7BUIS030W REVISION-1
Solutions

Multiple Choice Questions

1. The Data Protection Act is a law designed to protect what?

a. Your computer from being hacked
b. Personal data stored on computers
c. Theft of copyright materials

2. What is a person or company that collects data about people called?

a. Information commissioner
b. Data controller
c. Data subject

3. Which of the following is a tool to store, edit and organise data in a database?

a. A database
b. A database management system (DBMS)
c. SQL

4. What is a foreign key?

a. A foreign key is a field that is a unique identifier in that entity
b. A foreign key is a field that does not belong in that table
c. A foreign key is a primary key that appears in another table to create a relationship between the two tables

5. What is an entity?

a. A table in a database
b. A field in a database
c. A record in a database

6. What type of relationship exists between a person and national insurance number?

a. One to One
b. One to Many
c. Many to Many

7. Explain what is meant by DDL and DML with examples **[4 Marks]**

Data Definition Language (DDL) for defining the database structure and controlling access to data Eg: CREATE, ALTER, DROP

Data Manipulation Language (DML) is for retrieving and updating data. Eg: SELECT, INSERT

8. A company undertake projects in the IC design industry. Teams of engineers work on various chip design projects, under the guidance of their team leaders. These team leaders are frequently assessed during performance reviews to ensure that they are the right fit to lead the team. The company is seeking to design and develop a database-driven management system to be used internally to help organise the management and monitoring of projects.
   The Conceptual Entity-Relationship Diagram (ERD) for part of the company management system is shown below (figure 1). Carefully consider this conceptual ERD.

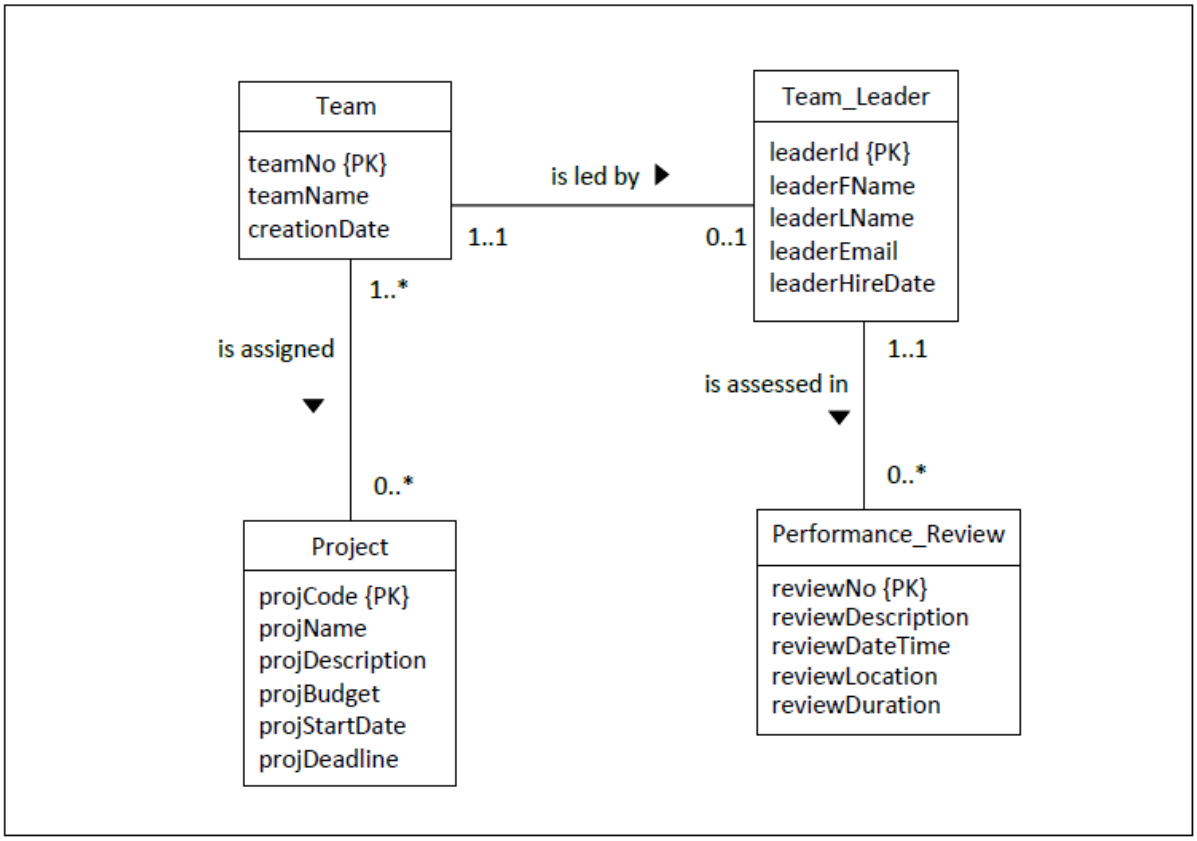


Figure 1: Conceptual ERD for part of the company management system

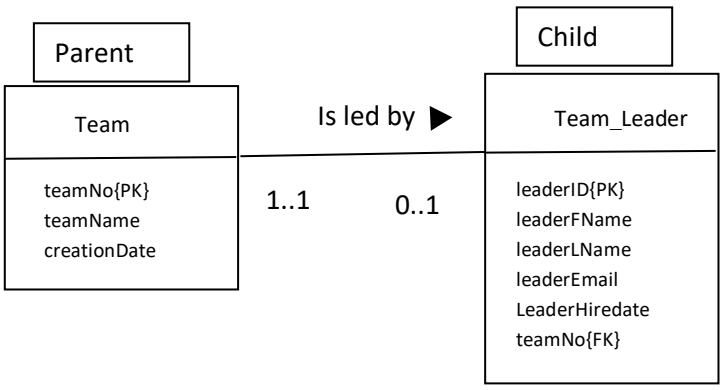
Question 8.1

a. Discuss in detail the multiplicity of the relationship 'is led by' (between the entities Team and Team_Leader). Provide adequate justifications to support your answers. **[4 Marks]**

One team can have no team leaders- If the team is newly created or the team leader has resigned
One team can have a maximum of one team leader- Only one team leader manages the team
One team leader can lead a minimum of one team and a maximum of one team- One team is assigned one team leader as per spec.

b. Briefly explain how you would map the relationship *is led by'* (between the entities Team and Team_Leader) to a logical ERD. Provide a diagram to support your answer. Make sure you include all the correct attributes and keys. **[6 Marks]**

This is a one to one relationship with optional participation on one side.
In this case, the logical ERD contains 2 tables, the entity at the 1 side can be the parent and the entity at the optional side can be child



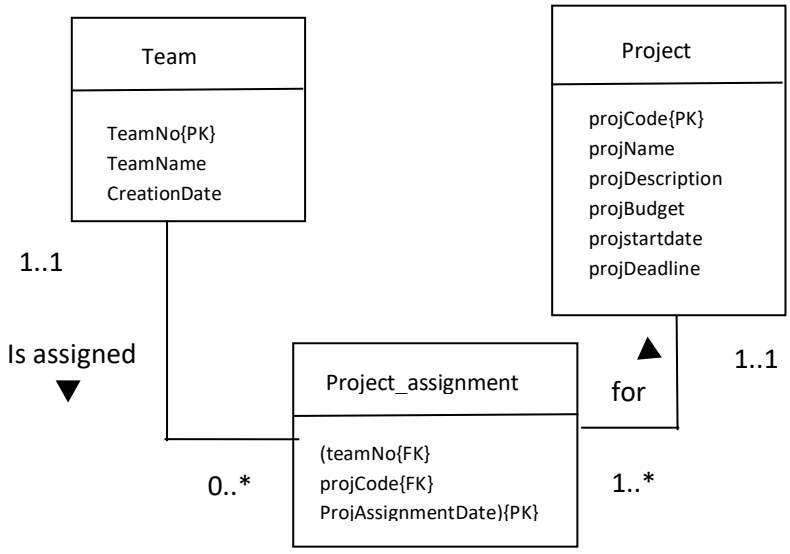
Question 8.2

a. Discuss in detail the multiplicity of the relationship 'is assigned' (between the entities Team and Project). Provide adequate justifications to support your answers. **[4 Marks]**

One team is assigned no projects- It might be a new team
One team is assigned many projects
One project is assigned to minimum one team
One project is assigned to many teams- Multiple section of the project might be assigned to multiple teams

b. Briefly explain how you would map the relationship '*is assigned to work on'* (between the entities Team and Project) to a logical ERD. Provide a diagram to support your answer. Make sure you include all the correct attributes and keys. **[6 Marks]**

This is a many to many relationship. Both tables are parents.
In this case, the logical ERD contains 3 tables, two parent tables and one link table



Question 8.3

a. Write a SQL query to display the complete names and email addresses of the team leaders who were hired after 7 January 2017 and whose surnames start with the letter R. **[5 Marks]**

```
SELECT leaderFName, leaderLName,leaderEmail
FROM Team_Leader
WHERE leaderHireDate > '2017-01-07'
AND leaderSName LIKE 'R%';
```

b. Write a SQL query to display the Name, Description and budget of all the projects, but only for those projects that do not cost more than £250000.00 and less than £500000.00 **[5 Marks]**

```
SELECT projName, projDescription, projBudget
FROM Project
WHERE projBudget NOT BETWEEN 250000 AND 500000;
```

c. Write the SQL Code to create the Team_Leader and performance_review tables for the MySQL RDBMS. Carefully think of the data type for every column, whether a column can be left empty or not and whether additional constraints need to be defined. **[10 Marks]**

```
CREATE TABLE Team_Leader
( leaderId          VARCHAR(5),
leaderFName     VARCHAR(5) NOT NULL,
leaderLName       VARCHAR(5) NOT NULL,
leaderEmail        VARCHAR(5) NOT NULL,
leaderHireDate    TIMESTAMP NOT NULL,
TeamNo            INT(3) NOT NULL,
CONSTRAINT         t_lid_pk PRIMARY KEY (leaderId),
CONSTRAINT         t_tid_fk FOREIGN KEY (TeamNo) REFERENCES Team(TeamNo)
);


CREATE TABLE performance_review
( reviewNo          INT(5),
reviewDescription  VARCHAR(50) NOT NULL,
reviewDateTime     DATETIME NOT NULL,
reviewLocation     VARCHAR(50) NOT NULL,
reviewDuration     TIMESTAMP NOT NULL,
leaderId           VARCHAR(5) NOT NULL,
CONSTRAINT         p_rno_pk PRIMARY KEY (reviewNo),
CONSTRAINT         p_lid_fk FOREIGN KEY (leaderId) REFERENCES Team_Leader(leaderId)
);
```