**SECTION 1 ---------------------------------------------------------------**

**PROBLEM 1 -**

* 1. (3 points) a. Explain the following terms in the context of the relational data model. Use EmployeeDepartment database from Appendix 1 (at the end of this handout) to provide examples of each term.
* ▪ Relation
  + A relation is a table essentially, it is a set of items that are all related by a schema (set of fields or attributes) and all the items (rows) in the relation are unique.
    - An Example of this is the EMP Table itself
* ▪ Attribute
  + An attribute is a field that exists inside of a relation that serves to specify what kind of data exists below it in the table. For example, a USERID might be afield, so for every object that exists as a row, in the column that has the attribute USERID the item in that row is that object’s USERID.
    - An example of this is the EMPNO field in the EMP relation.
* ▪ Domain
  + A domain is the specification of the range of data a particular cell item in the table can hold. For example, An item of Specification USERID may only hold an integer that is 4 digits long maximum, because there will never be more than 9999 employees. So “int(4)” would be the domain for USERID
    - An example of this is that EMPNO has a domain of int(4) (because thats how i specified it when i made the table) So EMPNO will only be an integer with 4 digits max.
* ▪ Tuple
  + A Tuple is a single row in a given table that serves to create a unique entry in that table. The items inside of a tuple will correspond with the attributes of whatever table that tuple exists inside. We use tuples to formulate data for entry into a given relation, so each entry in the tuple matches not only the fields of the table but the order of the fields as well.
    - An example of this is that in the table DEPT, where the fields are (DEPTNO, DNAME, LOC) in that order, a tuple will be (10, “ACCOUNTING”, “NEW YORK”)
* ▪ Degree
  + The Degree of a given relation is the number of fields or attributes for that relation. So if a table of Employees has the fields (ID#, FNAME, LNAME, ADDRESS, CELL#) than the degree of that table is 5. (Degree == number of columns)
    - An example of this is that the relation EMP has a degree of 8 (EMPNO, ENAME, JOB, MGR, HIREDATE, SAL, COM, DEPTNO) (8 columns in the table)
* ▪ Cardinality
  + The Cardinality of a given relation is the number of tuples that exist inside the given table. So if a table has 15 tuples in it, one for each person in the database, then it will have a Cardinality of 15. (Cardinality == number of rows)
    - An example of this is that the relation DEPT has a cardinality of 4. (4 rows in the table)

**PROBLEM 2 -**

* 2. (3 points) a. Explain the following terms in the context of the relational data model. Use the Employee-Department database from Appendix 1 to provide examples of each term.
* ▪ Candidate Key
  + A Candidate Key is any field or set of fields that can uniquely identify a given tuple, but no subset of the key itself can uniquely identify a given tuple, so the Key is minimal. A Candidate Key is a potential to become a primary key
    - An Example of this in the table EMP is the EMPNO field. Since it can uniquely identify a given tuple and it is minimal.
* ▪ Primary Key
  + A primary key is the goal for a Candidate Key. A primary Keys function serves to uniquely identify every tuple in the relation, for this reason, if a field is designated as a primary key in a given table, then no two items of that field in that table will be the same. This ensures that every tuple will be unique and identifiable by the primary key itself. Often, an ID# serves as a primary key.
    - An Example of this in the table EMP is the EMPNO field once again. It alone uniquely identifies each tuple in the table.
* ▪ Foreign Key
  + A Foreign key is a field that exists in your table as a regular old field (not a primary key) but is a primary key in another table somewhere.
    - An example of this is the DEPNTO field in the EMP table. In EMP table, it serves just as a way of telling us which Dept each employee is in. But over in the DEPT table. The DEPTNO serves as a primary key as it is used to ensure uniqueness and to identify each unique tuple in the DEPT relation.

**SECTION 2 ---------------------------------------------------------------**

**PROBLEM 3 -**

CREATE TABLE CATEGORY (

CatCode varchar(2),

CatDesc varchar(10)

);

**PROBLEM 4 -**

CREATE TABLE EMPLOYEES (

Firstname varchar(20),

Lastname varchar(20),

Emp\_num int(5),

Job\_Class varchar(4)

);

**PROBLEM 5 -**

ALTER table EMPLOYEES

ADD (EmpDate DATE, EndDate DATE);

**PROBLEM 6 -**

ALTER TABLE EMPLOYEES

MODIFY Job\_Class varchar(2)

**PROBLEM 7 -**

ALTER TABLE EMPLOYEES

DROP EndDate

**PROBLEM 8 -**

ALTER TABLE EMPLOYEES

RENAME TO JL\_EMPS;

**SECTION 3 ---------------------------------------------------------------**

**PROBLEM 9 -**

create table EMP (

EMPNO int(4),

ENAME varchar(6),

JOB varchar(9),

MGA int(4),

HIREDATE date,

SAL int(4),

COMM int(4),

DEPTNO int(2),

primary key(EMPNO)

);

create table DEPT (

DEPTNO int(2),

DNAME varchar(14),

LOC varchar(9),

primary key(DEPTNO)

)

**PROBLEM 10 -**

insert into EMP (EMPNO, ENAME, JOB, MGR, HIREDATE, SAL, COMM, DEPTNO) values

(7369, "SMITH", "CLERK", 7902, "1980-12-17", 800, NULL, 20 ),

(7499, "ALLEN", "SALESMAN", 7698, "1981-02-20", 1600, 300, 30 ),

(7521, "WARD", "SALESMAN", 7698, "1981-02-22", 1250, 500, 30 ),

(7566, "JONES", "MANAGER", 7839, "1981-04-02", 2975, NULL, 20 ),

(7654, "MARTIN", "SALESMAN", 7698, "1981-09-28", 1250, 1400, 30 ),

(7698, "BLAKE", "MANAGER", 7839, "1981-05-01", 2850, NULL, 30 ),

(7782, "CLARK", "MANAGER", 7839, "1981-06-09", 2450, NULL, 10 ),

(7788, "SCOTT", "ANALYST", 7566, "1982-12-09", 3000, NULL, 20 ),

(7839, "KING", "PRESIDENT", NULL, "1981-11-17", 5000, NULL, 10 ),

(7844, "TURNER", "SALESMAN", 7698, "1981-09-08", 1500, 0, 30 ),

(7876, "ADAMS", "CLERK", 7788, "1983-01-12", 1100, NULL, 20 ),

(7900, "JAMES", "CLERK", 7698, "1981-12-03", 950, NULL, 30 ),

(7902, "FORD", "ANALYST", 7566, "1981-12-03", 3000, NULL, 20 ),

(7934, "MILLER", "CLERK", 7782, "1982-01-23", 1300, NULL, 10 )

insert into EMP (DEPTNO, DNAME, LOC) values

(10, "ACCOUNTING", "NEW YORK"),

(20, "RESEARCH", "DALLAS"),

(30, "SALES", "CHICAGO"),

(40, "OPERATIONS", "BOSTON")