1. What is the difference between DELETE and TRUNCATE statements?

DELETE removes rows based on some condition given by the user, but TRUNCATE removes all rows in a table without any condition.

1. Describe index for RDBMS.

An index inside of a relational data base management system is an additional data structure that associates a sorted copy of a column (or columns) to the database itself.

* 1. State its pros and cons.

Setting up an index on a column reduces the lookup time of queries from O(n) to O(logn) because indexes are sorted in order. This is achieved at the cost of additional storage space because indexes use a B-Tree data structure to store data.

* 1. What kind of columns should be indexed?

Since indexes take up additional space, we cannot use it on every column we have. Some common conditions for indexes are columns that are queried often, columns that are used to JOIN other tables, columns used in the ORDER BY command, or columns that contain data with high selectivity.

1. Describe INNER/LEFT/RIGHT/OUTER JOIN.

INNER JOIN

Inner join returns a new table with rows of data from different tables that have the same value for a specific column

LEFT JOIN

Left join returns a new table that consists of all rows of data from the first table, but now includes more columns of data from rows in table 2 that match a given condition.

RIGHT JOIN

Right join returns a new table that consists of all rows of data from the second table, but now includes more columns of data from rows in table 1 that match a given condition.

OUTER JOIN

Outer join returns a new table that consists of all rows and columns of data from tables 1 and 2, and in places where data from one table doesn’t have a respective data from another table, that space is left as NULL.

1. Describe GROUP BY/HAVING.

The GROUP BY command groups all values from a column into distinct groups of data. The HAVING command further filters the resulting table from the GROUP BY command with certain condition

1. Write a SQL to figure out who is the richest one given the following table.

|  |  |
| --- | --- |
| Name | Money |
| John | 200 |
| Mike | 500 |
| John | 400 |
| Jack | 300 |
| Jack | 100 |
| John | 150 |
| Mike | 50 |

**SELECT \* FROM person WHERE Money = (SELECT MAX(money) FROM person);**

1. Given the following tables, write SQL to answer the questions.

|  |
| --- |
| **City** |
| CityID (PK) |
| CityName |
| ZipCode |
| State |
| Country |

|  |
| --- |
| **Employee** |
| EmployeeID(PK) |
| EmployeeName |
| CityID |
| Phone |

|  |
| --- |
| **Sale** |
| SaleID (PK) |
| SaleDate |
| EmployeeID |
| CustomerID |

|  |
| --- |
| **Item** |
| ItemID (PK) |
| ItemName |
| SaleID |
| Amount |
| Price |

|  |
| --- |
| **Customer** |
| CustomerID(PK) |
| CustomerName |
| Phone |
| Address |

* 1. Which customer spends the most money.

**SELECT customerID, SUM(Amount\*Price) FROM Sale JOIN Item ON Sale.SaleID=Item.SaleID GROUP BY customerID;**

* 1. Which city contributes the least sales.

**SELECT CityID, SUM(Amount\*Price) FROM Employee LEFT JOIN sale ON Employee.employeeID=Sale.employeeID JOIN Item ON sale.saleID=Item.saleID GROUP BY CityID ORDER BY sum DESC;**

**SELECT CityName FROM City WHERE CityID=**

* 1. Which city sales the most amount of item “X”. (“X” is an item name)

**SELECT CityID, SUM(price) FROM**

**(**

**Employee JOIN sale ON Employee.employeeID=Sale.employeeID**

**JOIN Item ON sale.saleID=Item.saleID**

**)**

**WHERE ItemName=’X’ GROUP BY CityID ORDER BY sum DESC;**

**SELECT cityName FROM City WHERE CityID=**

* 1. Who is the best seller in “NewYork”. (“NewYork” is a city name)

**SELECT itemName, SUM(price) FROM(**

**Employee JOIN sale ON Employee.employeeID=Sale.employeeID**

**JOIN Item ON sale.saleID=Item.saleID**

**)**

**WHERE CityID='NewYork' GROUP BY itemName ORDER BY sum DESC;**

* 1. List people who spend more money than “the average spends of NewYork”.

**SELECT customerID, AVG(price) FROM (**

**Sale JOIN Item ON Sale.SaleID=Item.SaleID**

**)**

**GROUP BY customerID HAVING AVG(price) > (**

**SELECT AVG(price) FROM (Employee JOIN sale ON**

**Employee.employeeID=Sale.employeeID**

**JOIN Item ON sale.saleID=Item.saleID) WHERE**

**CityID='Taipei'**

**);**