FIT2094-FIT3171 2019 S1 -- Week 1 eBook

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Change Log:

- Formatted and Imported from Alexandria February 2019.

1.0. Introduction to SQL Developer

The exercises in this first tutorial will introduce you to the SQL Developer software that you will use to connect to the Oracle database. The main aim of these exercises is to get you familiar with the SQL Developer interface/menu/options. At the end of this exercise, you should be able to:

1. make a connection and login to your account on the Monash Oracle database
2. change your Oracle password, and
3. disconnect from Monash Oracle database in SQL Developer.

There are a number of different ways to connect to an Oracle database. In this unit, you will use Oracle software called SQL Developer.

The SQL Developer software can be downloaded from your unit's Moodle site. Information on how to install and configure SQL Developer is available on the Moodle site under Software and Documentation section. Please also note that accessing the Oracle database from a machine located outside Monash University's network will **require you to connect to the Monash VPN (Virtual Private Network) service**. Information on how to install the Monash VPN client and then connect to the VPN service can be found at https://www.monash.edu/esolutions/network/vpn

Before looking at how we connect to the Oracle database and run SQL using SQL Developer, please take a few moments and configure SQL Developer so that the software will satisfy the needs of this unit. To do this follow the steps shown below.

Please note that Oracle sometimes relocates the preference items shown below as they update to a newer version. The images shown below are for SQL Developer version 17.3.1 (the currently installed version in the on-campus labs). If you are using a later

version and are unable to find a particular setting, use the “Search” option in the top left of the preferences screen to find the desired item you wish to configure.

1.0.1 SQL Developer Preference Settings

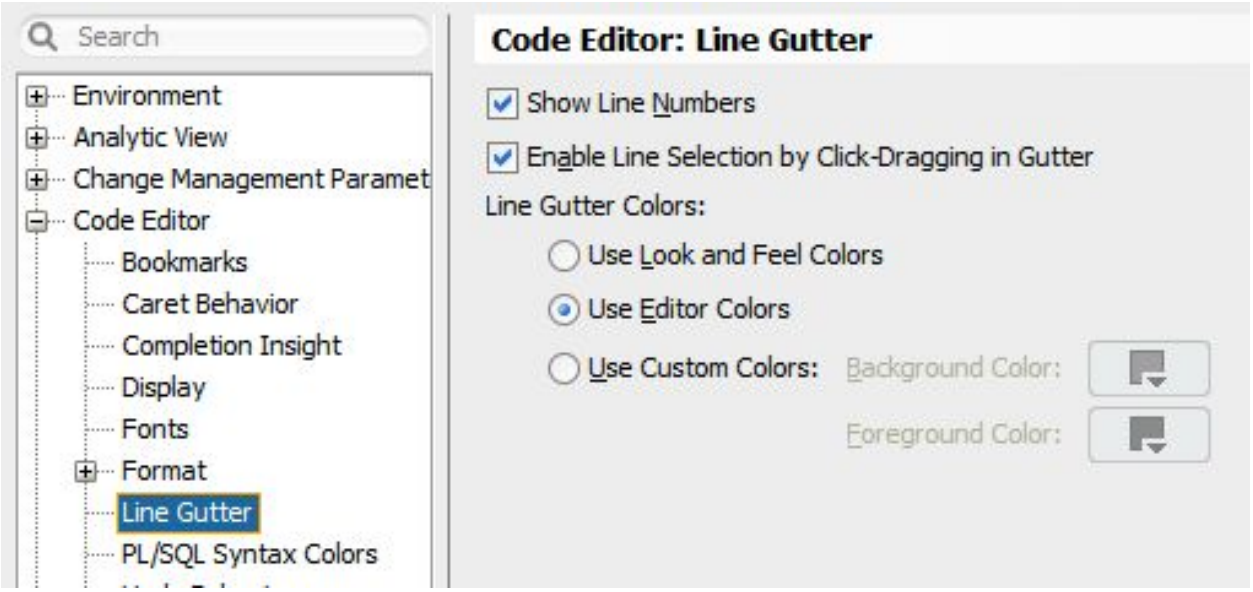
To help with your studies through the remainder of the semester you should configure SQL Developer to:

- display line numbers, and
- auto format SQL Code

This document also contains a number of other important configurations that you should implement before working extensively with SQL Developer. Under Windows, the SQL Developer preferences are accessed from the Tools menu, under MacOS from the Oracle SQL Developer menu on the left.

Display Line Numbers

To do this select: **Preferences – Code Editor – Line Gutter – Show Line Numbers** (Check Show Line Numbers):

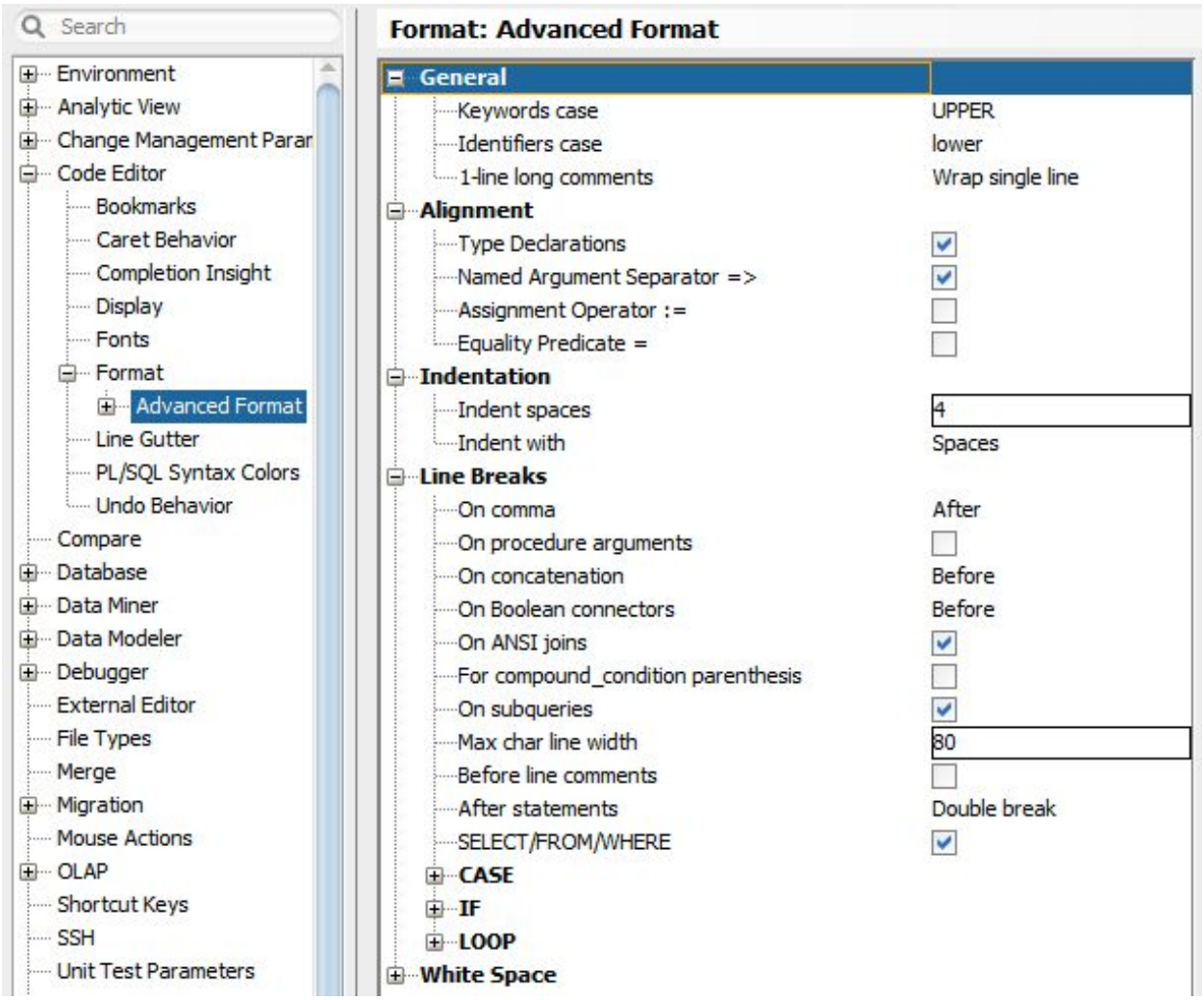


SQL Code AutoFormat

We now wish to configure SQL Developer so that it will reformat any SQL we enter into a well set out “pretty” format. The aim will be to simply type SQL commands without worrying about layout and then use the SQL Developer assigned format key (see below) to automatically format the code.

Preferences – Code Editor – Format – Advanced Format.

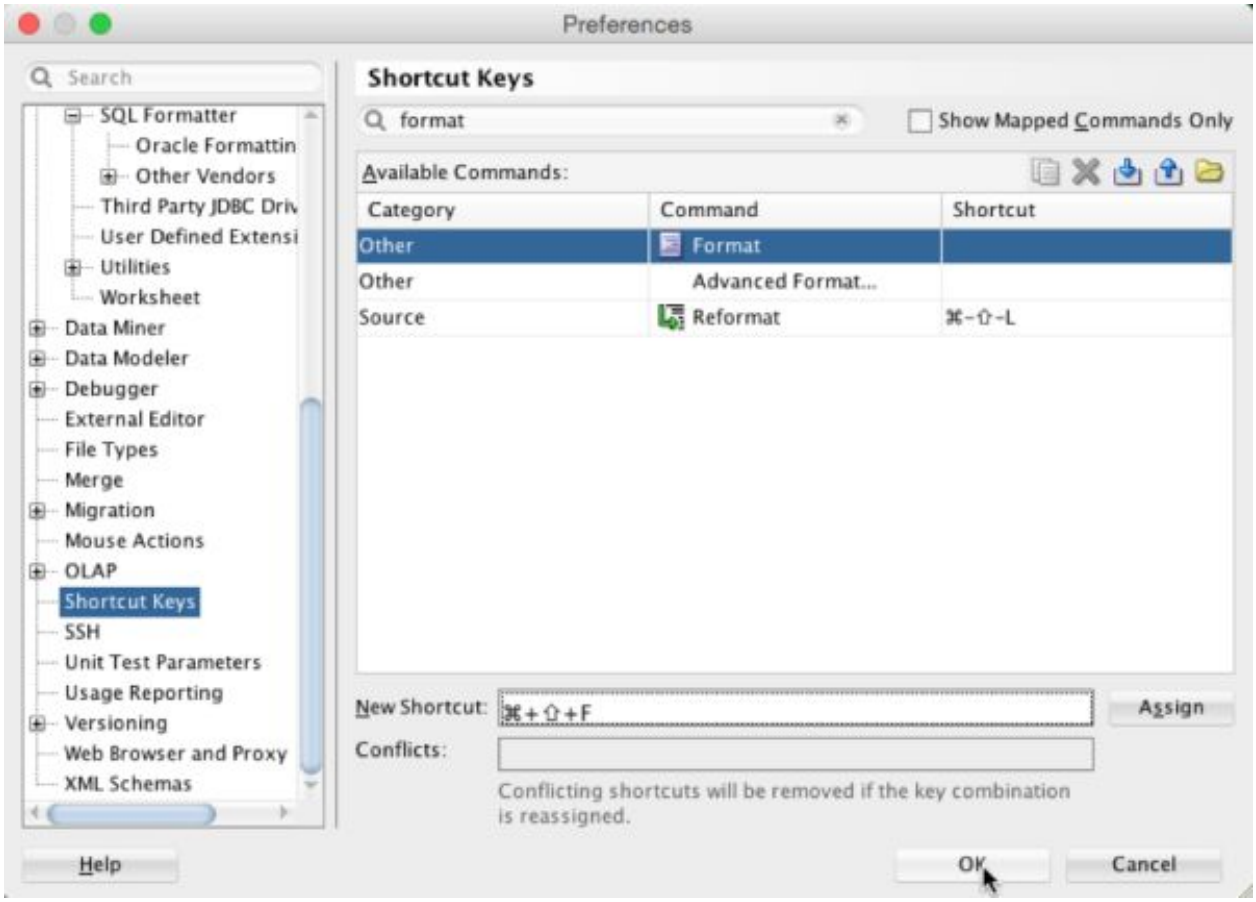
As a starting point, we recommend the settings as shown below (Select OK when completed):



Depending on your personal preferences you might like to return to these settings later on in the unit and reconfigure them to your wishes. You are free to use any settings which you are happy with, the settings shown are a starting point for your study.

To automate formatting we now need to assign a format key combination – select **Preferences – Shortcut Keys** and set a shortcut key for “Format”. Your installation may already have a key set for format (eg. on Windows it is Ctrl+F7) – if you are happy with that key you do not need to change anything.

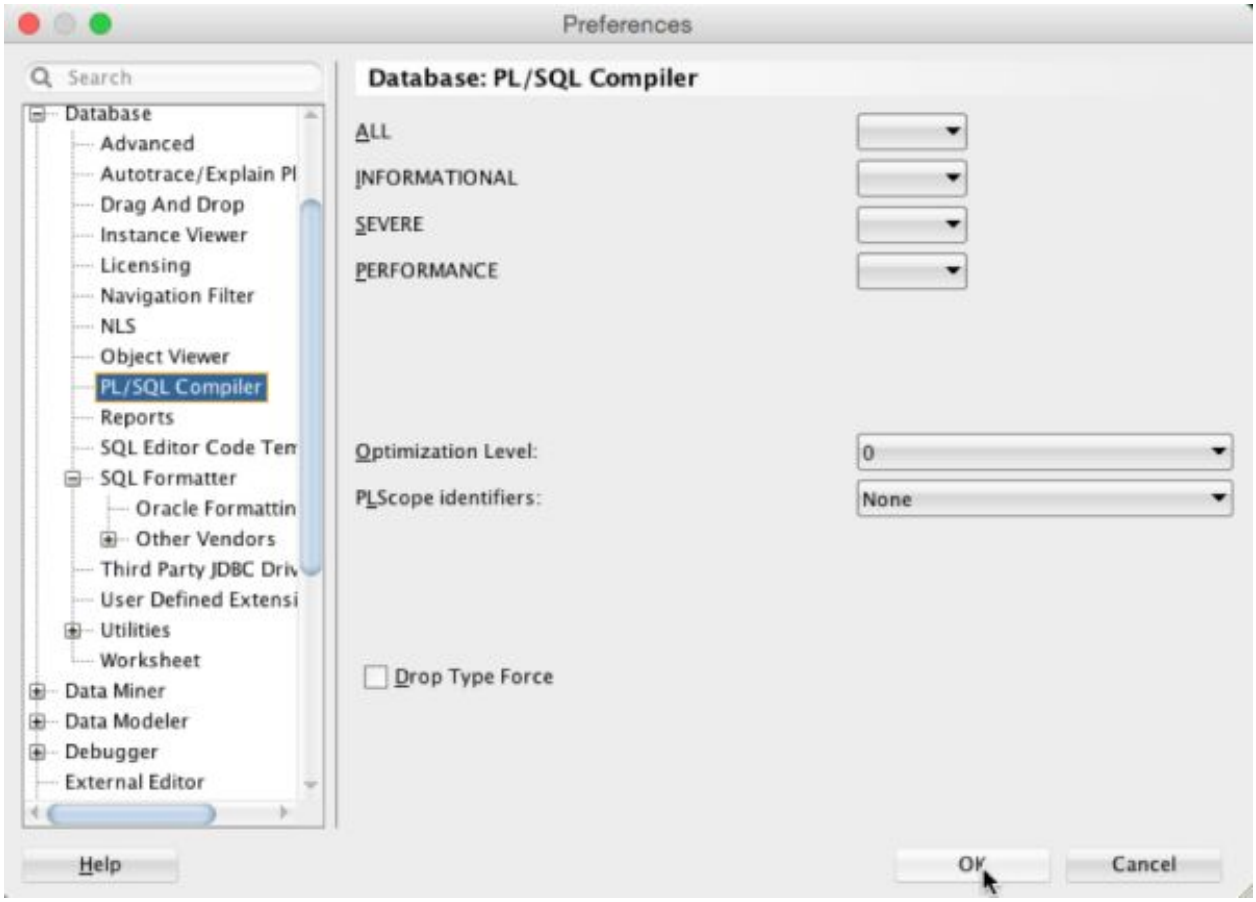
The following figure shows setting a shortcut key (Command+Shift+F) for a Mac:



Then you can enter SQL on a single line, or multiple lines, and select your “Format” shortcut key to “pretty” format the query.

PL/SQL Scope Identifiers

Please ensure you set the PLScope identifiers, under Database, to “None”:

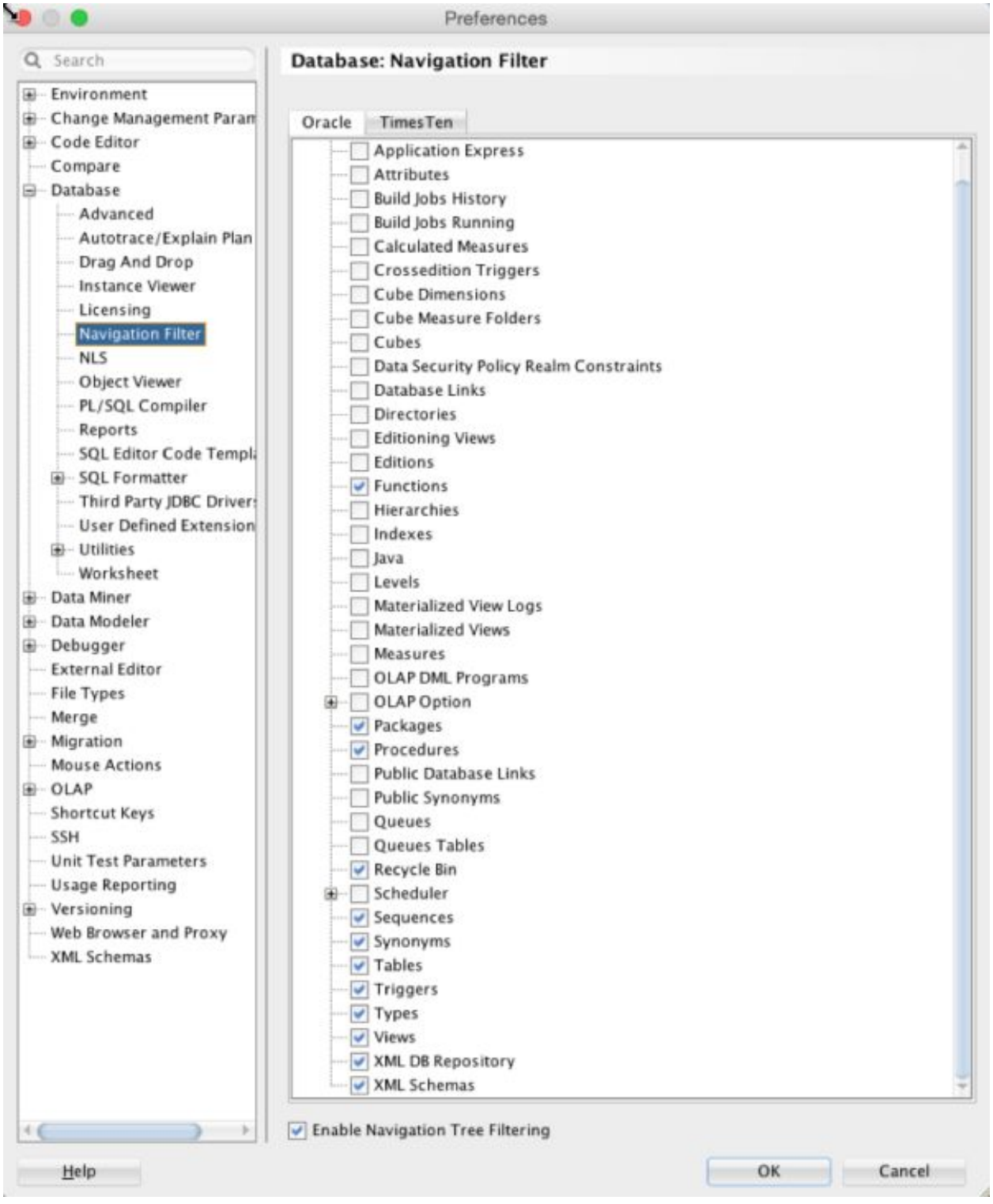


Navigation Filter (Optional)

SQL Developer displays a large, and often confusing array of items under its connection tree, these can be limited by applying a navigation filter (**Database – Navigation Filter**).

Select “Enable Navigation Tree Filtering”

Select to show nothing on the “TimesTen” tab. The suggested items for the Oracle tab are:


Preferences
Search
Environment
Change Management Param
Code Editor
Compare
Database
Advanced
Autotrace/Explain Plan
Drag And Drop
Instance Viewer
Licensing
Navigation Filter
NLS
Object Viewer
PL/SQL Compiler
Reports
SQL Editor Code Templ
SQL Formatter
Third Party JDBC Driver
User Defined Extension
Utilities
Worksheet
Data Miner
Data Modeler
Debugger
External Editor
File Types
Merge
Migration
Mouse Actions
OLAP
Shortcut Keys
SSH
Unit Test Parameters
Usage Reporting
Versioning
Web Browser and Proxy
XML Schemas
Database: Navigation Filter
Oracle
TimesTen
Application Express
Attributes
Build Jobs History
Build Jobs Running
Calculated Measures
Crossedition Triggers
Cube Dimensions
Cube Measure Folders
Cubes
Data Security Policy Realm Constraints
Database Links
Directories
Editioning Views
Editions
Functions
Hierarchies
Indexes
Java
Levels
Materialized View Logs
Materialized Views
Measures
OLAP DML Programs
OLAP Option
Packages
Procedures
Public Database Links
Public Synonyms
Queues
Queues Tables
Recycle Bin
Scheduler
Sequences
Synonyms
Tables
Triggers
Types
Views
XML DB Repository
XML Schemas
Enable Navigation Tree Filtering
Help
OK
Cancel

Copying your configuration to a new PC/Laptop

The configurations you have completed can be transferred to a different computer by manually copying the file **product-preferences.xml**. This process is also useful in the Monash on-campus labs if your PC has been configured to reset the configuration with each login – simply save the preferences file to your mapped desktop folder (see the section below 'Working in the On Campus Labs" on how to create this mapping), or onto a USB drive, Google Drive, or other cloud storage.

Simply copy the file **product-preferences.xml** from the configured version to the new version where you want the same settings:

On Windows the files are located in the folder:

```
C:\Users\yourusername\AppData\Roaming\SQL Developer\systemx.x.x.x.x\o.sqldeveloper\product-preferences.xml
```

Note that the path changes based on SQL Developer version and your own username. Example: for the current SQL Developer version and a user **lsmi1** this would be:

```
C:\Users\lsmi1\AppData\Roaming\SQL Developer\system17.3.1.279.0537\o.sqldeveloper\product-preferences.xml
```

If the AppData folder does not appear under **C:\Users\yourusername** you will need to turn "show hidden files and folders" on.

Copying your configuration to a new PC/Laptop - Mac instructions

On the Mac the files is located in the folder:

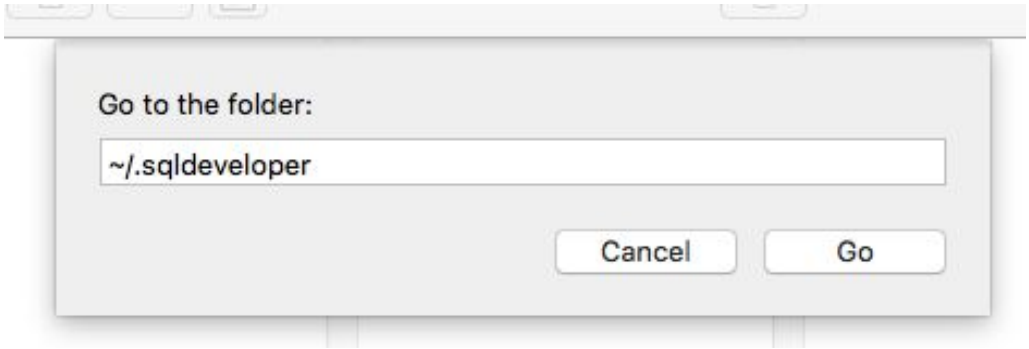
```
/Users/yourusername/.sqldeveloper/systemx.x.x.x.x/o.sqldeveloper.x.x.x.x.x/product-preferences.xml
```

Again, note that the path changes based on SQL Developer version and your own username. Example: for the current SQL Developer version and a user **lsmi1** this would be:

`/Users/lsmi1/.sqldeveloper/system17.3.1.279.0537/o.sqldeveloper/product-preferences.xml`

You are strongly recommended to make a copy of this file, once you are happy with your settings, and keep it in a safe place (USB, cloud storage, etc.)

To open the **`/Users/yourusername/.sqldeveloper`** folder on your mac, in Finder select from the **Finder menu** -> **Go – Go to Folder** and enter the path **`~/.sqldeveloper`** :



SQL Developer Language

If your laptop or computer is setup to use a non-English language (eg. Chinese), when SQL Developer installs it will make use of this system language as its default language.

For your Monash study, you ***must*** **modify** this so that the language being used (and displayed) by SQL Developer is English. To achieve this, edit the **sqldeveloper.conf** file (ensure SQL Developer is not running when editing this file) – it's normal location is:

MS Windows:

```
C:\Program Files\sqldeveloper\sqldeveloper\bin\sqldeveloper.conf
```

OSX:

```
/Applications/SQLDeveloper.app/Contents/Resources/sqldeveloper/sqldeveloper/bin/sqldeveloper.conf
```

and add the line:

```
AddVMOption -Duser.language=en
```

Note that you ***must carefully type (case is important) this line into the sqldeveloper.conf file yourself***.

WARNING: Do not copy and paste it from this document as the formatting/spaces and HTML code might interfere with the config file.

The entry must be on a line by itself and left aligned (add a new line at the end).

Also, note this must be done with a text editor.

WARNING: For MS Windows please do not use Windows' Notepad as it cannot handle line breaks correctly! Instead use something like Notepad++

1.0.1. Working in the On-Campus Labs

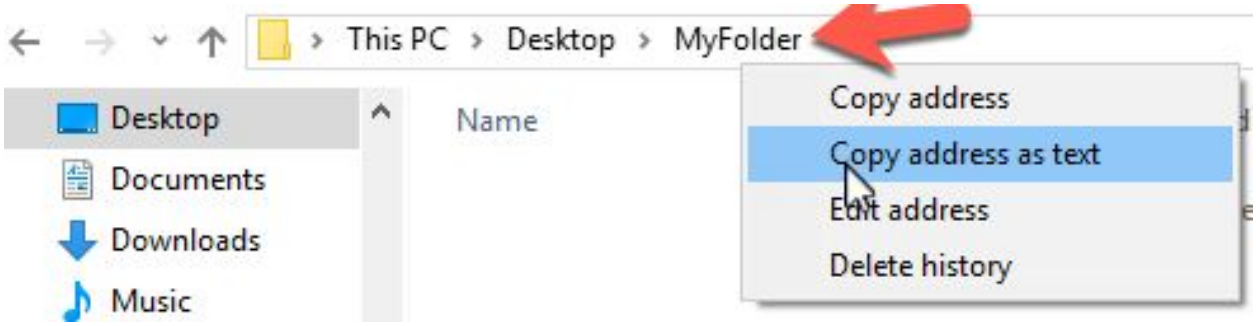
The technique which the University uses in the on-campus Windows 10 labs (to allow your files and desktop to be portable between different machines) causes SQL Developer considerable problems in saving files.

WARNING: If you depend on the lab machines to work on your weekly tasks, please read this entire section carefully.

Basics - Windows 10 on Lab PCs

To save files (.sql, .dmd, etc) from SQL Developer on the Monash Windows 10 on-campus labs we must use a mapped drive. If you have not as yet created such a drive, please use the following procedure.

First, create a folder on your Desktop (say MyFolder, or you can use any folder you have previously created), navigate to this folder and then right click in the path bar of the Windows file manager on the folder, and select “Copy address as text”:



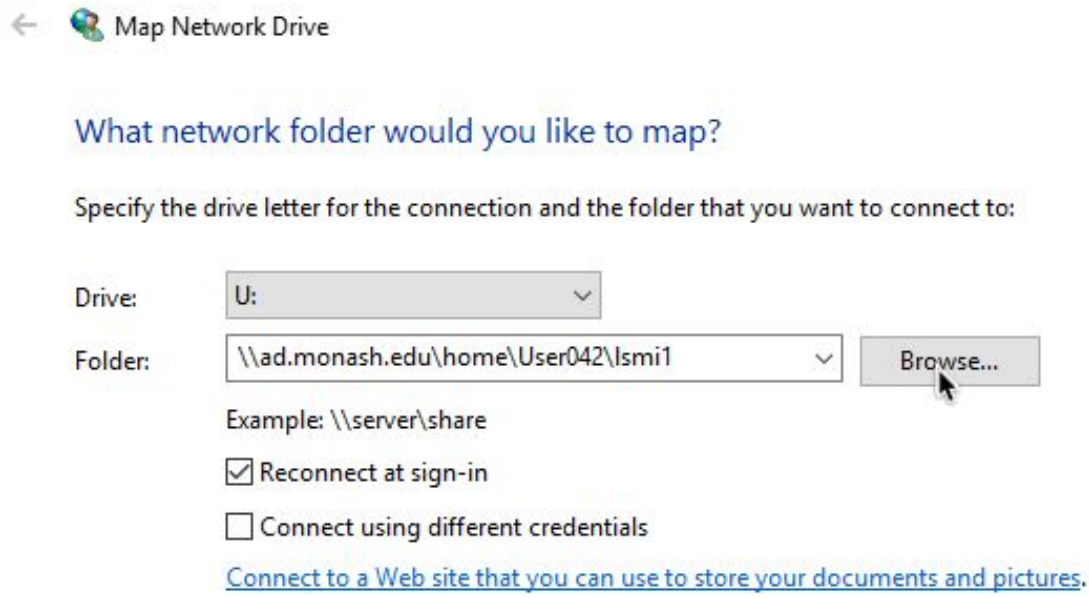
This will result in an address of the form:

```
\\ad.monash.edu\home\User042\lsmi1\Desktop\MyFolder
```

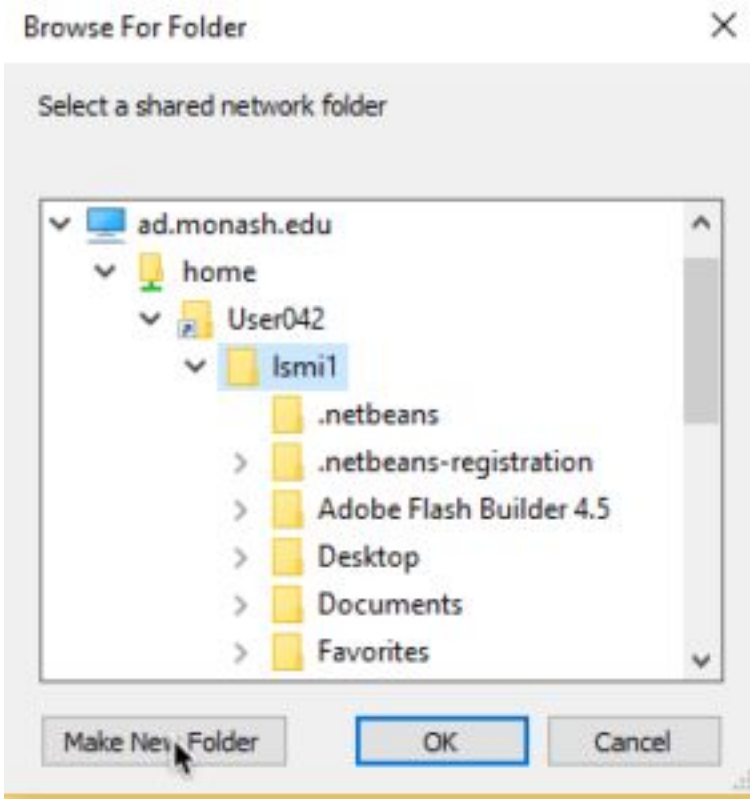
You should then use the first part of this path (exclude the ending \Desktop\MyFolder) to map a drive in Windows (use any drive letter you wish) however, we suggest U.

First right click **This PC** and select “Map Network Drive”:

Then enter the path that you copied above (without the Desktop eg. `\\ad.monash.edu\home\User042\lsmi1`) into the Folder entry:

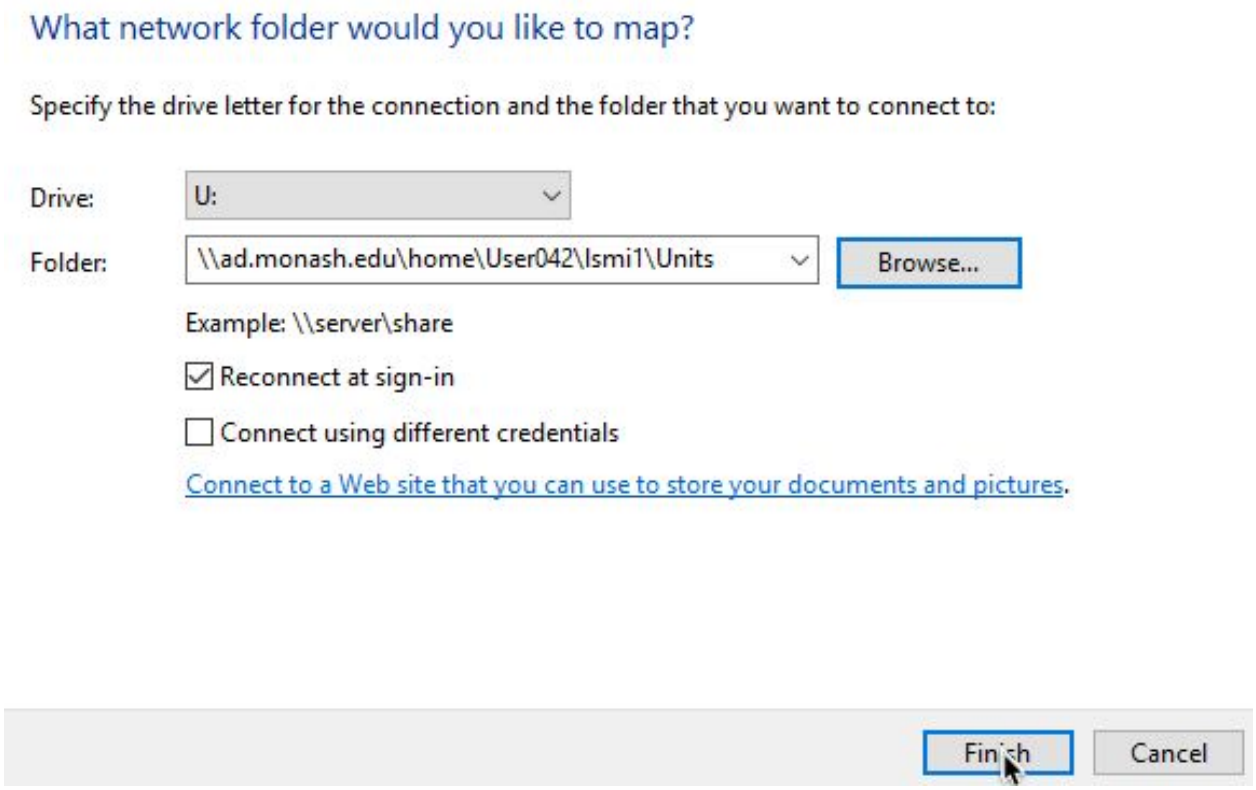


Be sure to check "**Reconnect at sign-in**", then select Browse...



and add a new Folder via “Make New Folder” under your Authcate username. We suggest you call the folder “Units” – you can then create subfolders below this (after we have mapped the drive) for the various units (especially Database related ones!) you will study throughout your course. This setup only needs to be done once.

Finally, after creating the folder and selecting OK:

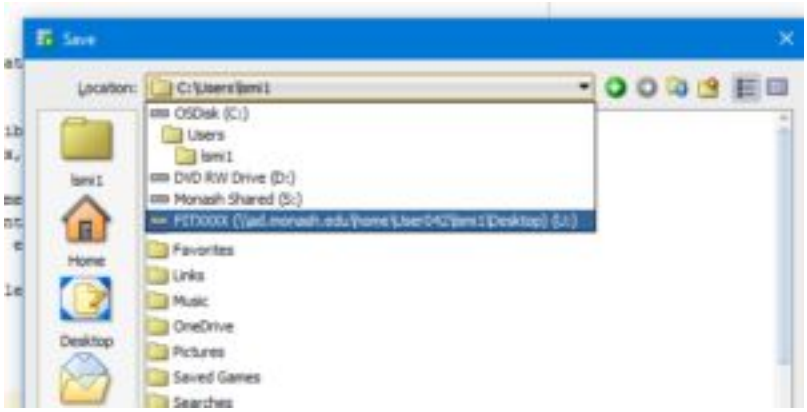


select Finish (double check “Reconnect at sign-in” is selected first). You now will have a drive U: below which you can create unit based subfolders.

This approach has the advantage that the files you save on drive U: will be saved immediately to the drive. **If you save anything to the Desktop these files are only transferred when you log out and can substantial slow down your login and logout times.**

Please note that students currently have a space limit of 5Gb on this server.

You will then be able to load and save files in the on-campus labs from your mapped drive eg. U: and access this drive from *any* University Windows Lab PC that you login to. To reach the drive you may need to pull down the SQL Developer folders list:

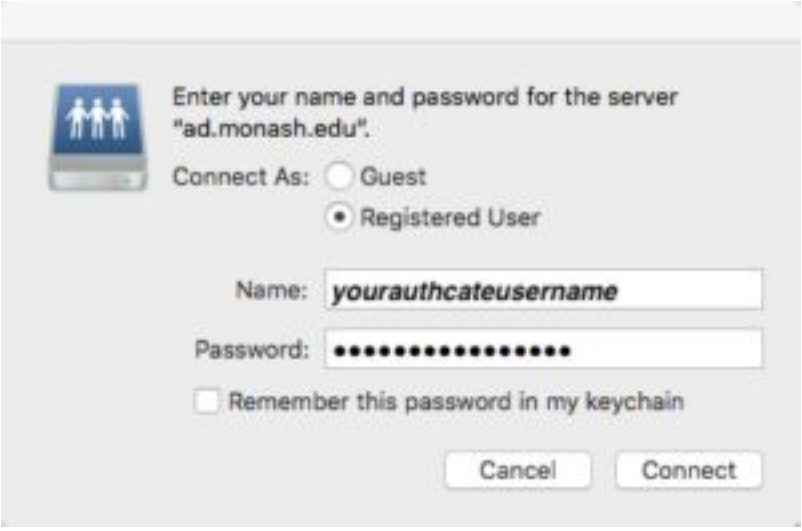


To access drive U: from the University MS Windows labs add the batch file, available under Moodle, to your University desktop. Simply double click on it when you first log in and your mapping will be recreated. The same batch file can be run from **MS Windows at home, or on your laptop, *provided* the VPN is active** – you will be prompted for your username (enter as MONASH*username*) and authcate *password*.

Follow-up for Mac users

You can also access this share on a Mac via Samba, *provided* the VPN is active. In Finder select **Go – Connect to Server** and enter a "Server Address" in the form **`smb://ad.monash.edu/home/User`*`1234/username/`*`Units`** *(replacing 1234 and username to point to your share).* The Mac OS implementation of samba shares has a few "issues", one of which is having the share reliably listed in the "Shared" sidebar of Finder (you may see ad.monash.edu but not be able to navigate to your Units folder). The approach you should take to address this is, under **Finder Preferences, General**

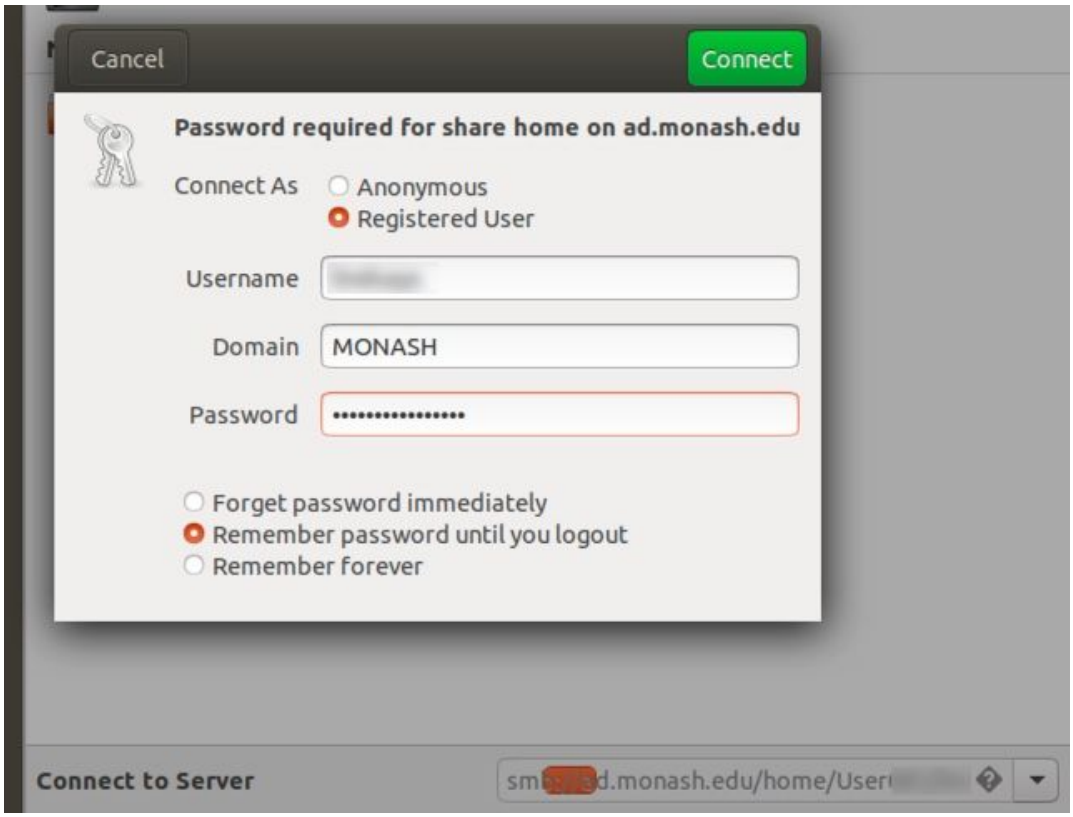
ensure that "Connected servers" is checked to show on your desktop before attempting to connect. When prompted for your username simply use your authcate username but **do not preface it with MONASH\.**



When you connect to your share you will see SYSVOL, NETLOGON (which you should ignore) and your **UNITS drive** displayed on your desktop. Double-clicking on Units will open the drive in Finder.

Follow-up for Linux users

The share can also be accessed via Samba under Linux distros such as Ubuntu. If you are off campus you will need to first install the CISCO VPN software available from **vpn.monash.edu** (note that if the software does not open correctly with a GUI you will need to resolve a missing dependency for the pango library – see here https://znggguvnf.org/2017-12-04–ubuntu-17-10-and-cisco-anyconnect.html). To access the share – open Files, Select Other Locations and enter your smb path into the "Connect to Server" field, when prompted enter your login details:

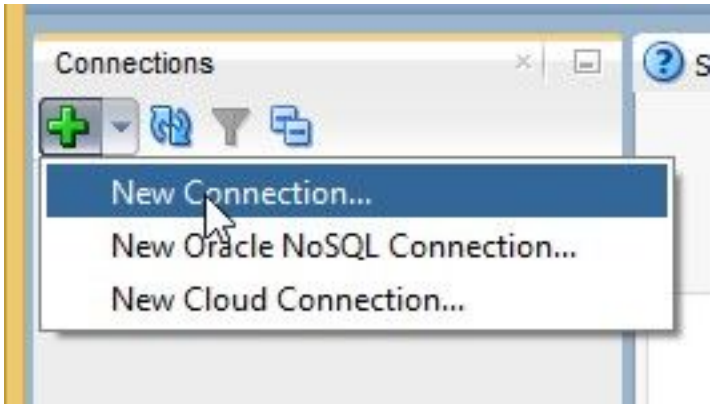


1.1. Connecting to Oracle database using SQL Developer

In the next few sections, you will learn how to use your newly configured SQL Developer software to access an Oracle database.

1. Adding a new connection

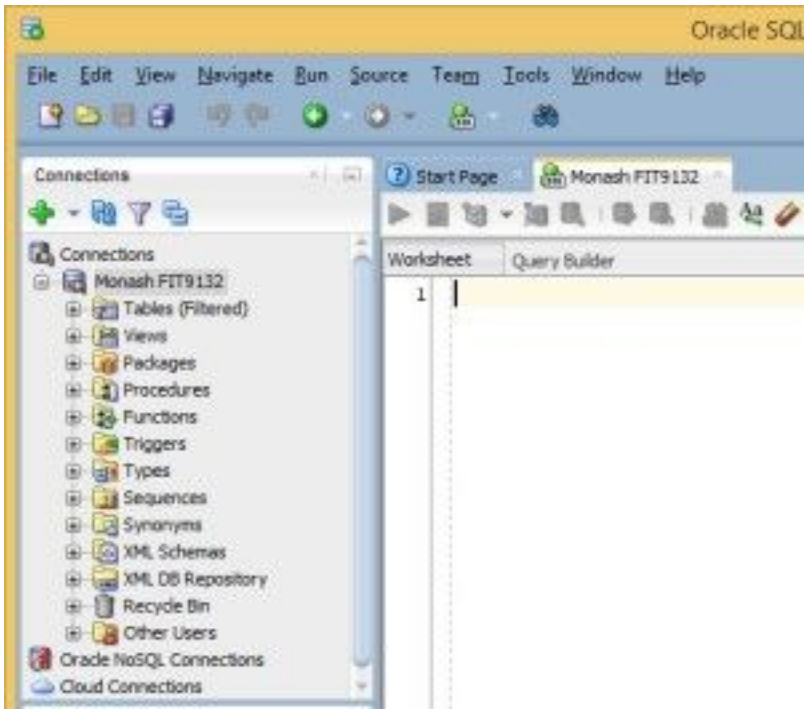
After running SQL Developer, right click on the Connections icon in the left panel, as shown below and select the New Connection option.



Now you will see the New / Select Database Connection window, as shown below.

The connection details that you need to connect to the Oracle database through SQL Developer will be provided by your tutor/lecturer. As well as setting up this connection, **it is very important that you configure SQL Developer correctly (as explained at the start of Module 1.0).**

After connection you will see:



SQL Statements can be entered in the right hand panel, labelled “Worksheet”.

2. Changing your password

After logging in for the first time you should change your password from the one supplied by your tutor.

WARNING: FOR SECURITY PURPOSES - DO NOT set your Oracle password the same as your standard Authcate password.

Oracle has several **important** limits on the password you set:

- The password **is case sensitive**
- May be 1 – 30 characters in length
- Must begin with an alphabetic character
- Can contain only alphanumeric characters and the underscore (_) or dollar sign ($)

You should set your password in SQL DEVELOPER using the PASSWORD command (your password is hidden). Type the word **`password`** in your worksheet and click on the **Execute Statement button (the green arrow)** in the toolbar to run the command:

After changing your password for the first time, please log out and then re-log back in to check that your password change has been successful.

IMPORTANT: If at any stage you find that you are unable to login to Oracle due to password problems ***please email your tutor to have your password reset***.

1.2. Pre-Lecture Notes

These are notes you may find useful to read through before the lecture, adapted from Lindsay Smith's lecture material. NOTE: THESE ARE NOT THE FINAL LECTURE SLIDES.

As a start, do read up about Databases on Wikipedia https://en.wikipedia.org/wiki/Database

Specifically, read the two sections: Terminology and overview & History

Then, read up below on the teaching method we use:

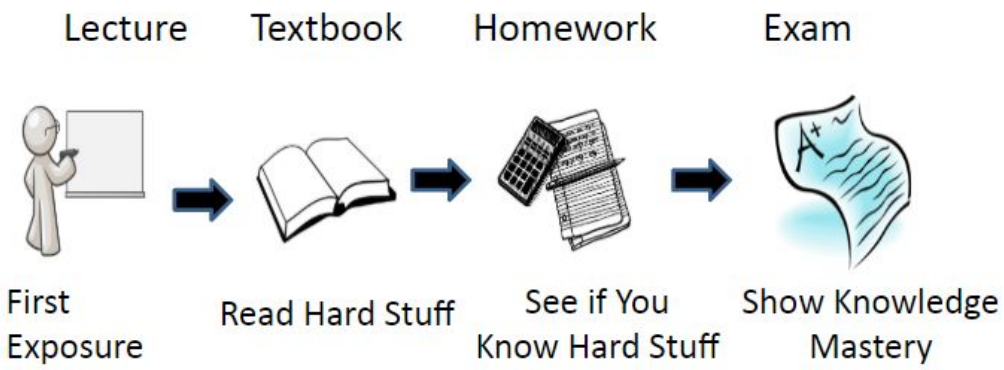
Teaching Method

- Your peers help you to understand the concepts through discussion.
- Lecture includes a series of discussions on concepts.
- The lecturer guides the discussion.

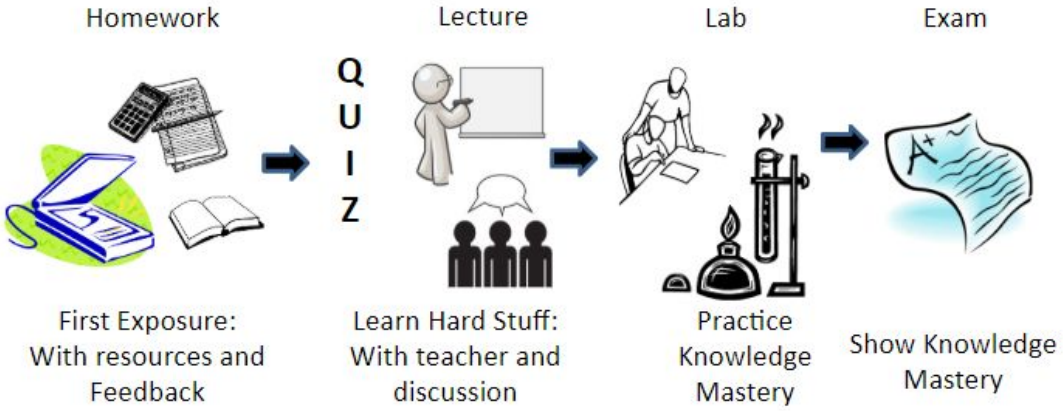
Peer Instruction

Prof Eric Mazur, Harvard University

Traditional Teaching Method



Peer Instruction – Full Picture

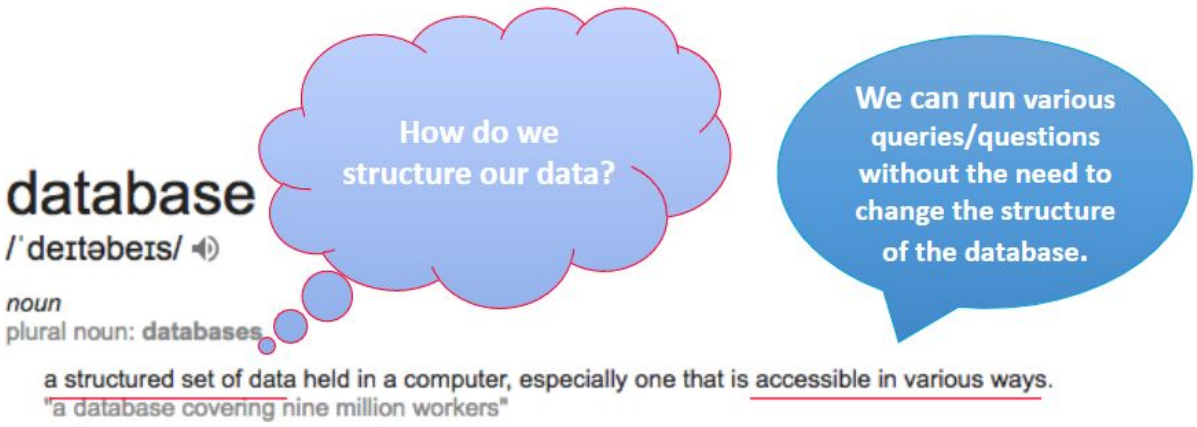


Things are different…

- Pre-lecture activities are crucial.
  - –Your lecture experience will depend on your preparation.
- Attending lectures is very important
- My lecture slides are NOT your notes!
  - –Create your own notes during pre-lecture reading.
  - –Annotate difficult concepts, revisit the annotation after lecture/tutorials.
  - –It is better not to take notes during lecture. You should be prepared before the lecture, then think, discuss and ask questions during lectures.

So, what is a database?
You have read the Wikipedia article, see if the following makes sense:

What is a database?



Think of potential issues of Data Redundancy the following sample student database can cause…

Data Redundancy – a student data spreadsheet

STU_NBR	STU_LNAME	STU_FNAME	STU_DOB	UNIT_CODE	UNIT_NAME	ENROL_YEAR	ENROL_SEM	MARK	GRADE
11111111	Bloggs	Fred	1-Jan-90	FIT1002	Computer Pr	2013	1	66	C
11111111	Bloggs	Fred	1-Jan-90	FIT1004	Database	2013	1	80	HD
11111112	Nice	Nick	10-Oct-94	FIT1001	Computer Sy	2013	1	80	HD
11111112	Nice	Nick	10-Oct-94	FIT1001	Computer Sy	2012	1	35	N
11111114	Sheen	Cindy	25-Dec-96	FIT1001	Computer Sy	2012	1	78	D
11111114	Sheen	Cindy	25-Dec-96	FIT1004	Database	2013	1	60	C
11111113	Wheat	Wendy	5-May-90	FIT1001	Computer Sy	2012	2	65	C
11111113	Wheat	Wendy	5-May-90	FIT1004	Database	2013	1	78	D

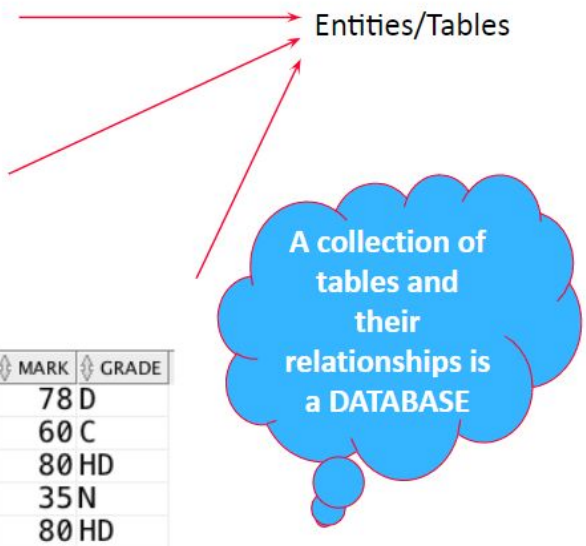
... and how they are resolved in the following version.

DATABASE

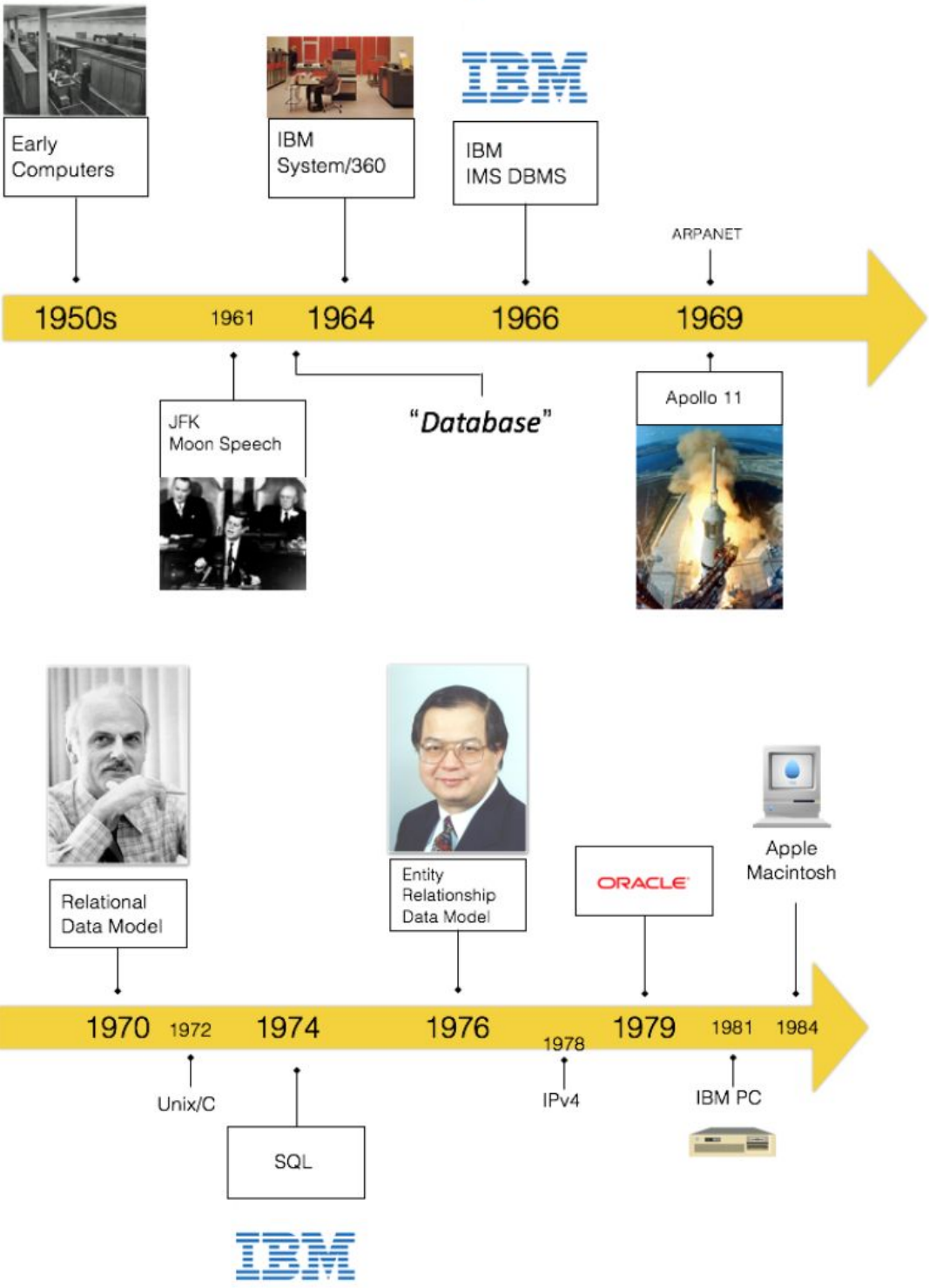
STU_NBR	STU_LNAME	STU_FNAME	STU_DOB
11111111	Bloggs	Fred	01/JAN/90
11111112	Nice	Nick	10/OCT/94
11111113	Wheat	Wendy	05/MAY/90
11111114	Sheen	Cindy	25/DEC/96

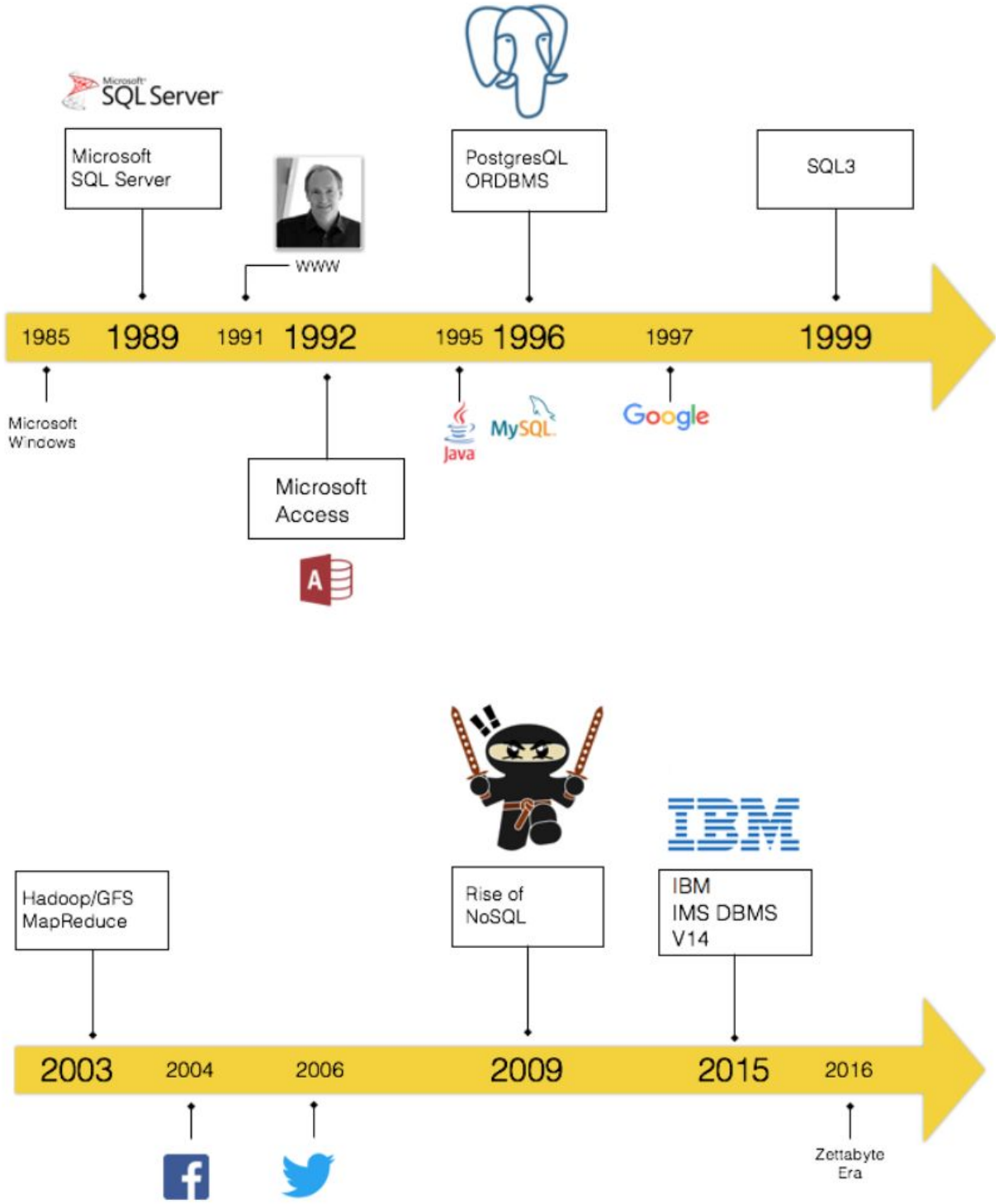
UNIT_CODE	UNIT_NAME
FIT1002	Computer Programming
FIT1001	Computer Systems
FIT1004	Database

STU_NBR	UNIT_CODE	ENROL_YEAR	ENROL_SEMESTER	MARK	GRADE
11111114	FIT1001	2012	1	78	D
11111111	FIT1002	2013	1	60	C
11111111	FIT1004	2013	1	80	HD
11111112	FIT1001	2012	1	35	N
11111112	FIT1001	2013	1	80	HD
11111113	FIT1001	2012	2	65	C
11111113	FIT1004	2013	1	78	D
11111114	FIT1004	2013	1	60	C

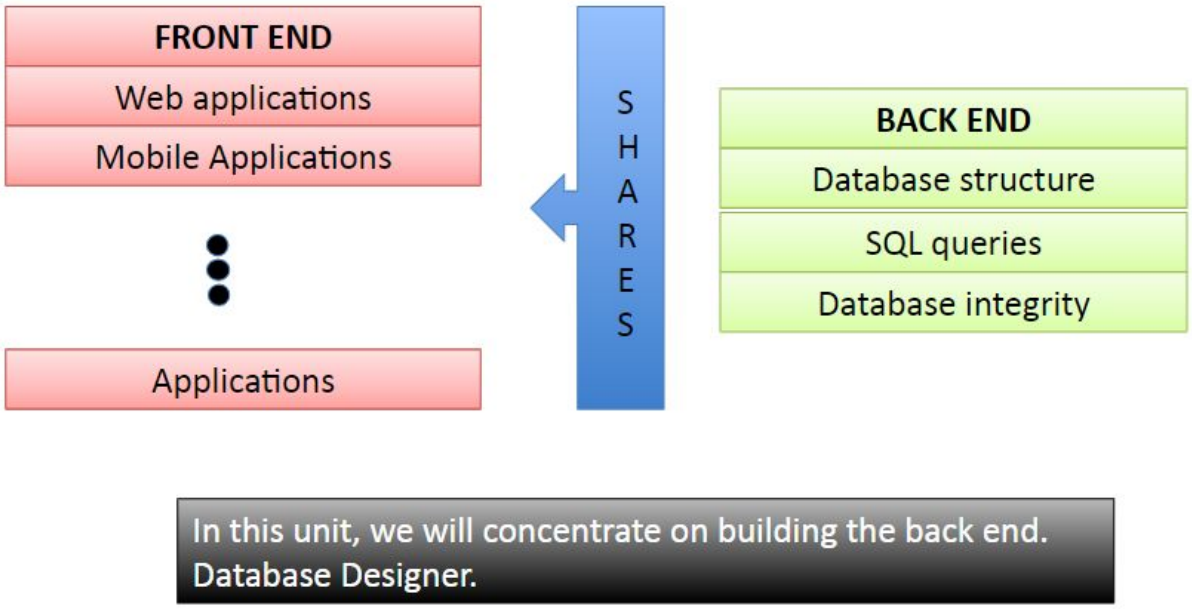


In Perspective ...




Microsoft SQL Server
Microsoft SQL Server
www
PostgresQL ORDBMS
SQL3
1985
1989
1991
1992
1995
1996
1997
1999
Microsoft Windows
Microsoft Access
Java
MySQL
Google
Hadoop/GFS MapReduce
Rise of NoSQL
IBM
IBM IMS DBMS V14
2003
2004
2006
2009
2015
2016
Zettabyte Era

Developing Application with Database



In this unit, we will concentrate on building the back end. Database Designer.

EOF.