CS 405G: Introduction to database systems
Assignment 2

Assigned: Sep 26, 2014
Due: Oct 6, 2014

Submission instructions: Please try to prepare the assignment in word document (hand-written homework is also acceptable). Print and bring them to class on the due date. Put the course number and your name at the top left corner of the first page of your homework. Please follow the rules in the course syllabus regarding late homework and plagiarism.

Problem 1. Book (6th Edition) 6.18 (page 188)

Problem 2. Book (6th Edition) 6.21 (page 190)

Problem 3. Book (6th Edition) 6.22 (page 190)

Problem 4 The following schemas describe Presidents, Judges and the appointment relationships between them.

Presidents(*PName* : string, *PDateOfBirth* : int, *Party* : string, *HomeState* : string)
Judges(*JName* : string, *JDateOfBirth* : int, *LawSchool* : string)
Appoints(*PName* : string, *JName* : string, *Date* : integer)

Formulate the following queries on these schemas in **Relational Algebra**.

   a) Retrieve the names of all the presidents.
   b) Retrieve the names of all the judges graduated from Yale or Harvard.
   c) Retrieve the names of the presidents who appointed judges from both Yale and Harvard?
   d) List the number of judges graduated from each law school.
   e) Retrieve the pairs of names of judges attended the same law school
   f)   What are the political parties whose presidents only appointed judges from Yale
   g) What are the names of the presidents who appointed exactly two judges?
   h) What are the names of the presidents who never appointed a judge?
   i) Retrieve the names of judges that were appointed by more than 2 presidents.
   j) List the oldest of judges graduated from each law school appointed by presidents in the Republican Party.

Problem 5.
Suppose each of the following update operations is applied directly to the database of Figure 1. Discuss all integrity constraints violated by each operation, if any, and the different ways of enforcing these constraints:

(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.

EMPLOYEE Table

FNAME	MINIT	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO
John	B	Smith	123456789	09-JAN-55	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333444555	08-DEC-45	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	19-JUL-58	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	20-JUN-31	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	15-SEP-52	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	31-JUL-62	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	29-MAR-59	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	10-NOV-27	450 Stone, Houston, TX	M	55000	Null	1

DEPARTMENT Table

DNAME	DNUMBER	MGRSSN	MGRSTARTDATE
Research	5	333445555	22-MAY-78
Administration	4	987654321	01-JAN-85
Headquarters	1	888665555	19-JUN-71

DEPT_LOCATION Table

DNUMBER	DLOCATION
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

PROJECT Table

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

WORKS_ON Table

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

DEPENDENT Table

ESSN	DEPENDENT_NAME	SEX	BDATE	RELATIONSHIP
333445555	Alice	F	05-APR-76	DAUGHTER
333445555	Theodore	M	25-OCT-73	SON
333445555	Joy	F	03-MAY-48	SPOUSE
987654321	Abner	M	29-FEB-32	SPOUSE
123456789	Michael	M	01-JAN-78	SON
123456789	Alice	F	31-DEC-78	DAUGHTER
123456789	Elizabeth	F	05-MAY-57	SPOUSE