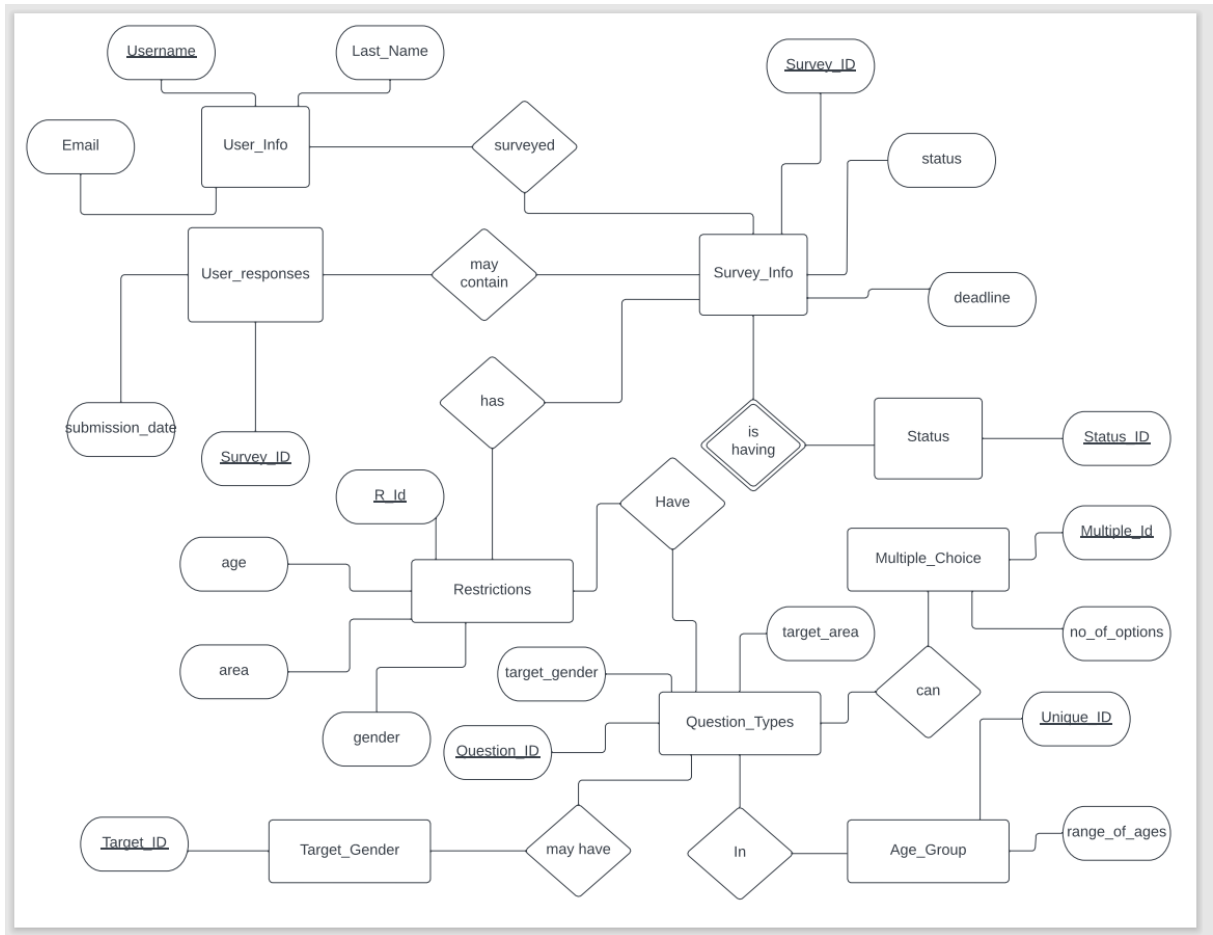
Multiple\_choice( Question\_ID→Foreign Key)

**3)Normalization:** Normalization can be defined as it is a process of converting a Database design into Standard format.

**a)1NF:** It is the first stage of Normalization process. In 1NF each set of columns must uniquely identify a row.

**b)2NF:** It is the second stage of Normalization process and it fulfill the requirements of 1NF,each non key attribute must be functionally dependent on Primary Key.

**c)3NF:** The main purpose of 3NF is to fulfill the requirements of 2NF and it has no transitive functional dependency.



#### 4) Relational Algebra Expression:

a)  $\sigma_{\text{multiple\_id}(\pi_{\text{mc.Question\_id}=\text{qt.Question\_id}}(\text{Multiple\_choice}(\text{mc}) \times \text{Question\_types}(\text{qt})) \text{ and } (\text{mc.Question\_id}=\text{"select the option"})}$

b)  $\sigma_{\text{survey\_id, description, user\_id}(\pi_{\text{id}='1'}(\text{User\_responses}(\text{u}) \times \text{Survey\_info}(\text{s})) \text{ and } (\text{u.survey\_id}=\text{s.survey\_id})}$

### 5)SQL Screenshot:

SELECT \* FROM INSTRUCTOR;

The screenshot shows a SQL IDE interface. The top pane contains SQL code for creating a database, using it, creating a table named INSTRUCTOR, and inserting 13 rows of data. The bottom pane displays the 'Result Grid' showing the data inserted into the INSTRUCTOR table.

```
1  -- CREATE DATABASE FDB;
2  -- USE FDB;
3  -- CREATE TABLE INSTRUCTOR(ID VARCHAR(10),NAME VARCHAR(25),SUBJECT VARCHAR(30),SALARY VARCHAR(10));
4  -- SELECT * FROM INSTRUCTOR;
5  • insert into instructor values('63395', 'McKinnon', 'Cybernetics', 94333.99);
6  • insert into instructor values('78699', 'Pingr', 'Statistics', 59303.62);
7  • insert into instructor values('96895', 'Mird', 'Marketing', 119921.41);
8  • insert into instructor values('4233', 'Luo', 'English', 88791.45);
9  • insert into instructor values('4034', 'Murata', 'Athletics', 61387.56);
10 • insert into instructor values('50885', 'Konstantinides', 'Languages', 32570.50);
11 • insert into instructor values('79653', 'Levine', 'Elec. Eng.', 89805.83);
12 • insert into instructor values('50330', 'Shuming', 'Physics', 108011.81);
13 • insert into instructor values('80759', 'Queiroz', 'Biology', 45538.32);
```

ID	NAME	SUBJECT	SALARY
63395	McKinnon	Cybernetics	94333.99
78699	Pingr	Statistics	59303.62
96895	Mird	Marketing	119921.41
4233	Luo	English	88791.45
4034	Murata	Athletics	61387.56
50885	Konstantinides	Languages	32570.50
79653	Levine	Elec. Eng.	89805.83
50330	Shuming	Physics	108011.81
80759	Queiroz	Biology	45538.32
73623	Sullivan	Elec. Eng.	90038.09
97302	Bertolino	Mech. Eng.	51647.57

INSTRUCTOR 3 x

Read Only