University Of Engineering and Technology, Lahore
Computer Engineering Department

Course Name: Database Systems	**Course Code: CS363L**
Assignment Type: Lab	**Dated: 24-01-2022**
Semester: 6th	**Session: 2019**
Lab/Project/Assignment #: Lab 2	**CLOs to be covered: CLO1, CLO4**
Lab Title: Getting Comfortable with SQL	**Teacher Name: Ms. Darakhshan**

Lab Evaluation:

CLO1	Construct DML queries to retrieve and store data in different relations					
Levels (Marks)	**Level1**	**Level2**	**Level3**	**Level4**	**Level5**	**Level6**
Cognitive (2.5)						
					Total	**/2.5**
CLO4	Develop projects using learned techniques to solve real world problem with small/large data and learn how to query, visualize, report and make prediction on it.					
	Level1	**Level2**	**Level3**	**Level4**	**Level5**	**Level6**
Cognitive (3)						
					Total	**/3**

Rubrics for Current Lab:

Scale	Marks	Level	Rubric
Excellent	**3**	L1	Understood schema shared for project 1. Have explored it using BigQuery. Understands how query can consume quota of BigQuery.
Very Good	**2.5**	L2	Completed all the activities of Chapter 2 of TSQL Fundamentals book.
Good	**2**	L3	Created tables and have written all queries (lab activities) related to operator precedence, DISTINCT, and ORDER BY clauses while perform the lab activities. Understands how NULL affects the result of query.
Basic	**1.5**	L4	Knows how to write SQL queries with WHERE clause.
Barely Acceptable	**1**	L5	Just created tables and entered data
Not Acceptable	**0**	L6	Did not attempt

Rubrics for Homework

Scale	Marks	Level	Rubric
Excellent	**5**	L1	Completed all 10 questions. Understands the concept of SELECT, PROJECT, WHERE, NULL, DISTINCT and Operator precedence concepts. No plagiarism involved. Can re-write query for a different schema related to the mentioned concepts. No plagiarism
Very Good	**4**	L2	Completed 7 questions. Understands the question and can re-write query related to the learned concepts. No plagiarism

Good	**3**	L3	Completed 5 questions. Understands the question and can re-write query related to the learned concepts. No plagiarism
Barely Acceptable	**1**	L4	Completed 2 questions. Understands the question and can re-write query related to the learned concepts. No plagiarism
Not Acceptable	**0**	L5	Completed none or missed lab.

LAB DETAILS:

Lab Goals/Objectives:

- SQL I: Single table queries, Concepts Schemas, Systems, Select from where
- Retrieving and Restricting data using the SQL SELECT statement
- Project Announcement, Understanding and Discussion

Theory/Relevant Material:

Topic 6.1, 6.2, 6.3 from First Course in Database Systems 3rd Edition by Ullman
Chapter 2 – TSQL Fundamentals

Capabilities of SQL SELECT Statements

A SELECT statement retrieves information from the database. With SELECT statement you can use the following capabilities:

- **Projection**: Select the columns in a table that are returned by a query. Select as few or as many of the columns as required.
- **Selection**: Select the rows in a table that are returned by a query. Various criteria can be used to restrict the rows that are retrieved.
- **Joining**: Bring together data that is stored in different tables by specifying the link between them. SQL joins are covered in more detail in the next labs.

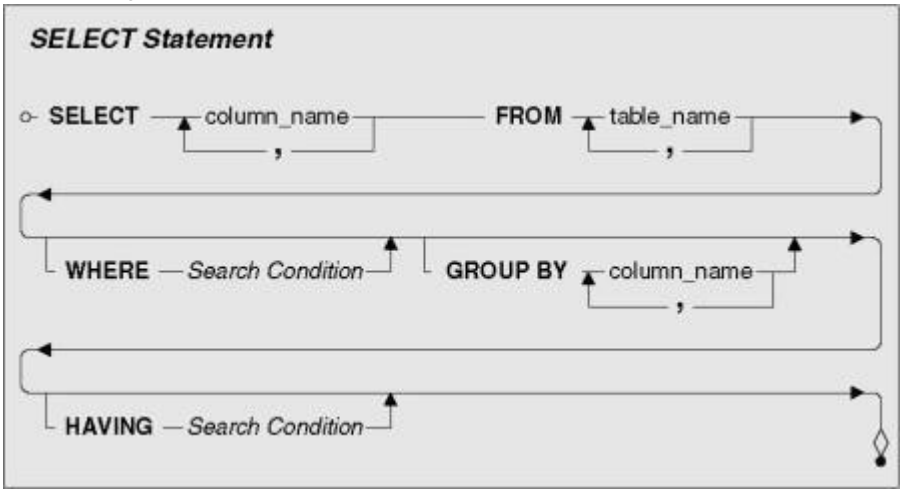

Figure 1 Select statement graphical flow

Structure of basic select statement

In its simplest form, a SELECT statement must include the follow in:

- A SELECT clause, which specifies the columns to be displayed
- A FROM clause, which identifies the table containing the columns that are listed in the SELECT statement

Note

Throughout this course, the words keyword, *clause:* and *statement* are used as follows:

- A keyword refers to an individual SQL element. For example, SELECT and FROM are keywords.
- A clause is a part of a SQL statement. For example, SELECT name, CNIC and so on is a clause.
- A statement is a combination of two or more clauses. For example, SELECT FROM Student is a SQL statement.

Note

- SQL statements are not case-sensitive.
- SQL statements can be entered on one or more lines.
- Keywords cannot be abbreviated or split across lines.
- Clauses are usually placed on separate lines.
- Indents are used to enhance readability.

SQL statements can optionally be terminated by a semicolon (;). Semicolons are required when you execute multiple SQL statements.

Lab Tasks:

Activity 1:

- Create a new table Student which have the following schema Student(RegNo,FirstName,LastName,GPA,Contact)
- Add at least 5 records of your own class in which one or two students have GPA undefined.
- Display all the data from the table Student
- Display specific columns form the table Student
- Display all the data of students where GPA > 3.5
- Display all the data of students where GPA <= 3.5
- Do the above 2 queries cover all the data?
- Display first and last name of all students as single column using concatenation operator.

Operator Precedence:

Operator	**Precedence**
Unary operators, bitwise NOT	1

Multiplication and division	2
Addition, subtraction, and concatenation	3
SQL conditions	4

Activity 2:

- Identify at least one SQL statement in which precedence can affect the result of query.
- Identify how the result of a mathematical expression on null value affect the result of a query.

DISTINCT clause:

- Use the distinct operator to eliminate the duplicates in your sql statement

Comparison and Logical Operators:

- Following comparison operators are commonly used in SQL server
  - o =
  - <>
  - >
  - >=
  - <=
  - <
  - IS NULL
  - BETWEEN AND
  - IN(set)
  - LIKE
- Following Logical operators are used
  - NOT
  - OR
  - AND
- Your task is to write SQL statements corresponding to each operator using Northwind schema

ORDER BY Clause

- Write at least 3 SQL statements using Northwind schema which use ORDER BY clause

TOP N clause:

- Limit the result of 3 ORDER BY queries to 10 rows.

Homework Questions:

All the given tasks should be performed in the context of Northwind schema.

1. Write a query to report orders which were delayed shipped.
2. Our employees belong to how many countries. List the names.
3. Is there any employee whose is not accountable?
4. List the names of products which have been discontinued.
5. List the IDs the orders on which discount was not provided.
6. Enlist the names of customers who have not specified their region.
7. Enlist the names of customers along with contact number who either belongs to UK or USA.
8. Report the names of companies who have provided their web page.
9. In which countries, products were sold in year 1997.
10. List the ids of customers whose orders were never shipped.

Project 1 Announcement:

Details for Project 1 has been shared in a second file. Project 1 helps in understanding SQL language, working with BigQuery platform and how to use big datasets for getting desired information using multiple tables. You will be asked to write SQL queries for multiple questions. All these questions will be related to a single database. You will write SQL queries for the questions. For this you will use BigQuery interface. For submission, a python file will be shared with you. You need to copy all your SQL queries in that python file which will be submitted later. More details on the project can be found in the file shared with this lab. For this week there is no submission for the project. However, project 1 will be submitted in next 3 weeks. Your progress for project 1 will be checked in next week. In this lab, you will understand schema for the database of the project and get yourselves comfortable with the problem.

Submission Instructions:

Make a document name DBLab2_2019_CE_X.docx, add supporting SQL scripts of your homework and submit on google classroom by Sunday, 30th January, 2022 9 P.M