Assignment 3

Question 1

a)

$$\pi_{ORDER\#,\ SHIP\_Date}(\sigma_{WAREHOUSE\# = W2}(SHIPMENT))$$

b)

$$CUSTOMER\_JOSE \leftarrow \sigma_{CNAME = 'Jose\ Lopez'}(CUSTOMER)$$

$$ORDER\_JOSE \leftarrow (CUSTOMER\_JOSE \bowtie_{CUST\# = ORDERCUST\#} ORDER)$$

$$SHIP\_JOSE \leftarrow (ORDER\_JOSE \bowtie_{ORDER\# = SHIPORDER\#} SHIPMENT)$$

$$RESULT \leftarrow \pi_{ORDER\#,\ WAREHOUSE\#}(SHIP\_JOSE)$$

c) $ORDERS\_ALL \leftarrow (CUSTOMER \bowtie_{CUST\# = ORDERCUST\#} ORDER)$

$$RESULT \leftarrow {}_{CNAME}\mathcal{F}_{COUNT\ ORDER\#,\ AVERAGE\ ORD\_AMT}(ORDERS\_ALL)$$

d) $ORDERS\_SHIP \leftarrow (ORDER \bowtie_{ORDER\# = SHIPORDER\#} SHIPMENT)$

$$RESULT \leftarrow \pi_{ORDER\#}(\sigma_{ODATE + 30 < SHIP\_DATE}(ORDERS\_SHIP))$$

e) $SHIP\_WARE \leftarrow (SHIPMENT \bowtie_{SHIPWAREHOUSE\# = WAREHOUSE\#} WAREHOUSE)$

$$RESULT \leftarrow \pi_{ORDER\#}(\sigma_{CITY = 'New\ York'}(SHIP\_WARE))$$

Question 2

a) $CORRECT\_NAME \leftarrow \sigma_{BRANCH\_NAME = 'Sharpstown'}(LIBRARY\_BRANCH)$

$$COPIES\_INBRANCH \leftarrow (CORRECT\_NAME \bowtie_{BRANCH\_ID = COPYBRANCH\_ID} BOOK\_COPIES)$$

$$BOOK\_INBRANCH \leftarrow (COPIES\_INBRANCH \bowtie_{COPIES\_INBRANCH BOOK\_ID = BOOK\_ID} BOOK)$$

$$RESULT \leftarrow \pi_{NO\_OF\_COPIES}(\sigma_{TITLE = 'The\ Lost\ Tribe'}(BOOK\_INBRANCH))$$

b) $ALL\_BOR \leftarrow \pi_{CARD\_NO}(BORROWER)$

$$ACTIVE\_BOR \leftarrow \pi_{CARD\_NO}(BOOK\_LOANS)$$

$$NONACTIVE\_BOR \leftarrow (ALL\_BOR - ACTIVE\_BOR)$$

$$RESULT \leftarrow \pi_{NAME}(NONACTIVE\_BOR \bowtie_{NONACTIVE\_BORCARD\_NO = CARD\_NO} BORROWER)$$

c) $BOOK\_BORROW \leftarrow (BORROWER \bowtie_{CARD\_NO = LOANCARD\_NO} BOOK\_LOANS)$

$$BOOK\_BRANCH \leftarrow (BOOK\_BORROW \bowtie_{BOOK\_BORROWBRANCH\_ID = BRANCH\_ID} LIBRARY\_BRANCH)$$

$$BOOK\_NAME \leftarrow (BOOK\_BRANCH \bowtie_{BOOK\_BRANCHBOOK\_ID = BOOK\_ID} BOOK)$$

$$RESULT \leftarrow \Pi_{TITLE,\ NAME,\ ADDRESS}(\sigma_{BRANCH\_NAME = 'Sharpstown'}(\sigma_{DUE\_DATE = today}(BOOK\_NAME)))$$

d) $BRANCH\_LOANS \leftarrow (LIBRARY\_BRANCH \bowtie_{BRANCH\_ID = LOANBRANCH\_ID} BOOK\_LOANS)$

$$RESULT \leftarrow {}_{BRANCH\_NAME}\mathcal{F}_{COUNT\ BOOK\_ID}(BRANCH\_LOANS)$$

e) $BORROWER\_LOANS \leftarrow (BORROWER \bowtie_{CARD\_NO = LOANCARD\_NO} BOOK\_LOANS)$

$$NUMBER\_LOANS \leftarrow {}_{CARD\_NO}\mathcal{F}_{COUNT\ BOOK\_ID}(BORROWER\_LOANS)$$

$$RESULT \leftarrow \pi_{NAME,\ ADDRESS,\ COUNT\_BOOK\_ID}(\sigma_{COUNT\_BOOK\_ID > 5}(NUMBER\_LOANS))$$

Question 3

a) $RESULT \leftarrow \pi_{FNAME, MINIT, LNAME}(\sigma_{HOURS > 10 \text{ PER WEEK}}(\sigma_{PNAME = \text{'ProductX'}}(\sigma_{DNO=5}(EMPLOYEE \bowtie PROJECT \bowtie WORKS\_ON))))$

b) $RESULT \leftarrow \pi_{FNAME, MINIT, LNAME}(EMPLOYEE \bowtie_{FNAME = DEPENDENT\_NAME} DEPENDENT)$

c) $RESULT \leftarrow \pi_{FNAME, MINIT, LNAME}(\sigma_{SUPER\_SSN = SSN}(\pi_{SSN}(\sigma_{FNAME=\text{'Franklin'}, LNAME=\text{'Wong'}}(EMPLOYEES))) \bowtie EMPLOYEES)$

d) $RESULT \leftarrow \pi_{FNAME, MINIT, LNAME, SALARY}(\sigma_{MGR\_START\_DATE < 29 \text{ OCTOBER } 2020}(EMPLOYEE \bowtie_{SSN = MGR\_SSN} DEPARTMENT)$

e) $CORRECT\_PROJECTS \leftarrow \sigma_{SUM\_HOURS > 100}(PNUMBER, \mathcal{F}_{SUM\ HOURS}(EMPLOYEE \bowtie WORKS\_ON))$

$RESULT \leftarrow \pi_{PNAME, PLOCATION}(CORRECT\_PROJECTS \bowtie_{CORRECT\_PROJECTS\_PNUMBER = PNUMBER} PROJECT)$