

Part A

Retrieve first name and last name of all male employees with salary more than 30000.

1. SELECT from EMPLOYEE where Salary > 30000. Store as EMP_SAL

$EMP_SAL \leftarrow \sigma_{Salary > 30000}(EMPLOYEE)$

EMP_SAL

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
Franklin	T	Wong	333445555	1955-12-01	638 Voss, I	M	40000	888665555	5
Jennifer	S	Wallace	987654321	1941-06-21	291 Berry, F	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-11	975 Fire O	M	38000	333445555	5
James	E	Borg	888665555	1937-11-11	450 Stone, M	M	55000	NULL	1

2. SELECT from EMP_SAL where Sex = M. Store as M_EMP_SAL

$M_EMP_SAL \leftarrow \sigma_{Sex = 'M'}(EMP_SAL)$

M_EMP_SAL

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
Franklin	T	Wong	333445555	1955-12-01	638 Voss, I	M	40000	888665555	5
Ramesh	K	Narayan	666884444	1962-09-11	975 Fire O	M	38000	333445555	5
James	E	Borg	888665555	1937-11-11	450 Stone, M	M	55000	NULL	1

3. PROJECT from M_EMP_SAL with columns Fname and Lname. Store as RESULT

$RESULT \leftarrow \pi_{Fname, Lname}(M_EMP_SAL)$

RESULT

Fname	Lname
Franklin	Wong
Ramesh	Narayan
James	Borg

Josh Coriell
Assignment #3
CSC 530

Could
combine
with 'and'
I suppose...

Part B

Retrieve locations of projects that belong to the Research department.

1. SELECT from DEPARTMENT where Dname = "Research". Store result as RESEARCH_DPT

$RESEARCH_DPT \leftarrow \sigma_{Dname = "Research"}(DEPARTMENT)$

RESEARCH_DPT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22

2. EQUIJOIN the tables RESEARCH_DPT and PROJECT where Dnumber from RESEARCH_DPT = Dnum from PROJECT. Store the result as RESEARCH_PROJECT_LOCATIONS

$RESEARCH_PROJECT_LOCATIONS \leftarrow (RESEARCH_DPT \bowtie_{Dnumber = Dnum} PROJECT)$

RESEARCH_PROJECT_LOCATIONS

Dname	Dnumber	Mgr_ssn	Mgr_start_date	Pname	Pnumber	Plocation	Dnum
Research	5	333445555	1988-05-22	ProductX	1	Bellaire	5
Research	5	333445555	1988-05-22	ProductY	2	Sugarland	5
Research	5	333445555	1988-05-22	ProductZ	3	Houston	5

3. PROJECT the attribute Plocation from RESEARCH_PROJECT_LOCATIONS. Store the result as RESULT.

$RESULT \leftarrow \pi_{Plocation}(RESEARCH_PROJECT_LOCATIONS)$

RESULT

Plocation
Bellaire
Sugarland
Houston

Part C

Retrieve first name, last name, and SSN of all employees who work more than 9 hours on project 2.

1. SELECT from WORKS_ON the tuples where Pno = 2 and Hours > 9. Store the result as PROJ_TWO_NINE

$PROJ_TWO_NINE \leftarrow \sigma_{Pno=2 \text{ and } Hours > 9}(WORKS_ON)$

PROJ_TWO_NINE

Essn	Pno	Hours
453453453	2	20.0
333445555	2	10.0

2. EQUIJOIN the relations PROJ_TWO_NINE and EMPLOYEE where Essn from PROJ_TWO_NINE = Ssn from EMPLOYEE. Store the result as PROJ_EMPLOYEES

$PROJ_EMPLOYEES \leftarrow (PROJ_TWO_NINE \bowtie_{Essn=Ssn} EMPLOYEE)$

PROJ_EMPLOYEES

Essn	Pno	Hours	Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
333445555	2	20.0	Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
453453453	2	10.0	Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5

3. PROJECT the attributes Fname, Lname, and SSN from PROJ_EMPLOYEES. Store the result as RESULT

$RESULT \leftarrow \pi_{Fname, Lname, ssn}(PROJ_EMPLOYEES)$

PROJ_EMPLOYEES

Fname	Lname	Ssn
Franklin	Wong	333445555
Joyce	English	453453453

Part D

Retrieve name, date of birth and relationship of all female dependents of employees who work for department 5.

1. SELECT from EMPLOYEES the tuples where Dno = 5. Store as DEPT_FIVE_EMP

$$DEPT_FIVE_EMP \leftarrow \sigma_{Dno=5}(EMPLOYEE)$$

DEPT_FIVE_EMP

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
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

2. PROJECT from DEPT_FIVE_EMP the Ssn attribute. Store the result as DF_SSNS

$$DF_SSNS \leftarrow \pi_{Ssn}(DEPT_FIVE_EMP)$$

DF_SSNS

Ssn
123456789
333445555
666884444
453453453

3. JOIN the relation DF_SSNS with the relation DEPENDENT where SSN in DFSSNS is equal to ESSN in DEPENDENT. Store the result as DF_DEPENDENTS

$$DF_DEPENDENTS \leftarrow (DF_SSNS \bowtie_{Ssn=Essn} DEPENDENT)$$

DF_DEPENDENTS

Ssn	Essn	Dependent_name	Sex	Bdate	Relationship
123456789	123456789	Michael	M	1988-01-04	Son
123456789	123456789	Alice	F	1988-12-30	Daughter
123456789	123456789	Elizabeth	F	1967-05-05	Spouse
333445555	333445555	Alice	F	1989-04-05	Daughter
333445555	333445555	Theodore	M	1983-10-25	Son
333445555	333445555	Joy	F	1958-05-03	Spouse

4. SELECT from DF_DEPENDENTS the tuples where SEX = F. Store the result as FEMALE_DEPENDENTS

$$FEMALE_DEPENDENTS \leftarrow \sigma_{Sex='F'}(DF_DEPENDENTS)$$

FEMALE_DEPENDENTS

Ssn	Essn	Dependent_name	Sex	Bdate	Relationship
123456789	123456789	Alice	F	1988-12-30	Daughter
123456789	123456789	Elizabeth	F	1967-05-05	Spouse
333445555	333445555	Alice	F	1989-04-05	Daughter
333445555	333445555	Joy	F	1958-05-03	Spouse

5. PROJECT the attributes Dependent_name, Bdate, and Relationship and store the table as RESULT.

$$RESULT \leftarrow \pi_{Dependent_name, Bdate, Relationship}(FEMALE_DEPENDENTS)$$

RESULT

Dependent_name	Bdate	Relationship
Alice	1988-12-30	Daughter
Elizabeth	1967-05-05	Spouse
Alice	1989-04-05	Daughter
Joy	1958-05-03	Spouse

Part E

Retrieve first name, last name and salary of employees who manage departments with projects located in Houston.

1. SELECT from the relation PROJECT the tuples where Plocation = Houston

$$H_PROJ \leftarrow \sigma_{Plocation = 'Houston'}(PROJECT)$$

H_PROJ

Pname	Pnumber	Plocation	Dnum
ProductZ		3 Houston	5
Reorganization		20 Houston	1

2. PROJECT the attribute Dnum from H_PROJ

$$DPT_NUM \leftarrow \pi_{Dnum}(H_PROJ)$$

DPT_NUM

Dnum
5
1

3. EQUIJOIN the relation DPT_NUM with the relation DEPARTMENT where Dnum in DPT_NUM = Dnumber in DEPARTMENT

$$H_DEPT \leftarrow (DPT_NUM \bowtie_{Dnum = Dnumber} DEPARTMENT)$$

H_DEPT

Dnum	Dname	Dnumber	Mgr_ssn	Mgr_start_date
5	Research		5	333445555 1988-05-22
1	Headquarters		1	888665555 1981-06-19

4. PROJECT the attribute Mgr_ssn from H_DEPT.

$$MGRS \leftarrow \pi_{Mgr_ssn}(H_DEPT)$$

MGRS

Mgr_ssn
333445555
888665555

5. EQUIJOIN the relation MGRS with the relation EMPLOYEE where Mgr_ssn in MGRS is equal to Ssn in EMPLOYEE

$$MGRS_INFO \leftarrow (MGRS \bowtie_{Mgr_ssn = ssn} EMPLOYEE)$$

MGRS

Mgr_ssn	Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
333445555	Franklin	T	Wong		333445555 1955-12-01	638 Voss, Houston, TX	M	40000	888665555	5
888665555	James	E	Borg		888665555 1937-11-11	450 Stone, Houston, TX	M	55000	NULL	1

6. PROJECT Fname, Lname, and Salary.

$$RESULT \leftarrow \pi_{Fname, Lname, Salary}(MGRS_INFO)$$

RESULT

Fname	Lname	Salary
Franklin	Wong	40000
James	Borg	55000

Give us

Instructions: Using relational algebra operations, construct queries that satisfy provided descriptions. Provide resulting relation (table with tuples) for each query. Database schema and state are provided for your reference.

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	1989-04-05	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

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
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DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
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DEPT_LOCATIONS

Dnumber	Dlocation
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PROJECT

Pname	Pnumber	Plocation	Dnum
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WORKS_ON

Essn	Pno	Hours
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DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
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