**SQL Assignment**

**The scenario - the company database**

The Synapse 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.

Use SQL to find the answers to the questions below towards your Synapse 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.

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1. 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.
2. 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.

**Appendices**

Appendix A: E/R diagram of the existing Synapse company database

Appendix B: The DDL statements creating the Synapse company database schema

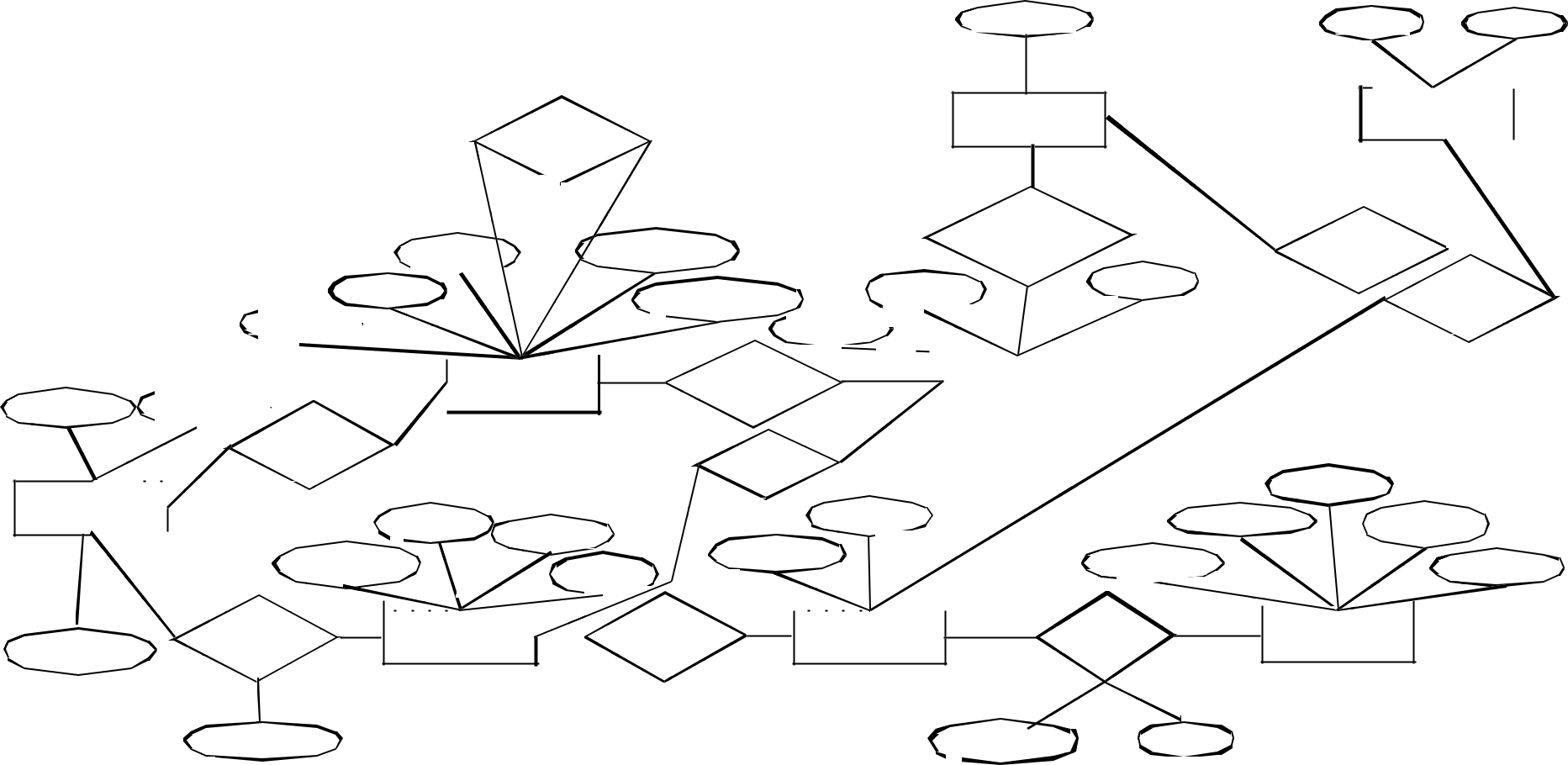
Appendix C: The contents of the existing company Synapse database

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**Appendix A:**

E/R diagram of the existing company database:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  | **number** |  | **name** | **state** |  |
|  |  |  | **manages** | |  |  | **store** |  | **city** |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  | **salary** |  | **birthdate** | |  | **subdivision** |  | **location** |  |  |
|  |  |  | **name** | | **floor** |  |  |
|  | **name** | |  |  | **startdate** | **location** | |  |
|  |  |  |  |  |
|  | **number** |  |  |  | **number** | |  |  |  |  |  |
| **sdate** | **account** | **employee** | |  | **head\_of** |  | **dept** |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | **counter** |  |  |  | **shelf** |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | **color** |  |  |
| **debit** |  |  |  |  |  | **name** |  | **name** |  |  |
|  | **name** | **price** |  |  |  | **weight** |  |  |
|  |  |  |  |  |  |  |
|  | **number** |  |  | **number** | |  | **number** |  | **qoh** |  |
|  |  | **qoh** | |  |  |  |
|  |  |  |  |  |  |  |
| **number** | **sale** | **item** |  | **deliver** | | **supplier** | **supply** | | **parts** |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | **quantity** |  |  |  |  |  | **shipdate** | **quan** |  |  |  |



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**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

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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;

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**Appendix C:**

The contents of the existing company database:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| SELECT \* FROM employee; | | SALARY | MANAGER | BIRTHYEAR | STARTYEAR |  |
| NUMBER | NAME |  |
| =========== | ==================== =========== =========== =========== =========== | | | | |  |
| 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; | | STORE | FLOOR | MANAGER |  |  |
| NUMBER | NAME |  |  |
| =========== | ==================== =========== =========== =========== | | | |  |  |
| 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 |  |  |  |  |  |

1. Oakland
2. El Cerrito

3 rows found

6

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SELECT \* FROM item; | | | DEPT | PRICE | QOH | SUPPLIER |  |
| NUMBER | NAME |  |  |
| =========== | ==================== =========== =========== =========== =========== | | | | | |  |
| 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; | |  | COLOR | WEIGHT | QOH |  |
| NUMBER | NAME |  |  |
| =========== | ==================== | | ======== =========== =========== | | |  |
| 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; | | QUANTITY | |  |  |  |
| DEBIT | ITEM |  |  |  |
| =========== | =========== =========== | | |  |  |  |
| 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; | | EMPLOYEE | ACCOUNT |  |
| NUMBER | SDATE |  |
| =========== | ========== =========== =========== | | |  |
| 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

7

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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; | | | SHIPDATE | QUAN |  |
| SUPPLIER |  | PART |  |
| =========== | =========== | | ========== =========== | |  |
| 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; | | | CITY |  |  |
| NUMBER | NAME |  |  |  |
| =========== | ==================== =============== | | | |  |
| 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

8