

COMP1140, S2, 2018
Prac/Tute - Week 2
Introduction to SQL Server 2014 and T-SQL

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In this practice, you are introduced to Microsoft's SQL Server 2014, and practice on T-SQL. We will use SQL Server 2014 throughout the course.

1. SQL Server 2014 Enterprise Edition

SQL Server 2014 comes in many editions – Enterprise, Standard, Express, Developer and others – with varying degrees of functionality. We will use SQL Server 2014 Enterprise Edition in lab. But we will mainly practise on the functions that SQL Server 2014 Express Edition has. You can also install and practise on your home computer the free downloadable edition of SQL Server 2014 Express. You can also download and install SQL Server 2016 Enterprise Edition from Microsoft Imagine (free for all UON students).

Useful links:

URL for SQL Server:

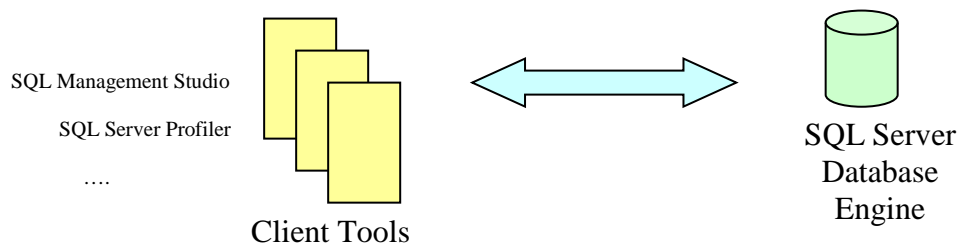
<https://www.microsoft.com/en-us/sql-server/>

URL for downloading SQL Server 2014 Express:

<https://www.microsoft.com/en-us/download/details.aspx?id=42299>

2. Client Server Environment

You will be working with SQL Server in a client-server environment. When you successfully install SQL Server 2014, the database server and a host of client tools will be installed on your machine.



SQL Server Database Engine is run as a server (MSSQLServer) on Windows Operation System. There are many client tools that are available for you to connect to the database server and perform operations. We will use *SQL Server Management Studio* extensively throughout this course.

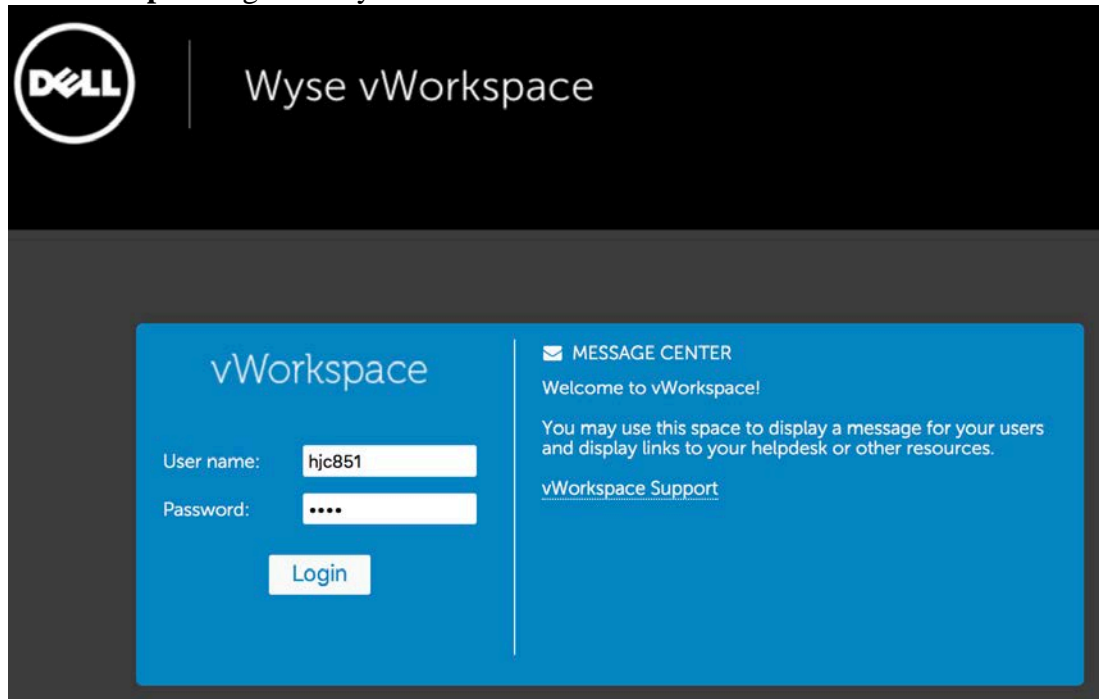
3. SQL Server Management Studio

Using SQL's Management Studio, you can connect to the SQL Server 2014 Database Engine using Windows or SQL Server authentication.

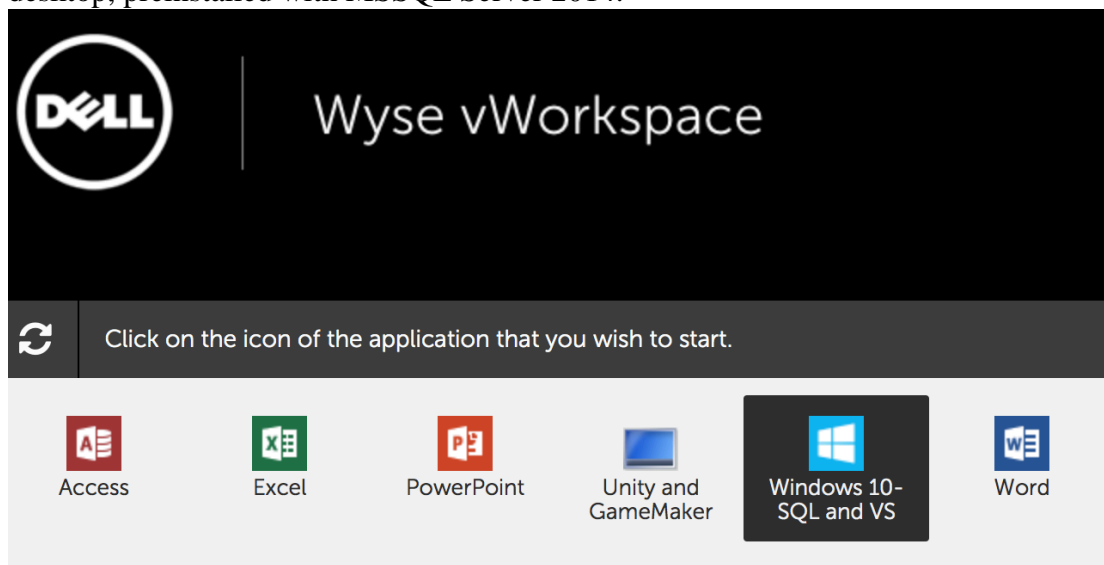
3.0 Connect to UON Virtual Desktop Infrastructure (optional)

Step 1: From Internet Explorer (or your favourite web browser), navigate to the following URL: <http://dcit-vdi.newcastle.edu.au/HTML5>

Step 2: Login with your Uni ID



Step 3: Click 'Windows 10-SQL and VS' to open and login to a virtual desktop, preinstalled with MSSQL Server 2014.



You will then login to a virtual desktop, preinstalled with all the software required for these labs.

NOTE: after finishing using the **Virtual Desktop**, make sure log out by: goto **Power** -> **Disconnect**

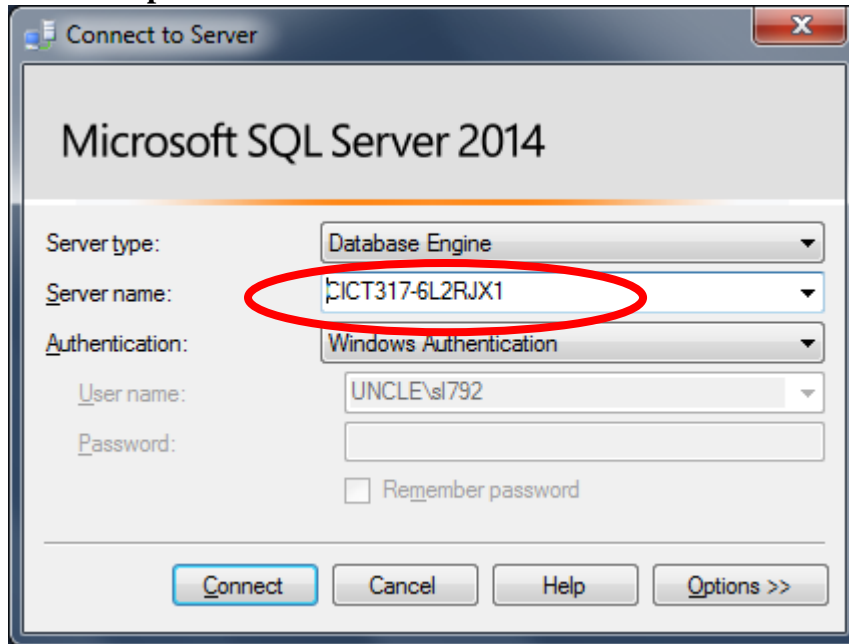
3.1 In Labs, you need to first *create a database* for yourself.

Follow the instructions below:

Step 0: Start SQL's Management Studio by:

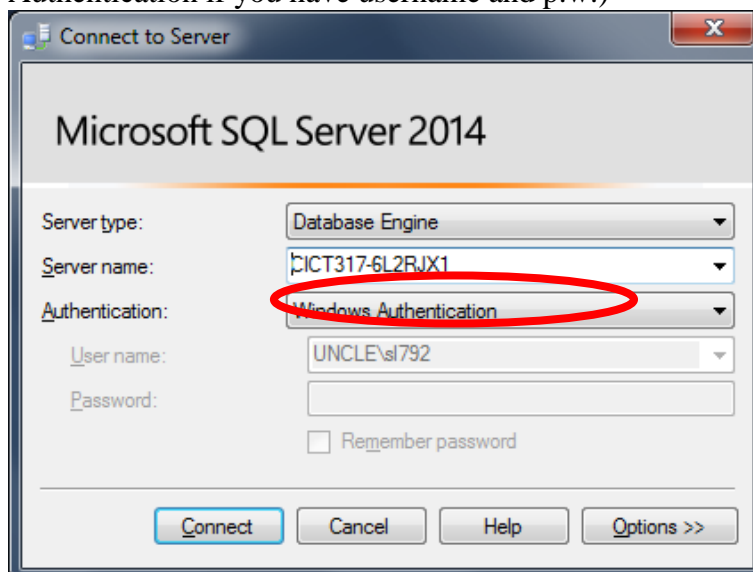
Goto: Start -> All Apps -> Microsoft SQL Server 2014 -> SQL Server 2014 Management Studio

Step 1: Choose the local database server.

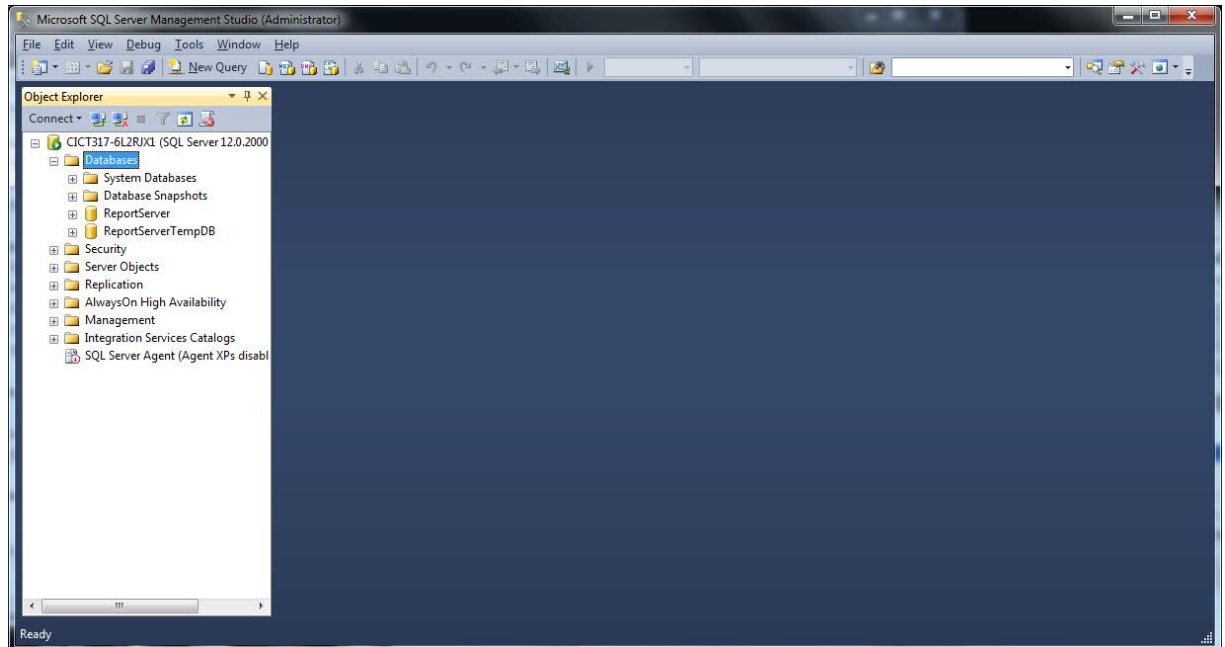


Note: Servers on VDI workstations will have the server name Win10_2016-XXX, while physical machines will have the server name C<room>-XXXXXXX

Step 2: Use Windows Authentication (can also use SQL Server Authentication if you have username and p.w.)



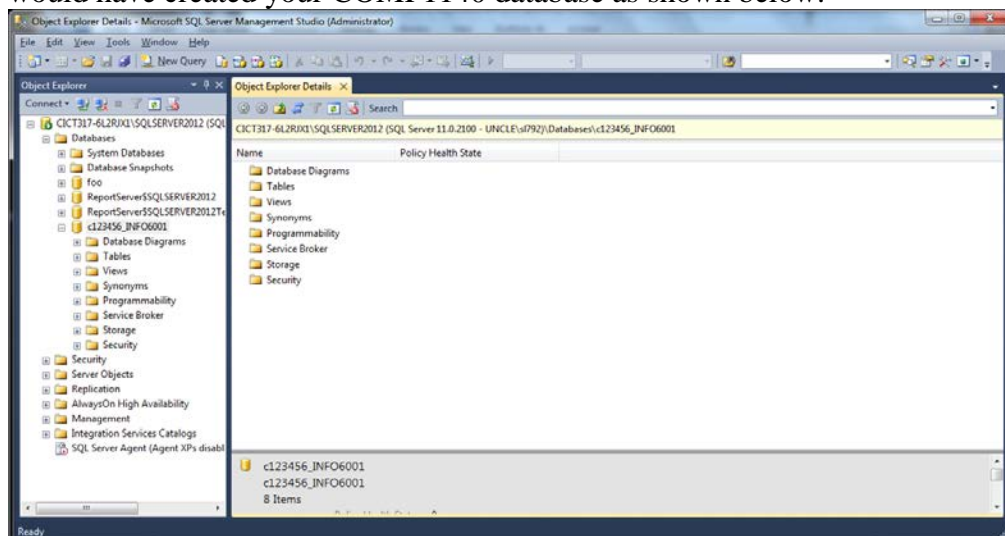
Step 3: After connecting to server successfully (*Note: if the Studio fails connecting to the Server, one way to fix is to make sure the Server is running. This can be done by checking the setting of Services. Details can be practised in lab.*), you will see an interface similar to the figure below:



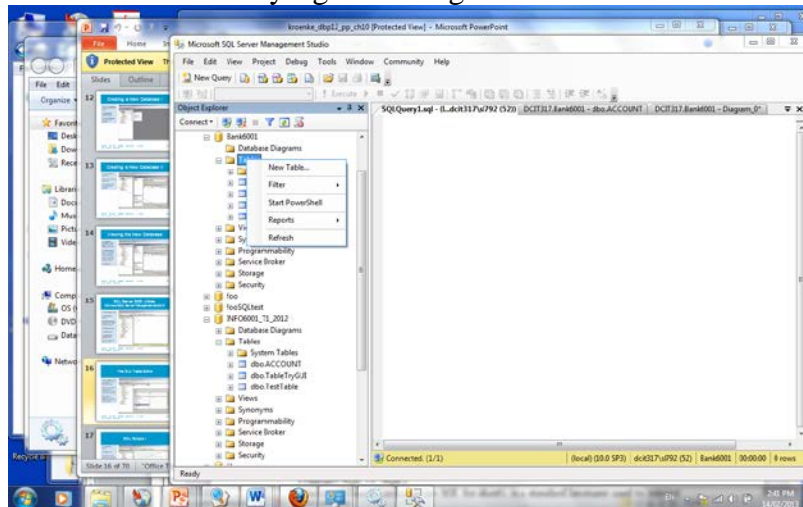
If you expand the *Databases* folder, you will see *System Databases* (which are used by the database engine), *Database Snapshots*, etc.

Step 4: For this class, you can create a database called *<Your-Win-Login>_COMP1140*. For example, if your login is *C123456*, you will create a database called *C123456_COMP1140*.

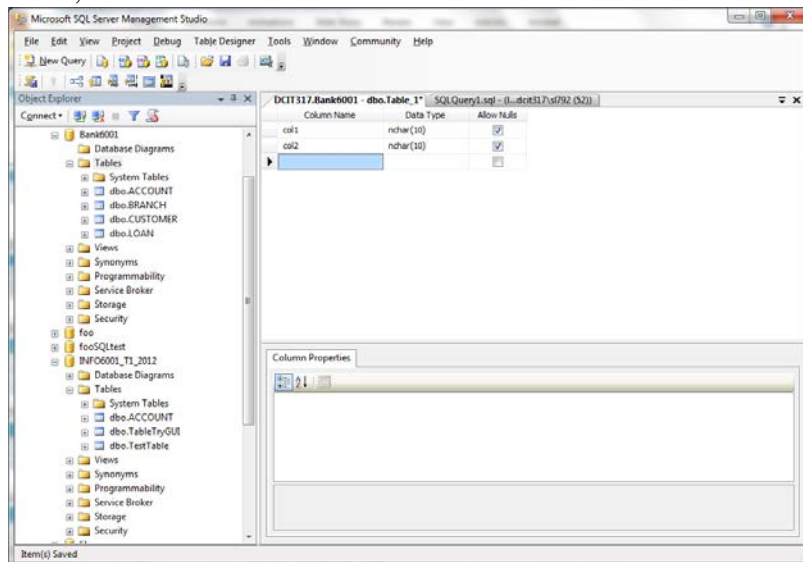
You can right-click on *Databases* folder and select “New Database”. Fill in the “Database name” to be *<Your_Login>_COMP1140* and click “OK”. This would have created your COMP1140 database as shown below:



3.2 Further exercise on *creating and exploring tables using GUI*: Create a new table by right clicking on Tables -> New -> Table:

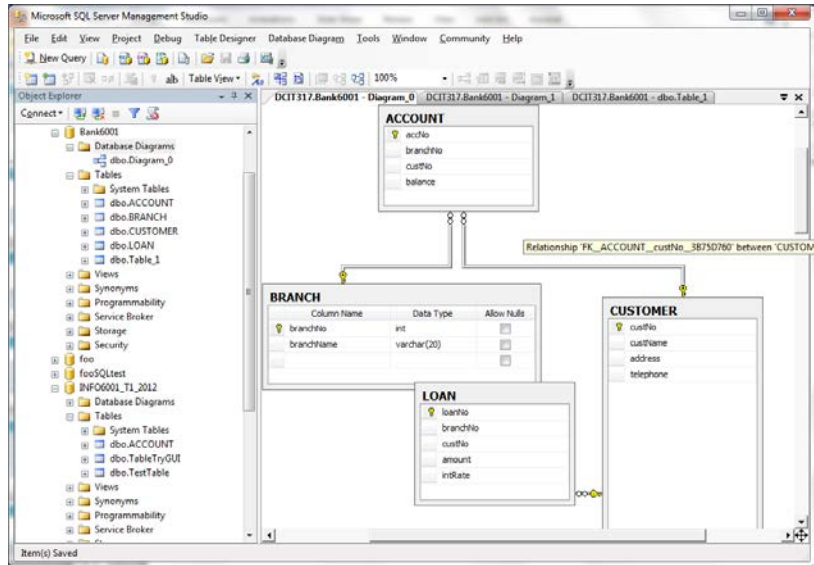


Then, build the table:

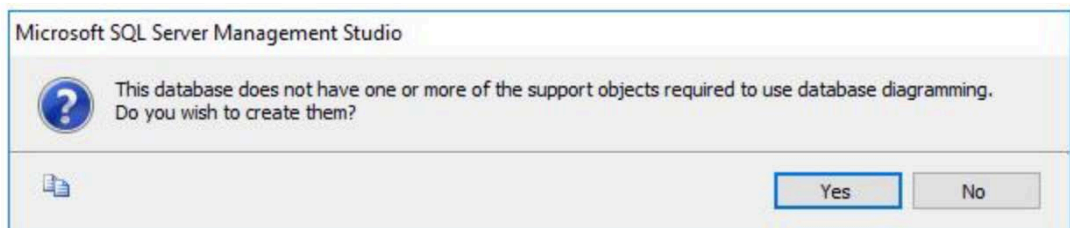


Save the table by clicking File -> Save table. (Can change table name here).

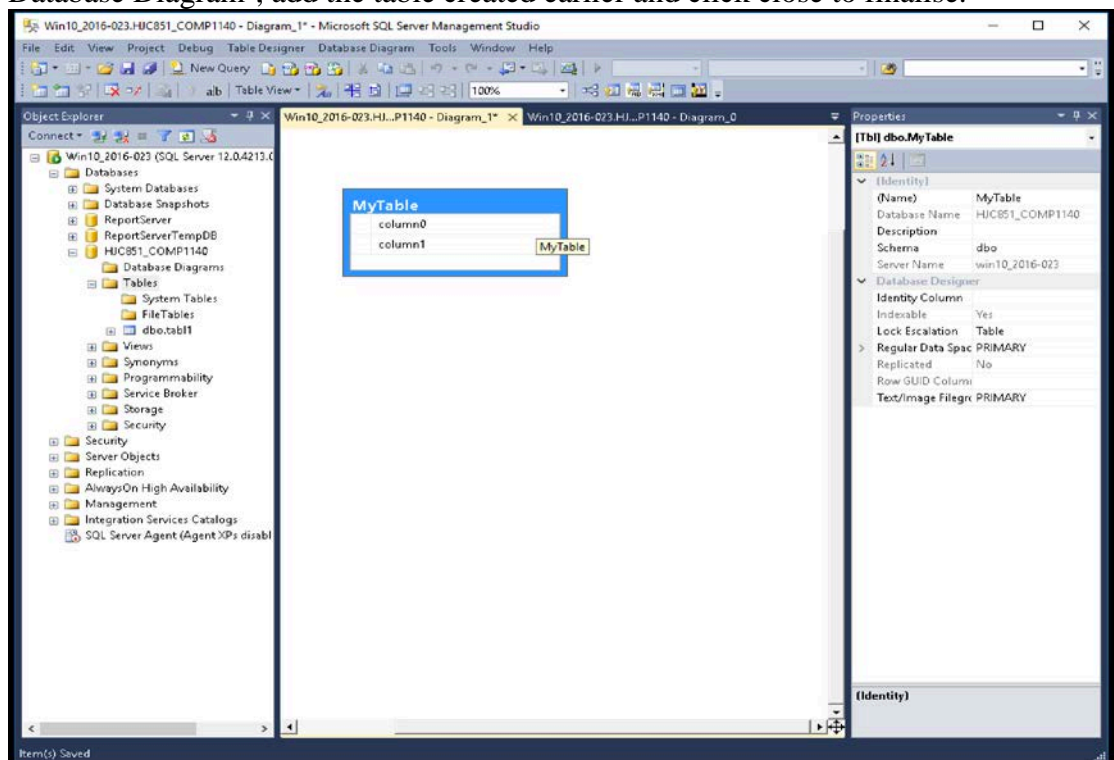
3.3 All the information about the tables can be viewed from Database Diagrams



On the first time expanding 'Database Diagrams' a popup will appear. Click Yes.

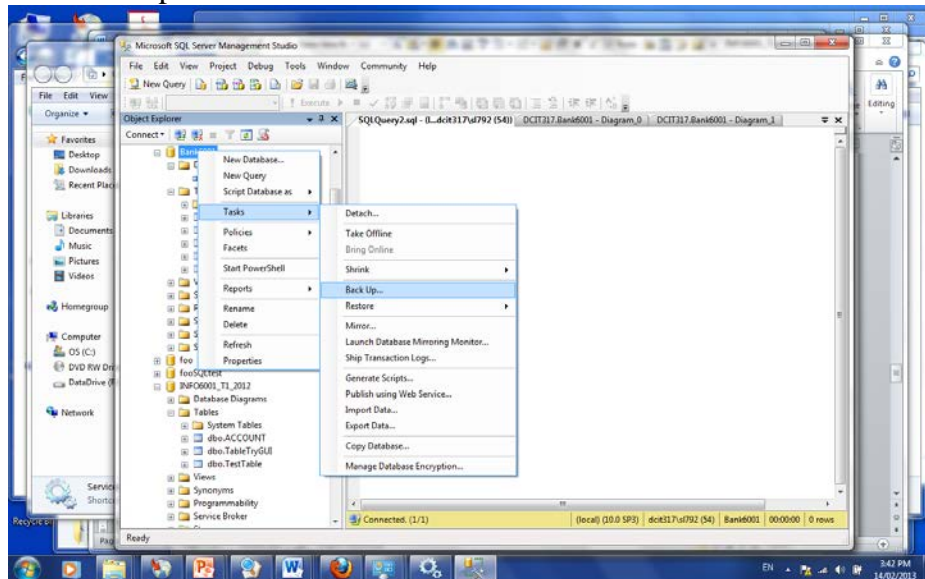


To create a Database Diagram, right click 'Database Diagrams' -> 'New Database Diagram', add the table created earlier and click close to finalise.

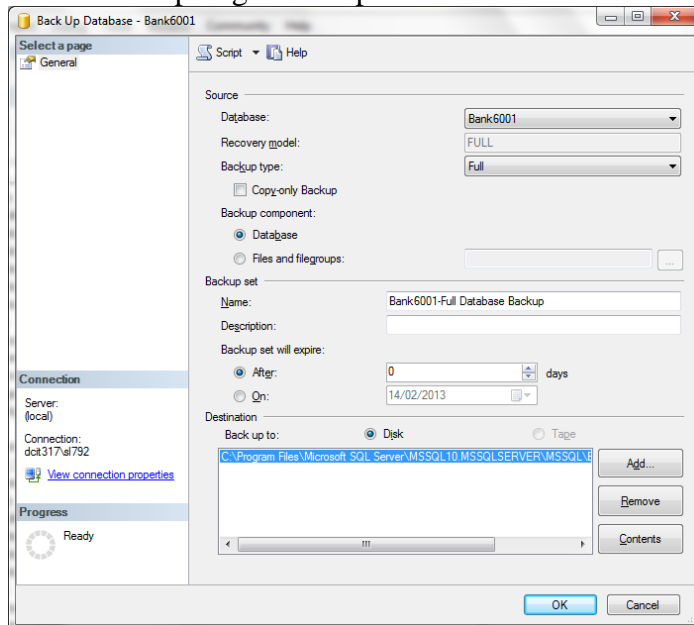


3.4 Backup database

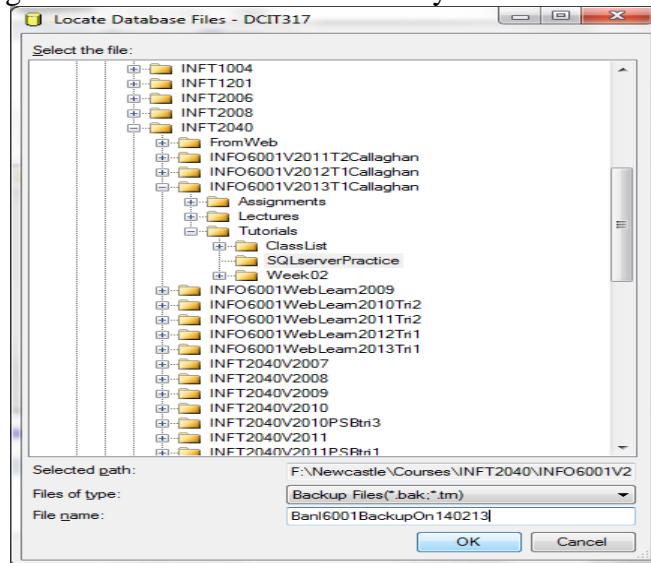
- a. Right-click the database object in the Object Explorer to bring up the Tasks and Back Up shortcut menu



- b. Click Back up to get backup menu:



c: change destination address if necessary:

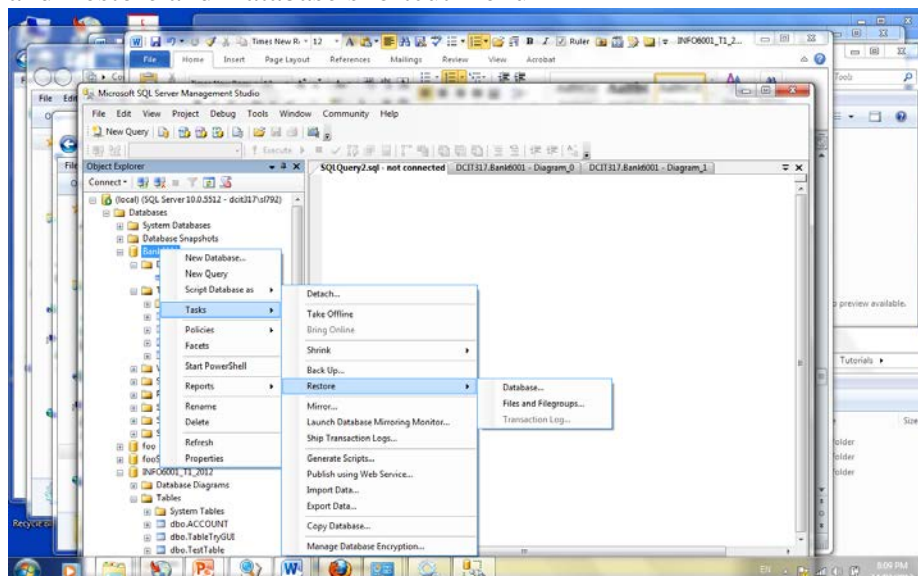


d: click ok to complete backup.

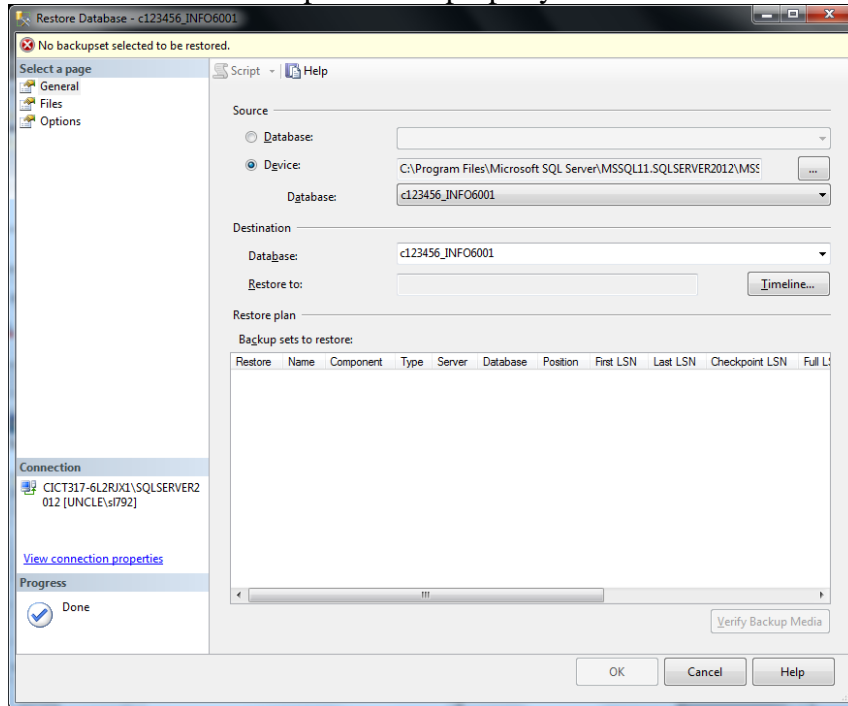
Note: By default, MSSQL Management Studio saves backups in a system folder. You will not be able to save to the documents directory on the VDI. Make sure you copy this backup to your U: drive, or OneDrive, otherwise it will be lost after logging out!

3.5 Restore database

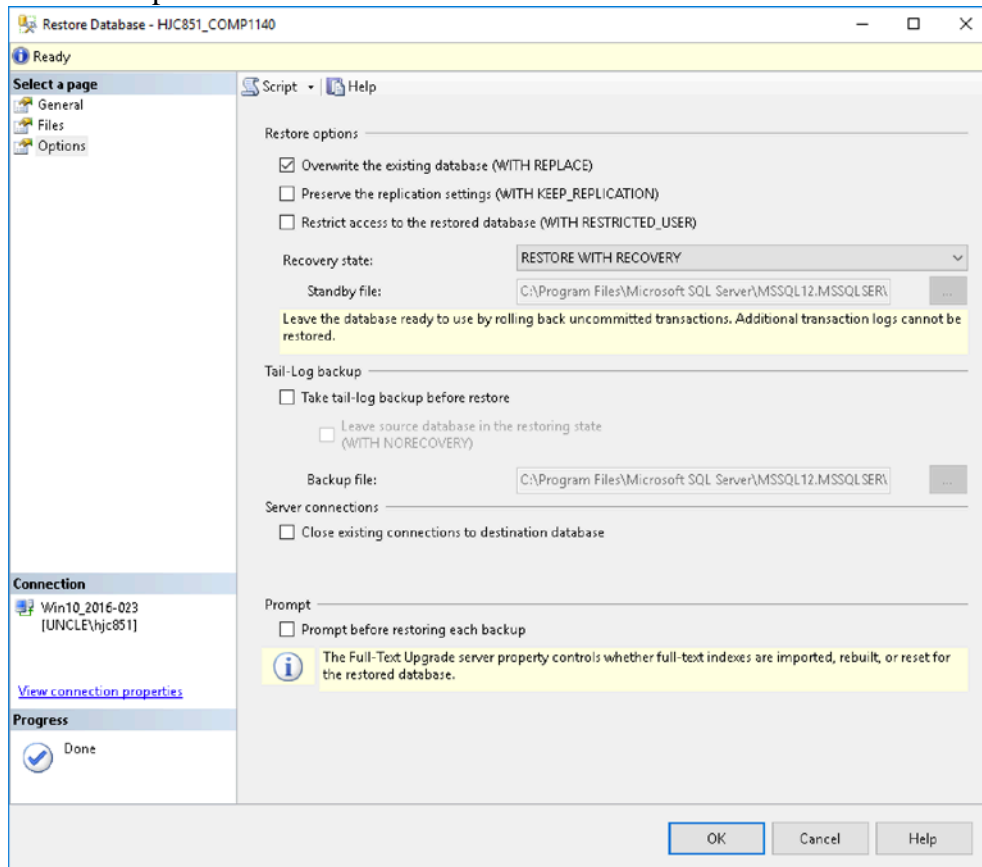
- a. Right-click the database object in the Object Explorer to bring up the Tasks and Restore and Database shortcut menu



- b. Select the stored backup database properly from Device:



And with options:



Note: Restoring the database will fail if there are opened connections. Ensure all query, diagram and table definition tabs are closed, or select the 'Close existing connections to destination database' box.

4. Transact SQL (T-SQL)

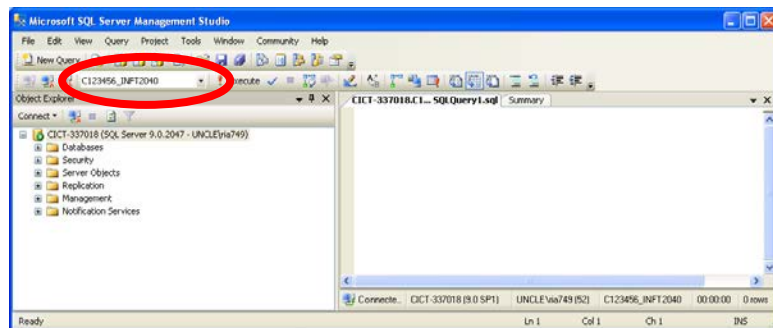
Structured Query Language (or *SQL* for short), is a standard language used to interact with relational databases. *Transact SQL* (or *T-SQL* for short) is standard SQL adapted to SQL Server. There are certain extensions and addition to standard SQL tailored SQL Server in T-SQL.

Some good links on SQL:

<https://www.tutorialspoint.com/sql/index.htm>

<https://www.w3schools.com/sql/>

Step 1: Click *New Query* button to open an SQL Window for your work. This is your SQL interface to the <Your_Login>_COMP1140 database (an example screen is shown below). The database name is shown on the top-left corner of the screen.

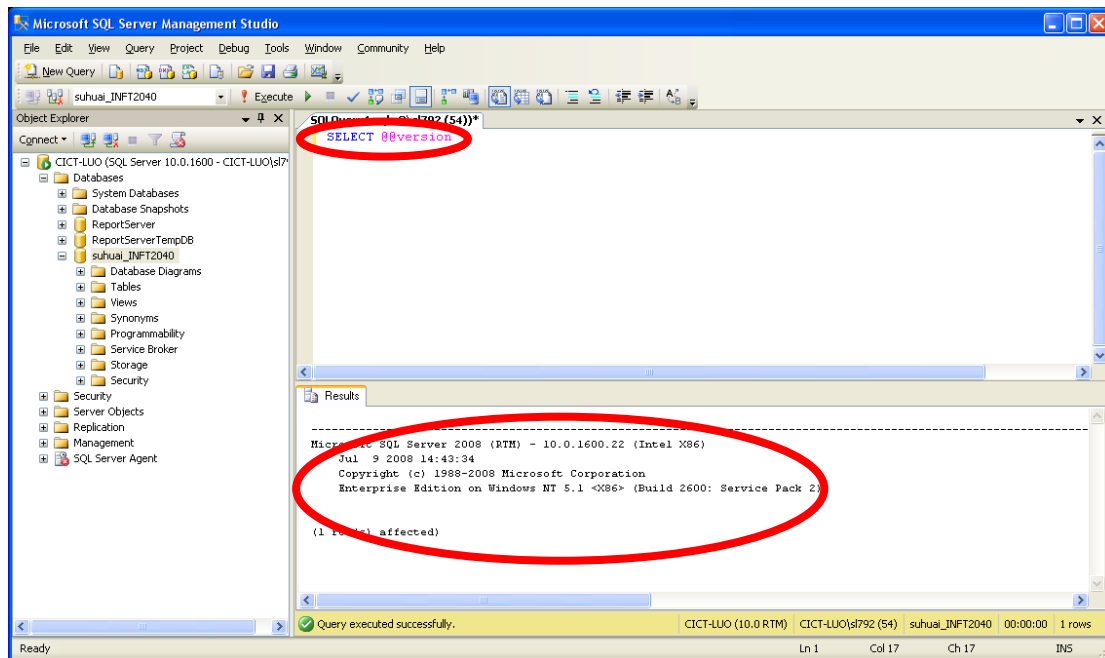


The right-hand side pane's query window provides you with a Transact - SQL interface to the database engine.

Our first T-SQL Statement will be:

```
SELECT @@version
```

This statement returns the current version of the SQL's database engine. Before executing, you should click "Query" → "Results To" → "Results to Text" to view the results in text (or Ctrl+T short key). Execute the statement to view version of SQL Server Database Engine.



Exercises

Along with SQL Server installation, documentation and help materials are also installed. **SQL Server Books Online** contains a comprehensive set of help materials on T-SQL. You can get to Books Online (BOL) by pressing the F1 key as well from your query window. BOL has an index and easy-to-search features. Familiarise yourself with finding information from BOL.

Now as an exercise, you will create a table, insert data and query it using **T-SQL** commands.

Note: These operations can be performed using GUI commands. However, here it is advised to use SQL statements instead to familiarise yourself with SQL.

Step 1: Create a table called *Student* with the following fields:

Field Name	Data Type	Comments
SID	CHAR(10)	Primary Key
Name	VARCHAR(50)	
gpa	DECIMAL(3,2)	

Example of a CREATE TABLE statement:

```

CREATE TABLE TestTable (
    Column1Name INT PRIMARY KEY,
    Column2 Name VARCHAR(100))

```

Step 2: Insert the following data rows to the table

SID	Name	gpa
-----	------	-----

STD0001	John Taylor	3.20
STD0021	Chris Boyle	2.89
STD0501	Michelle Tang	3.12

Example of an INSERT statement

```
INSERT INTO TestTable VALUES (1, 'Row 1 into table')
```

Step 3: Print all students using SELECT statement.

Example:

```
SELECT * FROM <Table Name>
```

Notes: You can drop a table from the database by executing DROP TABLE <table-name> command.

Step 4: Save your SQL script as *Prac1.sql*.