**Database Sheet-2 Dr. Hatem Abdulkader 2019**

**Question One**

**1-**Give five attributes for the following entities:

Student- Book- Professor

2- Consider a small database for a School . The database stores general information about students (stud\_id, stud\_name, grad\_level), classes (class\_id, class\_name, units\_earned), instructors (inst\_id, inst\_name, position), and grades (grad\_id, stud\_id, class\_id, grad) in the following way.

* Classes can contain zero, one, or more students. Students are enrolled in zero, one, or more classes.
* Classes can be a prerequisite of zero, one, or more classes. In this case, a class can be both a normal class and a prerequisite class for another class.
* A class can be taught by one instructor and one instructor only. Each instructor can teach zero, one, or many classes.
* Instructors can give zero, one, or more grades. Grades can be given by zero, one, or more instructors.
* Students can receive zero, one, or more grades. Grades can be given to zero, one, or more students.
* Grades can come from one class and one class only. A class can have many grades earned from it.

Draw the E/R diagram, including the cardinality of the relationships and determine which relationship is a recursive relationship. Also, determine which attributes are candidate keys, and select a primary key for each entity.

**Question Two**

A engineering consultancy firm supplies temporary specialized staff to bigger companies in the country to work on their project for certain amount of time. The table below lists the time spent by each of the company’s employees at other companies to carry out projects. The National Insurance Number (NIN) is unique for every member of staff.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **NIN** | **Contract No** | **Hours** | **Employee Name** | **Company ID** | **Company Location** |
| 616681B | SC1025 | 72 | P. White | SC115 | Belfast |
| 674315A | SC1025 | 48 | R. Press | SC115 | Belfast |
| 323113B | SC1026 | 24 | P. Smith | SC23 | Bangor |
| 616681B | SC1026 | 24 | P. White | SC23 | Bangor |

1. Explain in which normal form this table is
2. Find the Primary Key for this relation and explain your choice.
3. Find the **Fully Functional Dependencies** on the PK and the **Partial Dependencies** on the PK.
4. Normalise the table to 2NF
5. Find the transitive dependencies on the 2NF tables

**Question Three**

1- The school library stores information about the borrowing of books in the database file. The following show the structures of the two files:

BORROW Table

field type width contents

id numeric 5 student id number

bcode character 6 book code

bdate date 8 date of borrowing

category character 20 category of the book

STUDENT.Table

field type width contents

id numeric 5 student id number

name character 10 name

sex character 1 sex: M / F

class character 2 class

Using SQL statements to perform the following tasks:

(a) Print a list of the student id number and the book code of the books borrowed in the period 25 October to 4 November 1996 (both dates inclusive). The list should be in ascending order of student id number.

(b) List the codes of the books borrowed by Peter of class 1A.

(c) Find the number of English books borrowed in each day. (The first 3 characters of the book code are "ENG".) The list should be in the descending order of the number of books borrowed.

(d) Find the category of the books borrowed by the boys most.

**Question Four**

1- Give five data types in Access database engine

2- Draw an entity relationship diagram for the following bakery system:

A commercial bakery makes many different products. These include breads, desserts, specialty cakes, and many other baked goods. Materials such as flour, spices, milk and so on is purchased from vendors. Sometimes an ingredient is purchased from a single vendor and other times an ingredient is purchased from many vendors. The bakery has commercial customers, such as schools and restaurants, that regularly place orders for baked goods. Each baked good has a specialist that oversees the setup of the bake operation and inspects the finished product.

**Question Five**

**A-Choose the correct answer**

1-The role of the query system is to:

A)present the data in a user friendly format B)provide data security C)retrieve and manipulate data D)support data integrity

2- Which of the following items is not the advantage of a DBMS?

A)Data Independence B)Decentralized administration of the data C)Ease of application development D)Uniform security, privacy and integrity

3-The term referring to a physical item existing in the real world that you want to track is called:

A)class B)entity C)object D)table

4-Two different terms are used to describe the characteristics of interest for an entity. They are properties and:

A)attributes B)classes C)entities D)traits

5. What is the component of a DBMS that is responsible for storing, retrieving, and updating data?

A)data dictionary B)data management engine C)database engine D)query engine

6-The tool which assists in generating input screens is referred to as:

A)data dictionary B)forms generator C)input screen tool D)report generator

7- The ability to modify the data structure and not have to change the programs using that data is called:

A)data dictionary B)data independence C)data integrity D)referential integrity

8- Which of the following items is not a DBMS:

A)Access B)Acrobat Reader C)Oracle D)SQL Server

9-Which of the following languages is used to define the schema of the database?

A)DCL B) DDL C) DML D)None of these

10- A(n) \_\_\_\_\_\_\_\_\_\_\_\_ is a field or combination of fields that can be used to access or retrieve records.

A) foreign key B)secondary key C)ERD D) command key

**Question Six**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **IDNum** | **FirstName** | **LastName** | **SchoolName** | **SchAddress** | **SchCity** | **SchState** | **SchZip** |
| 1 | Joe | Smith | Carver | 123 Easy Street | Little Rock | AR | 72201 |
| 2 | Freda | Joseph | Carver | 123 Easy Street | Little Rock | AR | 72201 |
| 3 | Busy | Body | Cloverdale | 456 Anywhere | Little Rock | AR | 72209 |
| 4 | Pikup | Andropov | Lakewood | 789 High | North Little Rock | AR | 72222 |

For the above table perform the first, second and Third Normal form to the final design