



CSE 4/560
Databases and Query Languages
Homework 2
Total Marks 100

Your Name:

Your email ID:

Your UB Person ID:

1.[15] What is a foreign key constraint? Why are such constraints important? What is referential integrity?

2. [25] Given the following relational schema, you have already written the SQL statements required to create the preceding relations, including appropriate versions of all primary and foreign key integrity constraints. They are again added below for your reference.

Emp(*eid*: integer, *ename*: string, *age*: integer, *salary*: real)
Works(*eid*: integer, *did*: integer, *pcttime*: integer)
Dept(*did*: integer, *dname*: string, *budget*: real, *managerid*: integer)

```
CREATE TABLE Works(  
  eid INTEGER NOT NULL,  
  did INTEGER NOT NULL,  
  pcttime INTEGER,  
  PRIMARY KEY(eid, did),  
  UNIQUE (eid),  
  FOREIGN KEY (did) REFERENCES Dept  
);
```

```
CREATE TABLE Dept(  
  did INTEGER NOT NULL,  
  budget REAL,  
  managerid INTEGER,  
  PRIMARY KEY(did),  
  FOREIGN KEY (managerid) REFERENCES Emp  
);
```

(i) Now modify the Dept relation in SQL so that every department is guaranteed to have a manager.

(ii) Write an SQL statement to add John Doe as an employee with $\text{eid} = 101$, $\text{age} = 32$ and $\text{salary} = 15,000$

(iii) Suppose you have a view SeniorEmp defined as follows:

```
CREATE VIEW SeniorEmp (sname, sage, salary)
AS SELECT E.ename, E.age, E.salary
FROM Emp E
WHERE E.age > 50;
```

Explain what the system will do to process the following query:

```
SELECT S.sname
FROM SeniorEmp S
WHERE S.salary > 100,00
```

(iv) Give an example of a view on Emp that could be automatically updated by updating Emp.

(v) Give an example of a view on Emp that would be impossible to update (automatically) and explain why your example presents the update problem that it does.

3.[10] Consider the SQL query whose answer is shown below.

<i>sid</i>	<i>name</i>	<i>login</i>	<i>age</i>	<i>gpa</i>
53831	Madayan	madayan@music	11	1.8
53832	Guldu	guldu@music	12	2.0

(a) Modify this query so that only the login column is included in the answer.

(b) If the clause WHERE $S.gpa2$ is added to the original query, what is the set of tuples in the answer?

4. [60] Consider the following relations: Student(snum: integer, sname: string, major: string, level: string, age: integer)
Class(name: string, meets at: string, room: string, fid: integer)
Enrolled(snum: integer, cname: string)
Faculty(fid: integer, fname: string, deptid: integer)

Write the following queries in SQL. No duplicates should be printed in any of the answers.

(a) Find the names of all Juniors (level = JR) who are enrolled in a class taught by I;

(b) Find the age of the oldest student who is either a History major or enrolled in a course taught by I

(c) Find the names of all classes that either meet in room R128 or have five or more students enrolled.

(d) Find the names of all students who are enrolled in two classes that meet at the same time.

(e) Find the names of faculty members who teach in every room in which some class is taught.

(f) Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.

(g) For each level, print the level and the average age of students for that level.

(h) For all levels except JR, print the level and the average age of students for that level.

(i) For each faculty member that has taught classes only in room R128, print the faculty member's name and the total number of classes she or he has taught.

(j) Find the names of students enrolled in the maximum number of classes.

(k) Find the names of students not enrolled in any class.

(l) For each age value that appears in Students, find the level value that appears most often. For example, if there are more FR level students aged 18 than SR, JR, or SO students aged 18, you should print the pair (18, FR).