Course No: IS211 Semester: Summer 2014 Title: Database Systems-1 Duration: 60 minutes

Lecturer Name: Dr. Ayman Taha Model Answer

Question 1 (6 Marks) 1 mark for each point: Differentiate among the following terminology

i. Primary key, foreign key, partial key and candidate key Primary Key: on or more attributes satisfy key constraints and it is chosen to be the main key in any entity. While Candidate key is a set of attributes that satisfy Key constrains but are not chosen to be primary key On the other hand partial key is an attribute that exists to weak entity that is used part of primary key in physical model foreign key is a primary key in another table. FKs map relationships in conceptual model

ii. Database administrator, Database designer, end users and Database developer

Database administrator is the person responsible for authorizing access to the database, for coordinating and monitoring its use.

Database Designers is the person responsible to define the content, the structure, the constraints, and functions or transactions against the database

Database Developer is the person responsible to map user requirements into forms and reports.

End-user uses the data for queries, reports and some of them update the database content.

- iii. Database Management System (DBMS) and application program
 Database Management System (DBMS) is a software package/ system
 to facilitate the creation and maintenance of a computerized database.
 Application program is SW that make use of DBMS in order to control
 database and map user requirements from forms and reports
- iv. Referential integrity constraints and Primary key constraints Referential integrity constraint: The value in the foreign key column (or columns) FK of the the referencing relation R1 can be either match referencing primary values or be null

While primary key constraint is that the primary key attributes PK of each relation schema R in S

- It cannot have null values
- It should be unique.

v. Conceptual data model and physical data model

Conceptual data models: Provide concepts that are close to the way many users perceive data. It contains only entity without **foreign keys** and relations while physical data models: Provide concepts that describe details of how data is stored in the computer. Foreign keys and indexes are appeared in physical models

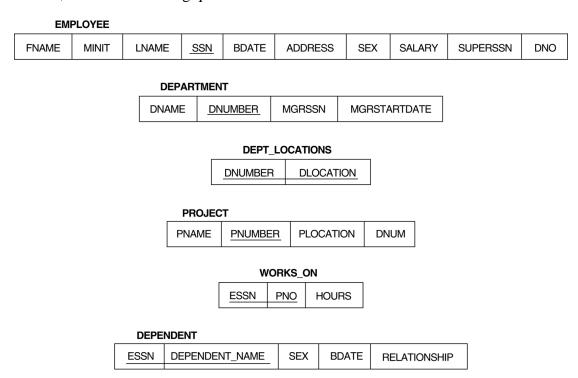
vi. DDL, DCL and DML

DDL Data Definition language is part of SQL that is related to the stroed data of tables e.g., create, alter and drop tables

DDL Data Definition language is part of SQL that is related to the structure of tables e.g., create, alter and drop tables

DCL Data Control language is part of SQL that is related to the users and their roles in database e.g., grant, and revoke

Question 2 (12 Marks) 2 marks for each query: Based on the below database schema, write the following queries:



1- Write SQL statement to create Table Works-on including its constraints.

CREATE TABLE WORKS_ON

 (Essn
 CHAR(9)
 NOT NULL,

 Pno
 INT
 NOT NULL,

 Hours
 DECIMAL(3,1)
 NOT NULL,

PRIMARY KEY (Essn, Pno),

FOREIGN KEY (Essn) REFERENCES EMPLOYEE(Ssn), FOREIGN KEY (Pno) REFERENCES PROJECT(Pnumber));

2- Get the name of employee who gets the lowest salary.

SELECT FNAME,LNAME FROM EMPLOYEE

Where salary in (select min (salary)

From employee)

3- Get the employee names who has no supervisor.

SELECT FNAME,LNAME FROM EMPLOYEE

WHERE SUPERSSN IS NULL

4- Retrieve the name and address of all employees who work for the 'Research' department.

SELECT FNAME, LNAME, ADDRESS FROM EMPLOYEE, DEPARTMENT

WHERE DNAME='Research' AND DNUMBER=DNO

5- For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birthdate.

SELECT PNUMBER, DNUM, LNAME, BDATE, ADDRESS

FROM PROJECT, DEPARTMENT, EMPLOYEE
WHERE DNUM=DNUMBER AND MGRSSN=SSN

AND PLOCATION='Stafford'

6- For each project on which more than two employees work, retrieve the project number, project name, and the number of employees who work on that project.

SELECT PNUMBER, PNAME, COUNT (*)

FROM PROJECT, WORKS_ON
WHERE PNUMBER=PNO
GROUP BY PNUMBER, PNAME
HAVING COUNT (*) > 2

Question 3 (12 Marks): Consider a movie database in which data is recorded about the movie industry. The data requirements are summarized as follows:

- Each movie is identified by title and year of release. Each movie has a length in minutes. Each has a production company, and each is classified under one or more type (such as horror, action and drama).
- Each movie has one or more directors and one or more actors appear in it.
- The persons involved in the movie database are classified as directors, actors, and producers. Each is identified by a unique personnel id. They are also described by their first and last names and age.
- Actors are further described by other attributes such as their spoken languages and gender. While, directors are further described by their certificates. However, producers are further described by their fortune.
- Each actor has a role in the movie.
- It is possible for a director to produce and/or act in a movie (including one that he or she may also direct).
- Production companies are identified by name and each has an address. A
 production company produces one or more movies.
- Each production company is owned by one or more producers while each producer is participated in only one production Company.

Design an Entity-Relationship diagram for the movie database.

Grades for ERD:

Inheritance (4 grades (2 for inheritance + 2 for optional))

6 entities (3 grades)

4 relations (3 grades + 2 for correct relationship type e.g., many-to 1)

Multivalve attribute type of movie (1 grade)

Role attribute on relationship (1 grade)

