TechLift
KICKSTART YOUR CAREER

WEB ENGINEERING

.Net

Week 4 - Day 19

Rapid Fire Revision:
Students as Teachers (15 min)

➤ The student volunteers will act like the trainer and ask questions about any topics being covered in the previous days of this week. This question can be from previous week as well.

➤ These volunteers will also explain the correct answer to the students in case of wrong answers. The trainer will facilitate the volunteers where required.

➤ Trainer will encourage as many volunteers as time will allow.
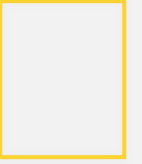
ASP.NET Web Application

Learning Objectives

By the end of this session, the students will have developed an understanding of:

▶ Relational Databases

▶ Non-Relational Databases

▶ SQL Server Developer Edition Installation

Relational Database

Introduction

RDBMS stands for Relational Database Management System.

RDBMS is a program used to maintain a relational database.

RDBMS is the basis for all modern database systems such as MySQL, Microsoft SQL Server, Oracle, and Microsoft Access.

RDBMS uses SQL queries to access the data in the database.

A relational database defines database relationships in the form of tables. The tables are related to each other - based on data common to each.

Example: Microsoft SQL Server, Oracle Database, MySQL and IBM DB2

Database Table

A table is a collection of related data entries, and it consists of columns and rows.

A column holds specific information about every record in the table.

A record (or row) is each individual entry that exists in a table.

Look at a selection from the Northwind "Customers" table:

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

MYSQL

SQL is the standard language for dealing with Relational Databases.

SQL is used to insert, search, update, and delete database records.

SQL Basic Commands

SELECT - extracts data from a database

UPDATE - updates data in a database

DELETE - deletes data from a database

INSERT INTO - inserts new data into a database

CREATE DATABASE - creates a new database

ALTER DATABASE - modifies a database

CREATE TABLE - creates a new table

ALTER TABLE - modifies a table

DROP TABLE - deletes a table

CREATE INDEX - creates an index (search key)

DROP INDEX - deletes an index

Database & Table Creation MySQL

The CREATE DATABASE statement is used to create a new SQL database.

Database Creation Syntax

```
CREATE DATABASE databasename;
```

The CREATE TABLE statement is used to create a new table in a database.

Table Creation Syntax

```
CREATE TABLE table_name (
    column1 datatype,
    column2 datatype,
    column3 datatype,
    ....
);
```

Excercise

Create a database name 'Student' with the
following column names

PersonID	LastName	FirstName	Address	City

Table Creation Syntax

```
CREATE TABLE table_name (
    column1 datatype,
    column2 datatype,
    column3 datatype,
    ....
);
```

MySQL SELECT Statements

The SELECT statement is used to select data from a database.

The data returned is stored in a result table, called the result-set.

Database Creation Syntax

```
SELECT column1, column2, ...
FROM table_name;
```

Sample Data

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

```
SELECT CustomerName, City, Country FROM Customers;
```

MySQL SELECT Statements

Previous Sample Data Output

CustomerName	City	Country
Alfreds Futterkiste	Berlin	Germany
Ana Trujillo Emparedados y helados	México D.F.	Mexico
Antonio Moreno Taquería	México D.F.	Mexico
Around the Horn	London	UK
Berglunds snabbköp	Luleå	Sweden
Blauer See Delikatessen	Mannheim	Germany
Blondel père et fils	Strasbourg	France
Bólido Comidas preparadas	Madrid	Spain

MySQL WHERE Clause

The WHERE clause is used to filter records.

It is used to extract only those records that fulfill a specified condition.

Where Clause Syntax

```
SELECT column1, column2, ...
FROM table_name
WHERE condition;
```

Sample Data

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

```
SELECT * FROM Customers
WHERE Country = 'Mexico';
```

MySQL WHERE Clause

Previous Sample Data Output

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
13	Centro comercial Moctezuma	Francisco Chang	Sierras de Granada 9993	México D.F.	05022	Mexico
58	Pericles Comidas clásicas	Guillermo Fernández	Calle Dr. Jorge Cash 321	México D.F.	05033	Mexico
80	Tortuga Restaurante	Miguel Angel Paolino	Avda. Azteca 123	México D.F.	05033	Mexico

Excercise

Implement the Select Statement and Where Clause on the previous Student table you designed.

Add a new column 'marks' and show data of those students whose marks are equal to 50

For help click on this link

MySQL INNER JOIN

The INNER JOIN keyword selects records that have matching values in both tables.

INNER JOIN Syntax

```
SELECT column_name(s)
FROM table1
INNER JOIN table2
ON table1.column_name = table2.column_name;
```

MySQL INNER JOIN

Demo Data

Order Table

OrderID	CustomerID	EmployeeID	OrderDate	ShipperID
10308	2	7	1996-09-18	3
10309	37	3	1996-09-19	1
10310	77	8	1996-09-20	2

Customer Table

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico

MySQL INNER JOIN

Performing INNER JOIN on previous tables

```sql
SELECT Orders.OrderID, Customers.CustomerName
FROM Orders
INNER JOIN Customers ON Orders.CustomerID = Customers.CustomerID;
```

OUTPUT

OrderID	CustomerName
10248	Wilman Kala
10249	Tradição Hipermercados
10250	Hanari Carnes
10251	Victuailles en stock
10252	Suprêmes délices
10253	Hanari Carnes
10254	Chop-suey Chinese
10255	Richter Supermarkt
10256	Wellington Importadora
10257	HILARIÓN-Abastos
10258	Ernst Handel
10259	Centro comercial Moctezuma
10260	Old World Delicatessen

Exercise

Perform Inner join on the following tables and the resultant table should have the columns 'ID', 'NAME', 'AMOUNT', 'DATE'

Table 1

```
+----+----------+-----+-----------+----------+
| ID | NAME     | AGE | ADDRESS   | SALARY   |
+----+----------+-----+-----------+----------+
|  1 | Ramesh   |  32 | Ahmedabad |  2000.00 |
|  2 | Khilan   |  25 | Delhi     |  1500.00 |
|  3 | kaushik  |  23 | Kota      |  2000.00 |
|  4 | Chaitali |  25 | Mumbai    |  6500.00 |
|  5 | Hardik   |  27 | Bhopal    |  8500.00 |
|  6 | Komal    |  22 | MP        |  4500.00 |
|  7 | Muffy    |  24 | Indore    | 10000.00 |
+----+----------+-----+-----------+----------+
```

Table 2

```
+-----+---------------------+-------------+--------+
| OID | DATE                | CUSTOMER_ID | AMOUNT |
+-----+---------------------+-------------+--------+
| 102 | 2009-10-08 00:00:00 |           3 |   3000 |
| 100 | 2009-10-08 00:00:00 |           3 |   1500 |
| 101 | 2009-11-20 00:00:00 |           2 |   1560 |
| 103 | 2008-05-20 00:00:00 |           4 |   2060 |
+-----+---------------------+-------------+--------+
```
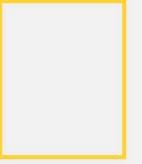
Non-Relational Database

Introduction

NoSQL Database is a non relational database, which is used to store and retrieve data other than tabular relations model, i.e, without using tables and is thus used to store big data and real-time web applications.

Example:

1. MongoDB,
2. Apache Cassandra,
3. Redis, Couchbase
4. Apache HBase

Advantages

● NoSQL Database facilitates efficient Horizontal Scalability.
● NoSQL Database is a more simpler and easy to use database server, when compared to those of relational databases.
● NoSQL Database facilitates fast data storage and retrieval functionalities.

# Difference Between SQL and NoSQL

Key	SQL	NoSQL
Type	SQL databases are classified as Relational databases, i.e., RDBMS.	NoSQL databases are known as non-relational or distributed database.
Language	SQL databases use standard Structured Query Languages, as the name suggests. SQL is an industry-standard and very powerful language to execute complex queries.	NoSQL database has dynamic schema for unstructured data. The data stored in a NoSQL database is not structured. Data could be stored as document-oriented, column oriented, graph-based or organized as a Key-Value store. The syntax can vary from database to database.
Scalability	SQL databases can extend their capacity on a single server by increasing their RAM, CPU or SSD. SQL databases are scalable vertically, as their storage could be increased for the same server by enhancing their storage components.	In order to increase the capacity of a NoSQL database, you would have to install new servers parallel to the parent server. NoSQL databases are horizontally scalable which means they can easily handle more traffic by adding new servers to the database, which makes them a great choice for large and constantly changing databases.
Schema	SQL databases have a fixed, pre-defined schema, which makes the data storage more rigid, static, and restrictive.	NoSQL databases don't have a pre-defined schema, which makes them schema-less and more flexible.
Internal implementation	SQL follows ACID (Atomicity, Consistency, Isolation and Durability) properties for its operations.	NoSQL is based on CAP (Consistency, Availability, and Partition Tolerance).
Data Storage	SQL databases can only be run on a single system and because of this, they don't follow the distribution of data and hence they don't support hierarchical	NoSQL Databases can run on multiple systems, and hence, they support data distribution features like data repetition, partition, etc., making them the best option for hierarchical storage of data.

Type of Data	SQL databases are table-based databases which makes them better for multi-row transaction applications.	NoSQL is document-based, key-value pair, and graph databases, which makes them better when there are a lot of changes in the data.
Performance and suitability	SQL databases are best suited for complex queries but are not preferred for hierarchical large data storage.	NoSQL databases are not so good for complex queries because these are not as powerful as SQL queries but are best suited for hierarchical large data storage.
Examples	SQL databases are implemented in both open source and commercial databases such as like Postgres & MySQL as open source and Oracle and Sqlite as commercial.	NoSQL is purely open source. Some of its famous implementation are MongoDB, BigTable, Redis, RavenDB, Cassandra, Hbase, Neo4j, and CouchDB.

SQL Server Developer Edition Installation

To download SQL Server 2019, you click the following link:

Download the SQL Server

STEP 1: The downloader will ask you to select the installation type, choose the Download Media option. This option allows you to download the setup files first and install the SQL Server later.
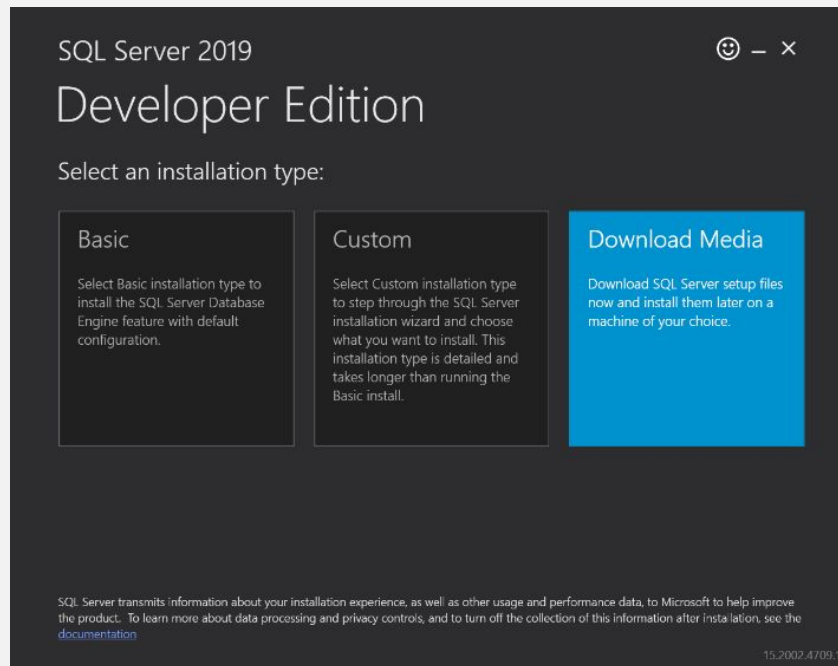
For complete Instructions click on this Link:
https://www.sqlservertutorial.net/install-sql-server/

Exercise

The trainer will ask the students to download SQL Server Developer Edition Installation by following these links:

1. Server Download:

   Download the SQL Server

2. Installation:

   https://www.sqlservertutorial.net/install-sql-server/

Homework

Develop a Student Information Management System using SQL Server
Your Management System should have the following features:

1. Student Information
2. Course Registration
3. ClassRoom Details

Learning Objectives

By the end of this session, the students have practised

✅ Relational Databases

✅ Non-Relational Databases

✅ SQL Server Developer Edition Installation

Conclusion & Q/A

See you tomorrow!