

Assignment 4

Question 1

- a) SELECT Order#, Ship-date
FROM SHIPMENT
WHERE Warehouse# = W2;
- b) SELECT O.Order#, O.Warehouse#
FROM CUSTOMER AS C, ORDER AS O, SHIPMENT AS S
WHERE C.Cname = 'Jose Lopez' AND C.Cust# = O.Cust# AND O.Order# = S.Order#;
- c) SELECT Cname, COUNT(*), AVG(Ord_amt)
FROM CUSTOMER, ORDER
WHERE CUSTOMER.Cust# = ORDER.Cust#
GROUP BY Cname;
- d) SELECT ORDER.Order#
FROM ORDER, SHIPMENT
WHERE Odate + 30 < Ship-date AND ORDER.Order# = SHIPMENT.Order#;
- e) SELECT Order#
FROM SHIPMENT, WAREHOUSE
WHERE SHIPMENT.Warehouse# = WAREHOUSE.Warehouse# AND City = 'New York';

Question 2

- a) SELECT Fname, Minit, Lname
FROM EMPLOYEE, PROJECT, WORKS_ON
WHERE Pnumber = Pno AND Essn = Ssn AND Dno = 5 AND Pname = 'Product X' AND Hours > 10 Per week;
- b) SELECT Fname, Minit, Lname
FROM (EMPLOYEE JOIN DEPENDENT ON Ssn = Essn)
WHERE Fname = Dependent_name;
- c) SELECT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE AS E
WHERE E.Super_ssn IN (SELECT Ssn
FROM EMPLOYEE AS S
WHERE S.Fname = 'Franklin' AND S.Lname = 'Wong');

Question 3

CREATE TABLE BOOK

```
(Book_id      INT          NOT NULL,
 Title        VARCHAR
 Publisher_name VARCHAR     NOT NULL,
 PRIMARY KEY (Book_id),
 FOREIGN KEY (Publisher_name) REFERENCES PUBLISHER (Name),
 ON DELETE SET NULL ON UPDATE CASCADE);
```

CREATE TABLE BOOK_AUTHORS

```
(Book_id      INT          NOT NULL,
 Author_name   VARCHAR     NOT NULL,
 PRIMARY KEY (Book_id, Author_name),
 FOREIGN KEY (Book_id) REFERENCES BOOK (Book_id),
 ON DELETE SET NULL ON UPDATE CASCADE);
```

CREATE TABLE PUBLISHER

```
(Name         VARCHAR     NOT NULL,
 ADDRESS      VARCHAR,
 Phone        INT,
 PRIMARY KEY (Name),
 UNIQUE (Name));
```

CREATE TABLE BOOK_COPIES

```
(Book_id      INT          NOT NULL,
 Branch_id     INT          NOT NULL,
 No_of_copies INT,
 PRIMARY KEY (Book_id, Branch_id),
 FOREIGN KEY (Book_id) REFERENCES BOOK (Book_id),
 FOREIGN KEY (Branch_id) REFERENCES LIBRARY_BRANCH (Branch_id));
```

CREATE TABLE BOOK_LOANS

```
(Book_id      INT          NOT NULL,
 Branch_id     INT          NOT NULL,
 Card-no       INT          NOT NULL,
 Date_out      DATE,
 Due_date      DATE,
 PRIMARY KEY (Book_id, Branch_id, Card-no),
 FOREIGN KEY (Book_id) REFERENCES BOOK (Book_id),
 FOREIGN KEY (Branch_id) REFERENCES LIBRARY_BRANCH (Branch_id),
 FOREIGN KEY (Card-no) REFERENCES BORROWER (Card-no));
```

CREATE TABLE LIBRARY_BRANCH

```
(Branch_id     INT          NOT NULL,
 Branch_name    VARCHAR,
 Address        VARCHAR,
 PRIMARY KEY (Branch_id),
 UNIQUE (Branch_name));
```



```
CREATE TABLE BORROWER
```

```
( Card-no    INT    NOT NULL,
```

```
  Name       VARCHAR,
```

```
  Address    VARCHAR,
```

```
  Phone      INT,
```

```
PRIMARY KEY (card_no));
```


Question 4

- a) TRC:
 $\{b.AUTHOR_NAME \mid BOOK_AUTHORS(b) \text{ and } (\exists d)(\exists c)(\exists i)$
 $(BOOK(d) \text{ and } BOOK_COPIES(c) \text{ and } LIBRARY_BRANCH(i) \text{ and } b.BOOK_ID = d.BOOK_ID$
 $\text{and } d.BOOK_ID = c.BOOK_ID \text{ and } c.BRANCH_ID = i.BRANCH_ID \text{ and } i.BRANCH_NAME = 'Sharpstown'})\}$

DRC:

- $\{B \mid (\exists G)(\exists A)(\exists D)(\exists E)(\exists F)(\exists C)(\exists I)(BOOK_AUTHORS(A, B) \wedge BOOK(C, -, -) \wedge BOOK_COPIES(D, F, -) \wedge$
 $LIBRARY_BRANCH(E, G, -) \wedge A = C \wedge C = D \wedge F = E \wedge G = 'Sharpstown')\}$

- b) TRC:
 $\{b.NAME \mid BORROWER(b) \wedge (\forall d)(BOOK_LOANS(d) \wedge b.CARD_NO \neq d.CARD_NO)\}$

DRC:

- $\{N \mid (\exists C)(\forall L)(BORROWER(C, N, -, -) \wedge BOOK_LOANS(-, -, L, -, -) \wedge C \neq L)\}$

- c) TRC:
 $\{b.TITLE, g.NAME, g.ADDRESS \mid BOOK(b) \wedge BORROWER(g) \wedge (\exists c)(\exists i)(LIBRARY_BRANCH(c) \wedge BOOK_LOANS(i) \wedge$
 $b.BOOK_ID = i.BOOK_ID \wedge i.DUE_DATE = \text{today} \wedge i.BRANCH_ID = c.BRANCH_ID \wedge c.BRANCH_NAME = 'Sharpstown' \wedge$
 $i.CARD_NO = g.CARD_NO)\}$

DRC:

- $\{Z, Y, X \mid (\exists A)(\exists B)(\exists C)(\exists D)(\exists E)(\exists F)(\exists j)(\exists K)(BOOK(A, Z, -) \wedge BORROWER(B, Y, X, -) \wedge LIBRARY_BRANCH(C, K, -) \wedge$
 $BOOK_LOANS(D, E, F, -, j) \wedge A = D \wedge E = C \wedge B = F \wedge j = \text{today} \wedge K = 'Sharpstown')\}$