CSCI321 – Fall 2012
Homework Set 1
Solutions

(a) Retrieve the names of employees in department 5 who work more than 10 hours per week on the 'ProductX' project.

$EMP\_W\_X \leftarrow (\sigma_{PNAME='ProductX'}(PROJECT)) \bowtie_{PNUMBER=PNO} WORKS\_ON$

$EMP\_WORK\_10 \leftarrow (EMPLOYEE) \bowtie_{SSN=ESSN} (\sigma_{HOURS>10}(EMP\_W\_X))$

$RESULT \leftarrow \Pi_{LNAME,FNAME}(\sigma_{DNO=5}(EMP\_WORK\_10))$

Result:

LNAME	FNAME
Smith	John
English	Joyce

(b) List the names of employees who have a dependent with the same first name as themselves.

$E \leftarrow (EMPLOYEE) \bowtie_{SSN=ESSN \land FNAME=DEPENDENT\_NAME} (DEPENDENT)$

$RESULT \leftarrow \Pi_{LNAME,FNAME}(E)$

Result (empty):

LNAME	FNAME

(c) Find the names of employees that are directly supervised by 'Franklin Wong'.

$WONG\_SSN \leftarrow \Pi_{SSN}(\sigma_{FNAME='Franklin' \land LNAME='Wong'}(EMPLOYEE)$

$WONG\_EMPS \leftarrow (EMPLOYEE) \bowtie_{SUPERSSN=SSN} (WONG\_SSN)$

$RESULT \leftarrow \Pi_{LNAME,FNAME}(WONG\_EMPS)$

Result:

LNAME	FNAME
Smith	John
Narayan	Ramesh
English	Joyce

(e) Retrieve the names of employees who work on every project.

$PROJ\_EMPS \leftarrow \Pi_{PNO,ESSN}(WORKS\_ON)$

$ALL\_PROJS(PNO) \leftarrow \Pi_{PNUMBER}(PROJECT)$

$EMPS\_ALL\_PROJS \leftarrow PROJ\_EMPS \div ALL\_PROJS$

$RESULT \leftarrow \Pi_{LNAME,FNAME}(EMPLOYEE \bowtie EMP\_ALL\_PROJS)$

Result (empty):

LNAME	FNAME

(f) Retrieve the names of employees who do not work on any project.

$ALL\_EMPS \leftarrow \Pi_{SSN}(EMPLOYEE)$

$WORKING\_EMPS \leftarrow \Pi_{ESSN}(WORKS\_ON)$

$NON\_WORKING\_EMPS \leftarrow ALL\_EMPS - WORKING\_EMPS$

$RESULT \leftarrow \Pi_{LNAME,FNAME}(EMPLOYEE \bowtie NON\_WORKING\_EMPS)$

Result (empty):

LNAME	FNAME

(i) Find the names and addresses of employees who work on at least one project located in Houston but whose department has no location in Houston.

$E\_P\_HOU(SSN) \leftarrow \Pi_{ESSN}(WORKS\_ON \bowtie_{PNO=PNUMBER} (\sigma_{PLOCATION='Houston'}(PROJECT)))$

$D\_NO\_HOU \leftarrow \Pi_{DNUMBER}(DEPARTMENT) - \Pi_{DNUMBER}(\sigma_{DLOCATION='Houston'}(DEPARTMENT))$

$E\_D\_NO\_HOU \leftarrow \Pi_{SSN}(EMPLOYEE \bowtie_{PNO=DNUMBER} D\_NO\_HOU)$

$RESULT\_EMPS \leftarrow E\_P\_HOU - E\_D\_NO\_HOU$

$RESULT \leftarrow \Pi_{LNAME,FNAME,ADDRESS}(EMPLOYEE \bowtie RESULT_EMPS)$

Result:

LNAME	FNAME	ADDRESS
Wallace	Jennifer	291 Berry, Bellaire, TX

(j) List the last names of department managers who have no dependents.

$DEPT\_MANAGERS(SSN) \leftarrow \Pi_{MGRSSN}(DEPARTMENT)$

$EMPS\_WITH\_DEPS(SSN) \leftarrow \Pi_{ESSN}(DEPENDENT)$

$RESULT\_EMPS \leftarrow DEPT\_MANAGERS - EMPS\_WITH\_DEPS$

$RESULT \leftarrow \Pi_{LNAME}(EMPLOYEE \bowtie RESULT\_EMPS)$

Result:

LNAME
Borg