SQL Assignment

1. Objectives

The purpose of this exercise is to practice writing queries in SQL, including the use of aggregate functions.

2. The scenario - the company database

The Jonson Brothers is a retail company with department stores in many major US cities. The company has a large number of employees and sells a varied line of products. To manage all information about the company structure and products, a database system is used. The company consists of a number of stores that contain a number of departments. The company has a number of employees, who (among other things) sell items at the different stores. Sales are registered in the sale and debit tables. The sale and debit tables may be a bit tricky to understand. You can view a row in the debit table as representing the receipt you get when you pay for your items, while a row in the sale table represents a row on such a receipt.
The company has contracts with various suppliers, who supply items for sale and also parts for the company's computer equipment. Deliveries of computer parts are registered in the supply table.
The current state of the company database can be seen in the ER diagram given in Appendix A and the table definitions and contents in the appendixes B and C.

3. The Lab

Use SQL to find the answers to the questions below towards your Jonson Brothers company database. Whenever a question requests information about entities that have both a number and a name, select both the number and the name to make your results more useful.

1) List all employees, i.e. all tuples in the EMPLOYEE relation.
2) List the name of all departments, i.e. the NAME attribute for all tuples in the DEPT relation.
3) What parts are not in store, i.e. QOH=0? (QOH = Quantity On Hand).
4) Which employees have a salary between 10000 and 12000 (inclusive)?
5) Retrieve all items sold in the department 49 with their name, price, and price increased by10%.
6) Which employees have a family name starting with "S"? Retrieve their names, numbers and salaries.
7) What are the names and weights of all parts delivered by a supplier called "DEC"? Formulate this query using a subquery in the where-clause.
8) Formulate the same query as above, but without a subquery.
9) Retrieve the name and the color of all parts that are heavier than a black tape drive. Formulate this query using a subquery in the where-clause. (The SQL query should not contain the weight as a constant.)
10) Formulate the same query as above, but without a subquery. (The query should not contain the weight as a constant.)
11) What is the average salary of all the employees whose manager is the employee with number 199?
12) For each supplier retrieve its name and the number of different items it supplies.
13) For each supplier in Massachusetts ("Mass") retrieve the total weight of all the parts delivered by the supplier.

14) Insert data about a new supplier on your choice in the supplier table. Note that the city column is a foreign key to the city table, i.e. the supplier city must already exist or be inserted in advance to the city table.
15) All departments in store number 8 showed good sales figures last year! Give the managers of these departments 5% raise of their salaries. Retrieve the information about these managers by a query before and after the update statement to verify that the data has been updated.

4. Handing in

Fill in your SQL statements in the `db-template.sql` file. Execute the commands in the resulting SQL file, which will generate a `.log` file. Print the `.log` file and hand it in.

5. Appendices

Appendix A: E/R diagram of the existing Jonson Brothers company database
Appendix B: The DDL statements creating the Jonson Brothers company database schema
Appendix C: The contents of the existing company Jonson Brothers database

6. Process to Follow

i. Create a new user in the database

ii. Grant all the required privileges to the user

iii. Login to the database using the new user

iv. Review the attached rough ER diagram (Appendix A) & DDL statement (Appendix B)

v. Create your own ER diagram in detail

vi. Create a script to run the DDL statements on database

vii. Run the DDL statement script on database

viii. Create insert statements as a script for the data that is provided – here you need to be bit smart in inserting the data in the database

Examples:

```
insert into STORE values(5, 'San Francisco');
insert into CITY values('Amherst', 'Mass');
insert into employee values(10, 'Ross, Stanley', 15908, 199, 1927, 1945);
```

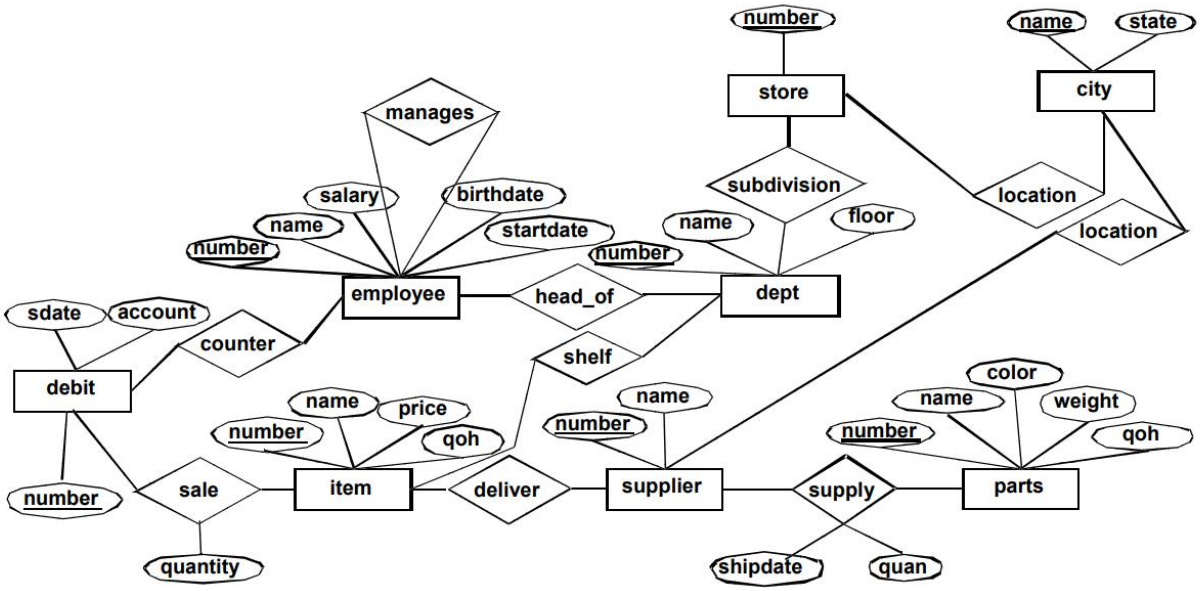
ix. Run the insert statements script to add rows to the table

x. Develop SQL's for the Lab (3. The Lab)

xi. Keep all the SQL's in one document and attach in the Drop Box

Appendix A:

E/R diagram of the existing company database:



Appendix B:

The schema for the existing company database

```
CREATE TABLE employee
        (number INTEGER CONSTRAINT pk_employee PRIMARY KEY,
         name VARCHAR(20),
         salary INTEGER,
         manager INTEGER,
         birthyear INTEGER,
         startyear INTEGER);

CREATE TABLE dept
        (number INTEGER CONSTRAINT pk_dept PRIMARY KEY,
         name VARCHAR(20),
         store INTEGER NOT NULL,
         floor INTEGER,
         manager INTEGER);

CREATE TABLE item
         (number INTEGER CONSTRAINT pk_item PRIMARY KEY,
          name VARCHAR(20),
         dept INTEGER NOT NULL,
          price INTEGER,
          qoh INTEGER CONSTRAINT ck_item_qoh CHECK (qoh >= 0),
          supplier INTEGER NOT NULL);

CREATE TABLE parts
        (number INTEGER CONSTRAINT pk_parts PRIMARY KEY,
         name VARCHAR(20),
         color VARCHAR(8),
         weight INTEGER,
         qoh INTEGER);

CREATE TABLE supply
        (supplier INTEGER NOT NULL,
         part INTEGER NOT NULL,
         shipdate DATE NOT NULL,
         quan INTEGER,
         CONSTRAINT pk_supply PRIMARY KEY (supplier, part, shipdate));

CREATE TABLE sale
        (debit INTEGER NOT NULL,
         item INTEGER NOT NULL,
         quantity INTEGER,
         CONSTRAINT pk_sale PRIMARY KEY (debit, item));

CREATE TABLE debit
        (number INTEGER CONSTRAINT pk_debit PRIMARY KEY,
         sdate DATE DEFAULT CURRENT_DATE NOT NULL,
         employee INTEGER NOT NULL,
         account INTEGER NOT NULL);

CREATE TABLE city
        (name VARCHAR(15) CONSTRAINT pk_city PRIMARY KEY,
         state VARCHAR(6));

CREATE TABLE store
        (number INTEGER CONSTRAINT pk_store PRIMARY KEY,
         city VARCHAR(15) NOT NULL);

CREATE TABLE supplier
        (number INTEGER CONSTRAINT pk_supplier PRIMARY KEY,
         name VARCHAR(20),
         city VARCHAR(15) NOT NULL);

-- Add foreign keys

ALTER TABLE dept
        ADD CONSTRAINT fk_dept_store FOREIGN KEY (store) REFERENCES store (number);
ALTER TABLE dept
        ADD CONSTRAINT fk_dept_employee FOREIGN KEY (manager) REFERENCES employee (number)
         ON DELETE SET NULL;

ALTER TABLE item
        ADD CONSTRAINT fk_item_dept FOREIGN KEY (dept) REFERENCES dept (number);
ALTER TABLE item
```

```
        ADD CONSTRAINT fk_item_supplier FOREIGN KEY (supplier) REFERENCES supplier (number);

ALTER TABLE supply
        ADD CONSTRAINT fk_supply_supplier FOREIGN KEY (supplier) REFERENCES supplier (number);
ALTER TABLE supply
        ADD CONSTRAINT fk_supply_parts FOREIGN KEY (part) REFERENCES parts (number);

ALTER TABLE sale
        ADD CONSTRAINT fk_sale_item FOREIGN KEY (item) REFERENCES item (number);
ALTER TABLE sale
        ADD CONSTRAINT fk_sale_debit FOREIGN KEY (debit) REFERENCES debit(number);
-- implies that a debit/transaction must be created before a sale record.

ALTER TABLE debit
        ADD CONSTRAINT fk_debit_employee FOREIGN KEY (employee) REFERENCES employee (number);

ALTER TABLE store
        ADD CONSTRAINT fk_store_city FOREIGN KEY (city) REFERENCES city (name);

ALTER TABLE supplier
        ADD CONSTRAINT fk_supplier_city FOREIGN KEY (city) REFERENCES city (name);

-- Create the view that has to be modified in lab 2, question 17

CREATE VIEW sale_supply(supplier, item, quantity) as
        SELECT supplier.name, item.name, sale.quantity
        FROM supplier, item, sale
        WHERE   supplier.number = item.supplier AND
                sale.item = item.number;
```

Appendix C:

The contents of the existing company database:

```
SELECT * FROM employee;
     NUMBER NAME                      SALARY     MANAGER   BIRTHYEAR   STARTYEAR
========== ==================== =========== =========== =========== ===========
         10 Ross, Stanley             15908         199        1927        1945
         11 Ross, Stuart              12067           -        1931        1932
         13 Edwards, Peter             9000         199        1928        1958
         26 Thompson, Bob             13000         199        1930        1970
         32 Smythe, Carol              9050         199        1929        1967
         33 Hayes, Evelyn             10100         199        1931        1963
         35 Evans, Michael             5000          32        1952        1974
         37 Raveen, Lemont            11985          26        1950        1974
         55 James, Mary               12000         199        1920        1969
         98 Williams, Judy             9000         199        1935        1969
        129 Thomas, Tom               10000         199        1941        1962
        157 Jones, Tim                12000         199        1940        1960
        199 Bullock, J.D.             27000           -        1920        1920
        215 Collins, Joanne            7000          10        1950        1971
        430 Brunet, Paul C.           17674         129        1938        1959
        843 Schmidt, Herman           11204          26        1936        1956
        994 Iwano, Masahiro           15641         129        1944        1970
       1110 Smith, Paul                6000          33        1952        1973
       1330 Onstad, Richard            8779          13        1952        1971
       1523 Zugnoni, Arthur A.        19868         129        1928        1949
       1639 Choy, Wanda               11160          55        1947        1970
       2398 Wallace, Maggie J.         7880          26        1940        1959
       4901 Bailey, Chas M.            8377          32        1956        1975
       5119 Bono, Sonny               13621          55        1939        1963
       5219 Schwarz, Jason B.         13374          33        1944        1959

                25 rows found

SELECT * FROM dept;
     NUMBER NAME                      STORE       FLOOR     MANAGER
========== ==================== =========== =========== ===========
          1 Bargain                        5           0          37
         10 Candy                          5           1          13
         14 Jewelry                        8           1          33
         19 Furniture                      7           4          26
         20 Major Appliances               7           4          26
         26 Linens                         7           3         157
         28 Women's                        8           2          32
         34 Stationary                     5           1          33
         35 Book                           5           1          55
         43 Children's                     8           2          32
         47 Junior Miss                    7           2         129
         49 Toys                           8           2          35
         58 Men's                          7           2         129
         60 Sportswear                     5           1          10
         63 Women's                        7           3          32
         65 Junior's                       7           3          37
         70 Women's                        5           1          10
         73 Children's                     5           1          10
         99 Giftwrap                       5           1          98

                19 rows found

SELECT * FROM store;
     NUMBER CITY
========== ===============
          5 San Francisco
          7 Oakland
          8 El Cerrito

                3 rows found
```

```
SELECT * FROM item;
```

NUMBER	NAME	DEPT	PRICE	QOH	SUPPLIER
11	Wash Cloth	1	75	575	213
19	Bellbottoms	43	450	600	33
21	ABC Blocks	1	198	405	125
23	1 lb Box	10	215	100	42
25	2 lb Box, Mix	10	450	75	42
26	Earrings	14	1000	20	199
43	Maze	49	325	200	89
52	Jacket	60	3295	300	15
101	Slacks	63	1600	325	15
106	Clock Book	49	198	150	125
107	The 'Feel' Book	35	225	225	89
115	Gold Ring	14	4995	10	199
118	Towels, Bath	26	250	1000	213
119	Squeeze Ball	49	250	400	89
120	Twin Sheet	26	800	750	213
121	Queen Sheet	26	1375	600	213
127	Ski Jumpsuit	65	4350	125	15
165	Jean	65	825	500	33
258	Shirt	58	650	1200	33
301	Boy's Jean Suit	43	1250	500	33

20 rows found

```
SELECT * FROM parts;
```

NUMBER	NAME	COLOR	WEIGHT	QOH
1	central processor	pink	10	1
2	memory	gray	20	32
3	disk drive	black	685	2
4	tape drive	black	450	4
5	tapes	gray	1	250
6	line printer	yellow	578	3
7	l-p paper	white	15	95
8	terminals	blue	19	15
9	terminal paper	white	2	350
10	byte-soap	clear	0	143
11	card reader	gray	327	0
12	card punch	gray	427	0
13	paper tape reader	black	107	0
14	paper tape punch	black	147	0

14 rows found

```
SELECT * FROM sale;
```

DEBIT	ITEM	QUANTITY
100581	118	5
100581	120	1
100582	26	1
100586	106	2
100586	127	3
100592	258	1
100593	23	2
100594	52	1

8 rows found

```
SELECT * FROM debit;
```

NUMBER	SDATE	EMPLOYEE	ACCOUNT
100581	1995-01-15	157	10000000
100582	1995-01-15	1110	14356540
100586	1995-01-16	35	14096831
100592	1995-01-17	129	10000000
100593	1995-01-18	13	11652133
100594	1995-01-18	215	12591815

6 rows found

```
SELECT * FROM city;
NAME            STATE
=============== ======
Amherst         Mass
Atlanta         Ga
Boston          Mass
Dallas          Tex
Denver          Colo
El Cerrito      Calif
Hickville       Okla
Los Angeles     Calif
Madison         Wisc
New York        NY
Oakland         Calif
Paxton          Ill
Salt Lake City  Utah
San Diego       Calif
San Francisco   Calif
Seattle         Wash
White Plains    Neb

                17 rows found

SELECT * FROM supply;
   SUPPLIER         PART SHIPDATE           QUAN
=========== ============ ========== ===========
          5            4 1994-11-15            3
          5            4 1995-01-22            6
         20            5 1995-01-10           20
         20            5 1995-01-11           75
         62            3 1994-06-18            3
         67            4 1995-07-01            1
         89            3 1995-07-04         1000
         89            4 1995-07-04         1000
        122            7 1995-02-01          144
        122            7 1995-02-02           48
        122            9 1995-02-01          144
        241            1 1995-06-01            1
        241            2 1995-06-01           32
        241            3 1995-06-01            1
        241            4 1993-12-31            1
        241            8 1995-07-01            1
        241            9 1995-07-01          144
        440            6 1994-10-10            2
        475            1 1993-12-31            1
        475            1 1994-07-01            1
        475            2 1993-12-31           32
        475            2 1994-05-31           32
        475            3 1993-12-31            2
        475            4 1994-05-31            1
        999           10 1996-01-01          144

                25 rows found

SELECT * FROM supplier;
     NUMBER NAME                 CITY
========== ==================== ===============
          5 Amdahl               San Diego
         15 White Stag           White Plains
         20 Wormley              Hickville
         33 Levi-Strauss         San Francisco
         42 Whitman's            Denver
         62 Data General         Atlanta
         67 Edger                Salt Lake City
         89 Fisher-Price         Boston
        122 White Paper          Seattle
        125 Playskool            Dallas
        199 Koret                Los Angeles
        213 Cannon               Atlanta
        241 IBM                  New York
        440 Spooley              Paxton
        475 DEC                  Amherst
        999 A E Neumann          Madison

                16 rows found
```