The assignment will be graded out of 100 points.

Due on Thursday, September 13th, 2018 by 11:59:59 PM

Submission Guidelines:

- The assignment should be submitted via Blackboard.
- The answers must be typed as a document.
- Make sure your name and your student ID are listed in your document.
- Name files as assignment2_<net-id>.<format>
- Accepted document formats are (.pdf, .doc or .docx). If you are using OpenOffice or LibreOffice, make sure to save as .pdf or .doc
- Please do not submit .txt files.
- If there are multiple files in your submission, zip them together as assignment2_<net-id>.zip and submit the .zip file.
- The maximum points one can get in this assignment is 100.
- You may resubmit the assignment at any time. Late submissions will be accepted at a penalty of 10 points per day. Maximum latency is 5 days beyond which a grade of zero will be assigned. This penalty will apply regardless of whether you have other excuses.

Assignment Specification

1. If you were designing a Web-based system to make airline reservations and to sell airline tickets, which DBMS Architecture would you choose from Centralized and Client/Server Architectures? Why? And why would the other architectures not be a good choice? (**8 pts.**)

2. Discuss the main categories of data models. What are the basic differences between the relational model, the object model, and the XML model? (**8 pts.**)

3. Identify the relation name, tuple, attributes, degree from below database table. (**4 pts.**)

EMPLOYEE

Employee_Name	Employee_Id	Department	Phone_No
John Karter	12789876	Sales	5672345677
Sarah Hart	14569878	Marketing	4089733403
Edward Smith	13425235	IT	6823331233

4. Define foreign key. What is this concept used for? (**4 pts.**)

5. Consider each of the following Update operations is applied directly to the below database (see next page). Discuss all integrity constraints violated by each operation, if any, and the different ways of enforcing these constraints: (**30 pts.**)

a) Insert < 'Robert', 'F', 'Scott', '943775543', '21-JUN-42', '2365 Newcastle Rd, Bellaire, TX', M, 58000, '888665555', 1 > into **EMPLOYEE**.

b) Insert < 'ProductA', 4, 'Bellaire', 2 > into **PROJECT**.

c) Insert < 'Production', 4, '943775543', '01-OCT-88' > into **DEPARTMENT**.

d) Insert < '677678989', null, '40.0' > into **WORKS_ON**.

e) Insert < '453453453', 'John', M, '12-DEC-60', 'SPOUSE' > into **DEPENDENT**.

f) Delete the **WORKS_ON** tuples with ESSN= '333445555'.

g) Delete the **EMPLOYEE** tuple with SSN= '987654321'.

h) Delete the **PROJECT** tuple with PNAME= 'ProductX'.

i) Modify the SUPERSSN attribute of the **EMPLOYEE** tuple with SSN= '999887777' to '943775543'.

j) Modify the HOURS attribute of the **WORKS_ON** tuple with ESSN= '999887777' and PNO= 10 to '5.0'.

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

6. Consider the following relations for a database that keeps track of business trips of salespersons in a sales office: (**8 pts.**)

    SALESPERSON (SSN, Name, Start_Year, Dept_No)
    TRIP (SSN, From_City, To_City, Departure_Date, Return_Date, Trip_ID)
    EXPENSE (Trip_ID, Account#, Amount)

    Specify 4 foreign keys for this schema, stating any assumptions you make.

7. Consider the relation CLASS (Course#, Univ_Section#, InstructorName, Semester, BuildingCode, Room#, TimePeriod, Weekdays, CreditHours). This represents classes taught in a university with unique Univ_Section#. Give what you think should be at least 4 candidate keys and write in your own words under what constraints each candidate key would be valid.(Note: The values of the Semester attribute include the year; for example "Spring/94" or "Fall/93") (**12 pts.**)

8. Design an Automobile showroom database. Specify the possible attributes for each of the below tables. You can add more tables if needed. Also specify the primary keys and the foreign keys for the table. You don't have to enter any data. Please mention any assumptions you make. (**10 pts.**)

   Note: Mention at least 5 attributes for each of the tables.
   Database Name: Automobile
   Table Names: Employee, Customer, Car, Buy

9. Specify all the referential integrity constraints for the AIRLINE relational database schema shown below which describes a database for airline flight information. You may write referential integrity constraint as R.A --> S (or R.(X) --> T) whenever attribute A (or the set of attributes X) of relation R form a foreign key that references the primary key of relation S (or T). (**16 pts.**)

AIRPORT

Airport_code	Name	City	State

FLIGHT

Flight_number	Airline	Weekdays

FLIGHT_LEG

Flight_number	Leg_number	Departure_airport_code	Scheduled_departure_time
		Arrival_airport_code	Scheduled_arrival_time

FARE

Flight_number	Fare_code	Amount	Restrictions

AIRPLANE_TYPE

Airplane_type_name	Max_seats	Company

CAN_LAND

Airplane_type_name	Airport_code

AIRPLANE

Airplane_id	Total_number_of_seats	Airplane_type