QUERYING DATABASES WITH SQL SELECT
(55335A TUTORIAL)

SQL is a programming language used to manage data in relational databases. The SELECT statement is a SQL statement used to query data inside one or more database tables. Tables organize data in rows and columns. Each column has a unique name that specifies the type of information it contains. Each row corresponds to a unique record or transaction. The following is an example of a table that stores records containing information about employees:

EmployeeID	LastName	FirstName	DateOfBirth	HireDate	Salary	LocationID	DepartmentID
1	Hansen	Joseph	10/29/1986	6/20/2019	87,000	1	3
2	Schaefer	Joanne	1/9/1984	10/25/2019	84,000	8	1
3	Conklin	Robert	4/1/1992	9/14/2019	45,000	4	2
4	Samuels	Henry	8/24/1982	10/16/2019	96,000	4	1
5	Sevilla	Kenneth	8/18/1970	7/11/2019	123,000	7	3
6	Middleton	Stephani	4/21/1969	7/28/2019	108,000	4	3
7	White	Karen	4/3/1975	6/11/2019	111,000	1	3
8	Rasmussen	Gail	1/21/1980	9/20/2019	123,000	1	5
9	Hernandez	Chadwick	2/4/1979	8/4/2019	36,000	6	3
10	Guy	Claire	4/29/1986	6/30/2019	42,000	1	4

Figure 1: Employees Table   (Note: The table contains 10,000 records and is available as a part of course 55318A from Microsoft Learning)

After connecting to the database, this employees table can be queried to show all the records it contains using the following select query:
SELECT * FROM Employees

The asterisk (*) after the select statement indicates that all columns should be displayed. You may specify specific columns and their order. The following select statement would show the FirstName, LastName and EmployeeID columns in the order specified:
SELECT FirstName, LastName, EmployeeID FROM Employees

To list only rows that have a specified value for a column, use the where clause as in the example below which lists all employees with a salary less than $50,000:
SELECT FirstName, LastName, Salary FROM Employees
Where Salary < 50000

Multiple conditions can be specified in a where clause using the AND / OR parameters. The following query will return a subset of the data from the previous query only listing records where the employee works in the department with an id of 3:
SELECT FirstName, LastName, Salary FROM Employees
Where Salary < 50000 AND DepartmentID = 3

To sort the data, you will use the order by clause as in the example below which sorts the records by the date the employee was hired. Records are sorted in ascending order by default unless the DESC option is used to sort it in descending order, as in the example below:
SELECT LastName, FirstName, HireDate FROM Employees
Order By HireDate DESC

Prepared by: Neil Tucker

QUERYING DATABASES WITH SQL SELECT
(55335A TUTORIAL)

When working with large datasets, you may want to review only a specified number of rows so the data can be queried faster. The Limit clause or top statement can be used to do this depending on which database server you are working with:
SELECT EmployeeID, LastName, FirstName, DateOfBirth FROM Employees
Limit 10

Or

SELECT TOP 10 EmployeeID, LastName, FirstName, DateOfBirth FROM Employees

To view only records that have unique attributes, specify the distinct clause. The following query will only show each last name in the table once and ignore duplicate occurrences:
SELECT Distinct(LastName) FROM Employees

Other statements and functions that can be used with columns in a select statement include AS, COUNT, MAX, MIN, SUM, AVG. Most of these are often used with the GROUP BY clause to categorize your query's output:
SELECT DepartmentID, AVG(Salary) AS AverageDepartmentIncome FROM EMPLOYEES
Order By DepartmentID
Group By DepartmentID

Exercise:
Using the examples and explanations given, write a query to perform each of the following tasks:

1. List all employees using the columns EmployeeID, DateOfBirth, FirstName, LastName

2. Sort the records by salary in descending order

3. Find the employee that is paid the most

4. List the minimum, maximum and average salaries

5. Find the oldest and youngest employees

6. Find the employee with the longest work history

7. List the 10 highest paid employees

8. Find out how many employees belong to the department with an ID of 5

9. Sort the employees based on their hire date, showing the newest employees first

10. Find out how many employees work in location 7

Note: If the table for this exercise is not already setup, use the Person.Customer or Person.Employee table as a substitute. Answers for the exercise are in the **SQL_SELECT_Answers.sql** file.

Prepared by: Neil Tucker