DBMS LAB # 1

MS SQL Server Installation & Operations

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SQL Server 2014 Installation and Commands Introduction

Server Editions of SQL Server 2014

Enterprise (64-bit and 32-bit)	The premium offering, SQL Server 2014 Enterprise edition delivers comprehensive high-end datacenter capabilities with blazing-fast performance, unlimited virtualization, and end-to-end business intelligence - enabling high service levels for mission-critical workloads and end user access to data insights.
Business Intelligence (64-bit and 32-bit)	SQL Server 2014 Business Intelligence edition delivers comprehensive platform empowering organizations to build and deploy secure, scalable and manageable BI solutions. It offers exciting functionality such as browser based data exploration and visualization; powerful data mash-up capabilities, and enhanced integration management.
Standard (64-bit and 32-bit)	SQL Server 2014 Standard edition delivers basic data management and business intelligence database for departments and small organizations to run their applications and supports common development tools for on-premise and cloud - enabling effective database management with minimal IT resources.

Breadth Editions of SQL Server 2014

Breadth editions of SQL Server are engineered for specific customer scenarios and are offered FREE or at a very nominal cost. The following table describes the breadth editions of SQL Server.

Developer (64-bit and 32-bit)	SQL Server 2014 Developer edition lets developers build any kind of application on top of SQL Server. It includes all the functionality of Enterprise edition, but is licensed for use as a development and test system, not as a production server. SQL

	Server Developer is an ideal choice for people who build and test applications.
Express (64-bit and 32-bit) editions	SQL Server 2014 Express edition is the entry-level, free database and is ideal for learning and building desktop and small server data-driven applications. It is the best choice for independent software vendors, developers, and hobbyists building client applications. If you need more advanced database features, SQL Server Express can be seamlessly upgraded to other higher end versions of SQL Server. SQL Server Express LocalDB, a lightweight version of Express that has all of its programmability features, yet runs in user mode and has a fast, zero-configuration installation and a short list of prerequisites.

SQL Server Components

Server components	**Description**
SQL Server Database Engine	SQL Server Database Engine includes the Database Engine, the core service for storing, processing, and securing data, replication, full-text search, tools for managing relational and XML data, and the Data Quality Services (DQS) server.
Analysis Services	Analysis Services includes the tools for creating and managing online analytical processing (OLAP) and data mining applications.
Reporting Services	Reporting Services includes server and client components for creating, managing, and deploying tabular, matrix, graphical, and free-form reports. Reporting Services is also an extensible platform that you can use to develop report applications.

Server components	Description
Integration Services	Integration Services is a set of graphical tools and programmable objects for moving, copying, and transforming data. It also includes the Data Quality Services (DQS) component for Integration Services.
Master Data Services	Master Data Services (MDS) is the SQL Server solution for master data management. MDS can be configured to manage any domain (products, customers, accounts) and includes hierarchies, granular security, transactions, data versioning, and business rules, as well as an Add-in for Excel that can be used to manage data.

Management tools	Description
SQL Server Management Studio	SQL Server Management Studio is an integrated environment to access, configure, manage, administer, and develop components of SQL Server. Management Studio lets developers and administrators of all skill levels use SQL Server.
SQL Server Configuration Manager	SQL Server Configuration Manager provides basic configuration management for SQL Server services, server protocols, client protocols, and client aliases.
SQL Server Profiler	SQL Server Profiler provides a graphical user interface to monitor an instance of the Database Engine or Analysis Services.
Database Engine Tuning Advisor	Database Engine Tuning Advisor helps create optimal sets of indexes, indexed views, and partitions.

Management tools	Description
Data Quality Client	Provides a highly simple and intuitive graphical user interface to connect to the DQS server, and perform data cleansing operations. It also allows you to centrally monitor various activities performed during the data cleansing operation.
SQL Server Data Tools	SQL Server Data Tools provides an IDE for building solutions for the Business Intelligence components: Analysis Services, Reporting Services, and Integration Services. (Formerly called Business Intelligence Development Studio). SQL Server Data Tools also includes "Database Projects", which provides an integrated environment for database developers to carry out all their database design work for any SQL Server platform (both on and off premise) within Visual Studio. Database developers can use the enhanced Server Explorer in Visual Studio to easily create or edit database objects and data, or execute queries.
Connectivity Components	Installs components for communication between clients and servers, and network libraries for DB-Library, ODBC, and OLE DB.

Installation of SQL Server:

Installing SQL Server 2014 Express Edition

To install Microsoft SQL Server 2014 Express Edition, follow these steps:

Run the setup file through the administrative account. The Microsoft SQL Server 2014 Installation Center will begin.

1. Select the "New Installation" Feature.
2. In this Feature Selection Wizard Select all of the features and click the Next button.
3. In this Instance Configuration select the **Default Instance** option and click Next button.
4. Click **Next**.
5. In this **Database Engine Configuration** select the **Windows Authentication Mode** and click Next button.
6. Installation will progress and setup will complete installation automatically. Just wait and watch.
7. From the Setup Complete window, click **Close**.

Now go to the Start menu and Search SQL Server Management Studio. A new window will be opened. Connect to the server.
Now place the following sample code in the query window, run it and see the output:

```
SELECT getdate(); -- Selects the current (server) date and time.
```

On the left side you will see databases named master etc.

On clicking any of the database, you'll see default tables in that database. You can also right click on any of the table and select 'return all rows' to see the entire values in the table.

But you have to create your own database with your own name.

Run the following query by pressing F5 key:

```
CREATE DATABASE WXYZ; -- Creates a database named WXYZ;
```

Remember…!! SQL is not case sensitive.

Are you able to see the database created…???

If no, then refresh the services again…!!

Now create the table in the above created database using the CREATE TABLE command:

Syntax:

```
CREATE
TABLE        table_name (
column_name1 data_type(size),
column_name2 data_type(size),
column_name3 data_type(size),
....
); --// CREATE TABLE is the keyword.
```

Suppose if you want to create the following table:

Name	Reg_No	Courses	Course_Code	Offered_By

You'll have to run the following query:

```
CREATE TABLE  Student
(
Name varchar(255),
Reg_No varchar(255),
Courses varchar(255),
Course_Code int,
Offered_by varchar(255)
);
```

Run the query and see the results.

Was the table created named STUDENT….???

Inorder to verify the results run the following query:

```
SELECT *
FROM Student;
```

Was the table displayed…???

SQL Server Data Types

String types:

Data type	Description	Storage
char(n)	Fixed width character string. Maximum 8,000 characters	Defined width
varchar(n)	Variable width character string. Maximum 8,000 characters	2 bytes+no. of chars
varchar(max)	Variable width character string. Maximum 1,073,741,824 characters	2 bytes + number of chars
text	Variable width character string. Maximum 2GB of text data	4 bytes + number of chars
nchar	Fixed width Unicode string. Maximum 4,000 characters	Defined width x 2
nvarchar	Variable width Unicode string. Maximum 4,000 characters	
nvarchar(max)	Variable width Unicode string. Maximum 536,870,912 characters	
ntext	Variable width Unicode string. Maximum 2GB of text data	
bit	Allows 0, 1, or NULL	
binary(n)	Fixed width binary string. Maximum 8,000 bytes	
varbinary	Variable width binary string. Maximum 8,000 bytes	
varbinary(max)	Variable width binary string. Maximum 2GB	
image	Variable width binary string. Maximum 2GB	

Data type	Description	Storage
tinyint	Allows whole numbers from 0 to 255	1 byte
smallint	Allows whole numbers between -32,768 and 32,767	2 bytes
int	Allows whole numbers between -2,147,483,648 and 2,147,483,647	4 bytes

bigint	Allows whole numbers between -9,223,372,036,854,775,808 and 9,223,372,036,854,775,807	8 bytes
decimal(p,s)	Fixed precision and scale numbers.	5-17 bytes

Data type	Description	Storage
datetime	From January 1, 1753 to December 31, 9999 with an accuracy of 3.33 milliseconds	8 bytes
datetime2	From January 1, 0001 to December 31, 9999 with an accuracy of 100 nanoseconds	6-8 bytes
smalldatetime	From January 1, 1900 to June 6, 2079 with an accuracy of 1 minute	4 bytes
date	Store a date only. From January 1, 0001 to December 31, 9999	3 bytes
time	Store a time only to an accuracy of 100 nanoseconds	3-5 bytes
datetimeoffset	The same as datetime2 with the addition of a time zone offset	8-10 bytes

Date types:

timestamp	Stores a unique number that gets updated every time a row gets created or modified. The timestamp value is based upon an internal clock and does not correspond to real time. Each table may have only one timestamp variable

Other data types:

Data type	Description
sql_variant	Stores up to 8,000 bytes of data of various data types, except text, ntext, and timestamp
uniqueidentifier	Stores a globally unique identifier (GUID)
xml	Stores XML formatted data. Maximum 2GB
cursor	Stores a reference to a cursor used for database operations
table	Stores a result-set for later processing

Tasks:

Task 1: Answer the following questions:

1. After learning about the system requirements and different versions of SQL Servers, which version (2014, 2016, etc) and edition (standard, express, etc) have you planned to install on your machine?
2. Depending on the version you choose, enlist the server components and management tools that will automatically be installed along with core Server.

Task 2: Write down the installation steps with proper screenshots, where needed.

Task 3: Write down the data types used in SQL Server.

Some useful links:

Installation guide:
https://docs.microsoft.com/en-us/sql/database-engine/install-windows/install-sql-server?view=sql-server-ver15

Compatibility Issues with previous versions:
https://docs.microsoft.com/en-us/sql/sql-server/install/work-with-multiple-versions-and-instances-of-sql-server?view=sql-server-ver15

Download Link:
https://www.microsoft.com/en-us/sql-server/sql-server-downloads