

Course Code: CS203	Course Name: Database Systems
Instructor Name / Names: Dr Zeeshan Ahmed, Mr. Ahsan Shah, Miss Tania Iram	
Student Roll No:	Section No:

Instructions :

- Return the question paper.
- Read each question completely before answering it. There are **3 questions and 3 pages** .
- In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
- This paper is subjective

Time: 60 minutes.

Max Marks: 50 marks

Question 1: (10 marks)

- a. Given is a glimpse of a table in a legacy system for maintaining records of students and their advisers: /4

Student name	Student_phone	Adviser Name	Adviser phone
Anna, Alvi	232-9987	Parks	232-0098
Rim, Simon	232-9918	Parks	232-0098
Sohaib, Alvi	232-9987	Johns	232-0094
Hayat, Khalid	232-2289	Johns	232-0094

- Write any 3 problems that you find out in this design which make manipulating data difficult.
 - Suggest the improvements to remove those flaws you found in the design.
- b. Describe Data Independence in context of three schema architecture. /3
- c. What is the difference between super key and key? What is default super key in a relation? /3

Question2: (5 marks)

Suppose that each of the following Update operations is applied directly to the database state shown on next page. Discuss all integrity constraints violated by each operation, if any, and the different ways of enforcing these constraints. (10)

- Insert <'Robert', 'F', 'Scott', '943775543', '1972-06-21', '2365 Newcastle Rd, Bellaire, TX', M, 58000, '888665555', 1> into EMPLOYEE.
- Delete the EMPLOYEE tuple with Ssn = '987654321'.
- Modify the Super_ssn attribute of the EMPLOYEE tuple with Ssn = '999887777' to '943775543'

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

DEPT_LOCATIONS

Dnumber	Dlocation
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

WORKS_ON

Essn	Pno	Hours
123456789	1	32.5
123456789	2	7.5
666884444	3	40.0
453453453	1	20.0
453453453	2	20.0
333445555	2	10.0
333445555	3	10.0
333445555	10	10.0
333445555	20	10.0
999887777	30	30.0
999887777	10	10.0
987987987	10	35.0
987987987	30	5.0
987654321	30	20.0
987654321	20	15.0
888665555	20	NULL

PROJECT

Pname	Pnumber	Plocation	Dnum
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	1986-04-05	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456789	Michael	M	1988-01-04	Son
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse

Question 3: (25 marks)

Consider a STATE_AGENT database in which state agent deals with different buyers for property business. The houses own by different owners are sold out by agent on commission basis. Draw an ER diagram to model this application. Assume anything which you think is missing.

The data requirements are summarized as follows:

- Each house is uniquely identified by house identifier. A house has following non key attributes street address, city, state, a number of bedrooms and a number of bathrooms and an associated owner.
- Each owner has a Social Security Number, first name, last name, phone, and profession.
- An owner can have one or more houses.
- Agents represent owners in the sale of a house. An agent can list many houses, but only one agent can list a house.
- An agent has a unique agent number, name, phone number and an associated office.

- When an owner agrees to list a houses with an agent, a commission and a selling price are determined.
- An office has office identifier, phone number, the manager name, address and an optional agent number.
- Many agents can work at one office.
- A buyer has a Social Security Number, first name, last name, phone number, preferences for the number of bedrooms and bathrooms, and a price range.
- An agent can work with many buyers, but a buyer works with only one agent.

BEST OF LUCK!