Assignment #2

1. $SSN\_Wong \leftarrow \pi_{SSN}(\sigma_{Fname='Franklin' \text{ and } Lname='Wong'}(EMPLOYEE))$

$EMP\_SSN\_SUPER \leftarrow \sigma_{SSN}(EMPLOYEE \bowtie_{SuperSSN=SSN} SSN\_Wong)$

$RESULT \leftarrow \pi_{LName}(EMPLOYEE * (EMP\_SSN\_SUPER - SSN\_Wong))$

2. $SSN\_Wong \leftarrow \pi_{SSN}(\sigma_{Fname='Franklin' \text{ and } Lname='Wong'}(EMPLOYEE))$

$PNo\_Wong \leftarrow \pi_{Pno}(WORKS\_ON \bowtie_{Essn=SSN} SSN\_Wong)$

$ALL\_EMPS\_PNo\_Wong \leftarrow (EMPLOYEE \bowtie WORKS\_ON) \bowtie_{SSN=ESSN,\ PNo=PNo.} PNo\_Wong$

$EMP\_SSN\_SUPER \leftarrow \sigma_{SSN}(ALL\_EMPS\_PNo\_Wong)$

$RESULT \leftarrow \pi_{LName}(EMPLOYEE * (EMP\_SSN\_SUPER - SSN\_Wong))$

3. $DEPS\_COUNT(SSN, Count) \leftarrow {}_{ESSN}\mathcal{F}_{Count\ Dependent\_name}(DEPENDENT)$

$RESULT \leftarrow \pi_{SSN, LName, Count}(EMPLOYEE \bowtie_{SSN=SSN} DEPS\_COUNT)$

4. $AVG\text{-}DEPT(DNo, Avg) \leftarrow DNo\,\mathcal{F}_{Average\ salary}(EMPLOYEE)$

$RESULT \leftarrow \pi_{Lname}(\sigma_{Salary > Avg}(AVG\_DEPT \bowtie_{DNo = DNo} EMPLOYEE))$

5.

$WORKS\_PROJS \leftarrow WORKS\_ON \bowtie_{PNo = Pnumber} PROJECT$

$SSN\_PROJS\_EMPS \leftarrow \pi_{SSN}(WORKS\_PROJS \bowtie_{PNum = DNo} EMPLOYEE)$

$NOT\_SSN \leftarrow \pi_{SSN}(EMPLOYEE) - SSN\_PROJS\_EMPS$

$RESULT \leftarrow \pi_{Lname}(EMPLOYEE * NOT\text{-}SSN)$

6.

$$BRANCH\_IDs \leftarrow \pi_{Branch\_id}(\sigma_{Branch\_name = 'Richardson'}(LIBRARY\_BRANCH))$$

$$BOOK\_BRANCH \leftarrow \pi_{Book\_id}(BOOK\_LOANS * BRANCH\_IDS)$$

$$RESULT \leftarrow \pi_{Title}(BOOK * BOOK\_BRANCH)$$

7.

$$Book\_IDs \leftarrow \pi_{Book\_id}(\sigma_{Due\_Date < CurrentDate \text{ and } Return\_Date \text{ is Null}}(BOOK\_LOANS))$$

$$RESULT \leftarrow \pi_{Title}(BOOK * BOOK\_IDS)$$

8.

$$Borrow\_No \leftarrow \pi_{Card\_no}(\sigma_{Due\_Date < CurrentDate \text{ and } Return\_Date \text{ is Null}}(BOOK\_LOANS))$$

$$RESULT \leftarrow \pi_{Name}(BORROWER * Borrow\_No)$$

9.

$$LOAN\_OVERDUE \leftarrow \sigma_{Due\_Date < CurrentDate \text{ and } Return\_Date \text{ is Null}}(BOOK\_LOANS)$$

$$LOAN\_BRANCH \leftarrow (LOAN\_OVERDUE \bowtie_{Branch\_id = Branch\_id} LIBRARY\_BRANCH)$$

$$RESULT(Branch\_name, Count) \leftarrow {}_{Branch\_name}\mathcal{F}_{COUNT\ Book\_id}(LOAN\_BRANCH)$$

10.

$$BORROW\_LOAN \leftarrow \pi_{Card\_no}(BOOK\_LOANS \bowtie_{Card\_no = Card\_no} BORROWER)$$

$$RESULT \leftarrow \pi_{Name}(BORROWER * (\pi_{Card\_no}(BORROWER) - BORROW\_LOAN))$$

11.

$$RICH\_BRANCH \leftarrow \sigma_{Branch\_name = 'Richardson'}(LIBRARY\_BRANCH)$$

$$RICH\_LOANS \leftarrow RICH\_BRANCH \bowtie_{Branch\_id = Branch\_id} BOOK\_LOANS$$

$$RICH\_LOANS\_TODAY \leftarrow \sigma_{Due\_Date = currentDate}(RICH\_LOANS)$$

$$RESULT \leftarrow \pi_{Title, Name, Address}(BOOK \bowtie RICH\_LOANS\_TODAY \bowtie BORROWER)$$
$$Book\_id = Book\_id \quad Card\_no = Card\_no$$

12.

$$LD\_COUNT(Branch\_id, Count) \leftarrow {}_{Branch\_id}\mathcal{F}_{COUNT\ Book\_id}(BOOK\_LOAN)$$

$$RESULT \leftarrow \pi_{Branch\_name, count}(LD\_COUNT \bowtie LIBRARY\_BRANCH)$$
$$Branch\_id = Branch\_id$$

13. $$COUNT\_BORR(Card\_no, Count) \leftarrow {}_{Card\_no}\mathcal{F}_{COUNT\ Book\_id}(BOOK\_LOAN)$$

$$RESULT \leftarrow \pi_{Name, Address, Count}(\sigma_{Count > 5}(COUNT\_BORR \bowtie BORROWER))$$
$$Card\_no = Card\_no$$