

FIT2094 Databases

Week 1 Applied Class Activities

FIT Database Teaching Team

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FIT2094 2022 S1

FIT2094-FIT3171 Databases

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Learning Objectives:

- discover the unit preview, workshop material, applied class material, and forums
- configure SQL Developer (using MoVE or locally installed)
- set a working directory
- set up local Git Repository
- create a connection to the Monash Oracle server
- login to Monash Oracle database
- change your Oracle password

1.1 Introduction to FIT2094

Active learning and hands-on experience are required in order to get a full understanding of the database concepts taught in FIT2094. In general, the pre-workshop material, quiz and activity introduces the concepts, the workshop demonstrates and discusses them and the applied class gives you the opportunity to practise and to emphasise/understand the concepts.

You must familiarise yourself with the unit preview: [FIT2094 unit preview](#), and carefully read the [Teaching Team and Unit Resources](#) section on Moodle.

Weekly reading materials, workshop materials, applied class handouts, assignment details and submission links, consultation times, and other study resources are provided through Moodle. You must regularly check Moodle for announcements (please be aware that every action you take on Moodle is logged by the system and the date and time of such access recorded).

For this semester, we will use the Ed Discussion forum platform. You must keep yourself up to date with postings to the various categories. To enter the Ed Discussion area select the "[Forums](#)" page/block from the unit home page and click on "Go to Ed Discussion siteExternal tool".

For assignments, Ed Discussion forums will act as a 'client' to students allowing them to clarify any design/task issues - the responses posted to these forums by the moderator will be regarded as part of the assignment brief. Failure to note these postings and implement/integrate them as part of your solution will incur grade penalties.

1.2 Software

1.2.1 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. For this unit, there are two alternative approaches to running the software (SQL Developer). We recommend that all students begin with Alternative 1 - Local Install. You will likely wish to swap between these two approaches as your circumstances require, so it is important to be familiar with both.

Alternative 1: install the required software on your local PC - this install will involve Oracle SQL Developer and the VPN software. To install Oracle SQL Developer for non-Windows platforms you will also need to install Java JDK 11. The download links and instructions for Local Install are provided in this unit's Moodle site under [Teaching Team and Unit Resources](#).

Please **ensure** you download the SQL Developer from the "**FIT Oracle Software Repository**" and follow the instructions in the document "**SQL Developer Installation Guide**" under the Installation and Preference Settings heading. Please also note that accessing the Oracle database from a

machine located outside Monash University's network will require you to connect to the VPN (Virtual Private Network) service.

Alternative 2: use the [Monash Virtual Environment \(MoVE\)](#) platform. Under MoVE, you will be able to access the units required software from any browser on any PC (Windows or Mac) via Citrix. No VPN software will be required on your computer, MoVE manages the VPN access. For this unit we will use the Light version of Citrix, which means no software will be required on your computer to be able to use MoVE (this also means you can even use MoVE from a public computer). Please read the [MoVE User Guide](#) on how to use MoVE.

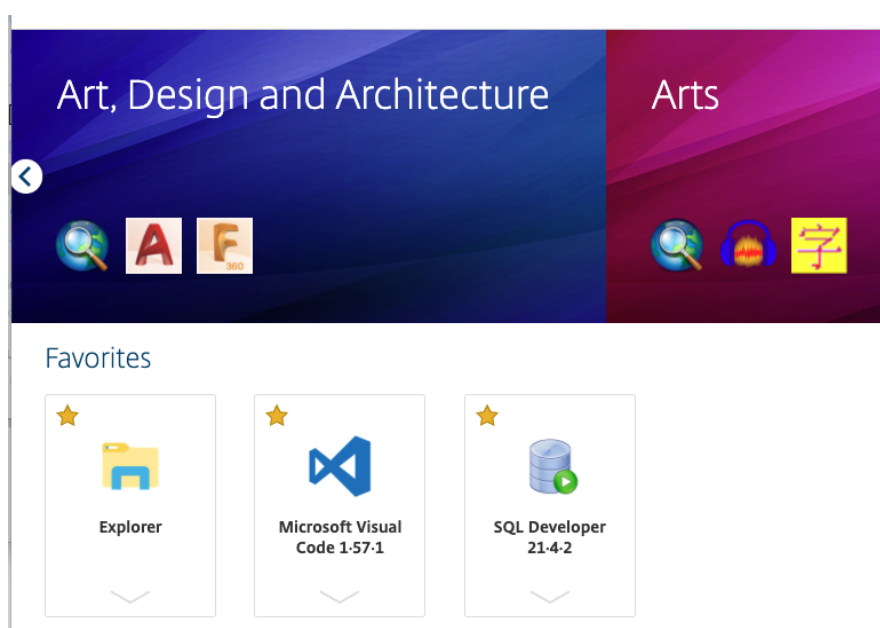
If you use MoVE you will note that SQL Developer may take one minute or more to load - please be patient and wait until it is fully loaded before trying to use it. You should also note that MoVE is highly dependent on your internet connection's quality and speed, this is part of the reason we recommend a local install as preferred.

1.2.2 SQL Developer Configuration

Run the application SQL Developer (on your Mac) or sqldeveloper.exe in your c:\sqldeveloper folder on Windows.



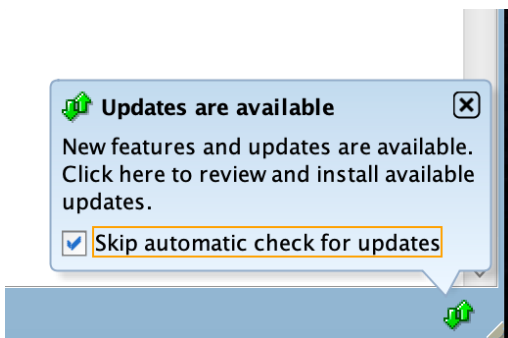
If you intend to use MoVE (Choice 2), you should watch the Moodle video "[Step 1 - Configure MoVE](#)" and go through the process of configuring MoVE. Please be aware that this video will not be available until you have passed the Learning and Teaching Agreement Quiz on Moodle Week 0 page. Then, click the SQL Developer icon in your MoVE favourites:



The first time SQL Developer opens, it shows a pop up window to import preferences from a previous installation, since you will not have any, please click 'No'.



If the "Updates are available" window appears, you must tick "Skip automatic check for updates" and close the pop up window. In this unit we require you to use only **SQL Developer 21.4.2** not any later/updated version.

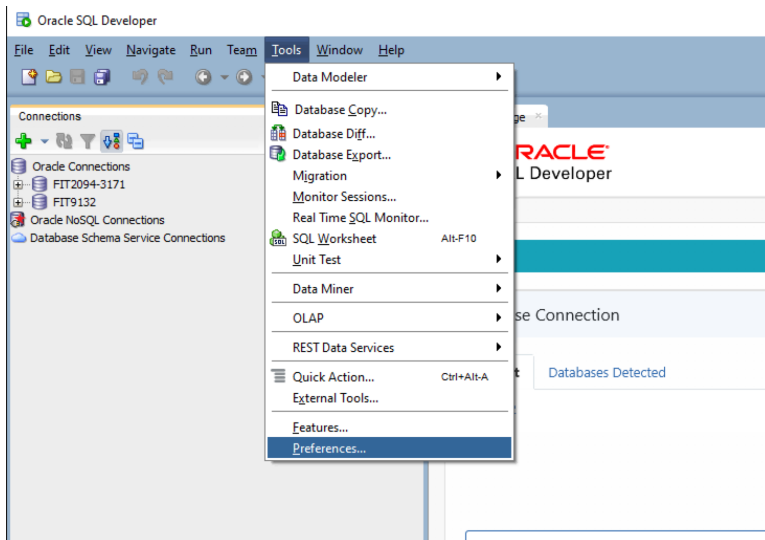


Oracle collects product usage information to improve their product, but it will not collect personal information. So, you can tick "Allow automated usage reporting to Oracle" in this pop up window then click "OK"

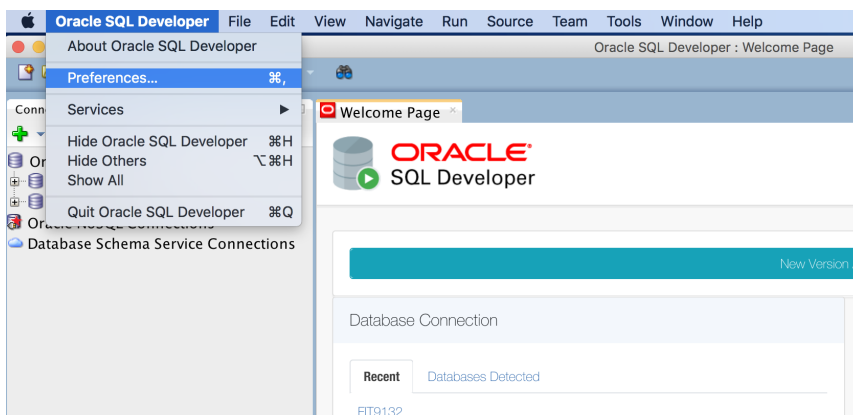


Once SQL developer is running, you can set the configuration/preference. Under Windows or MoVE, the SQL Developer preferences are accessed from the Tools menu, under MacOS from the Oracle SQL Developer entry on the left of the top menu bar.

Windows/MoVE



MacOS:

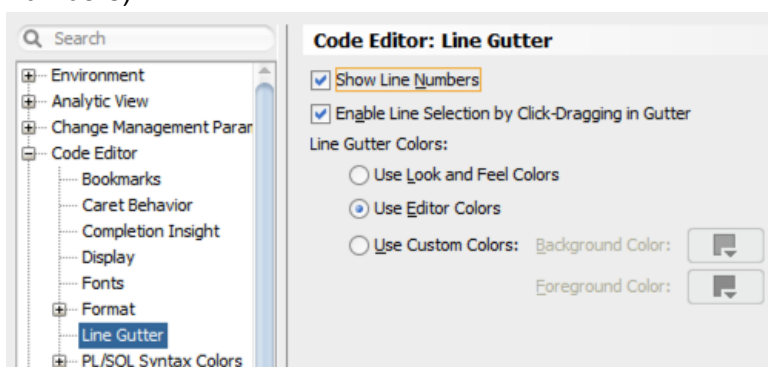


To help with your studies through the remainder of the semester, you should configure:

- display line numbers,
- auto format SQL Code, and
- PL/SQL Scope Identifiers

Display Line Numbers

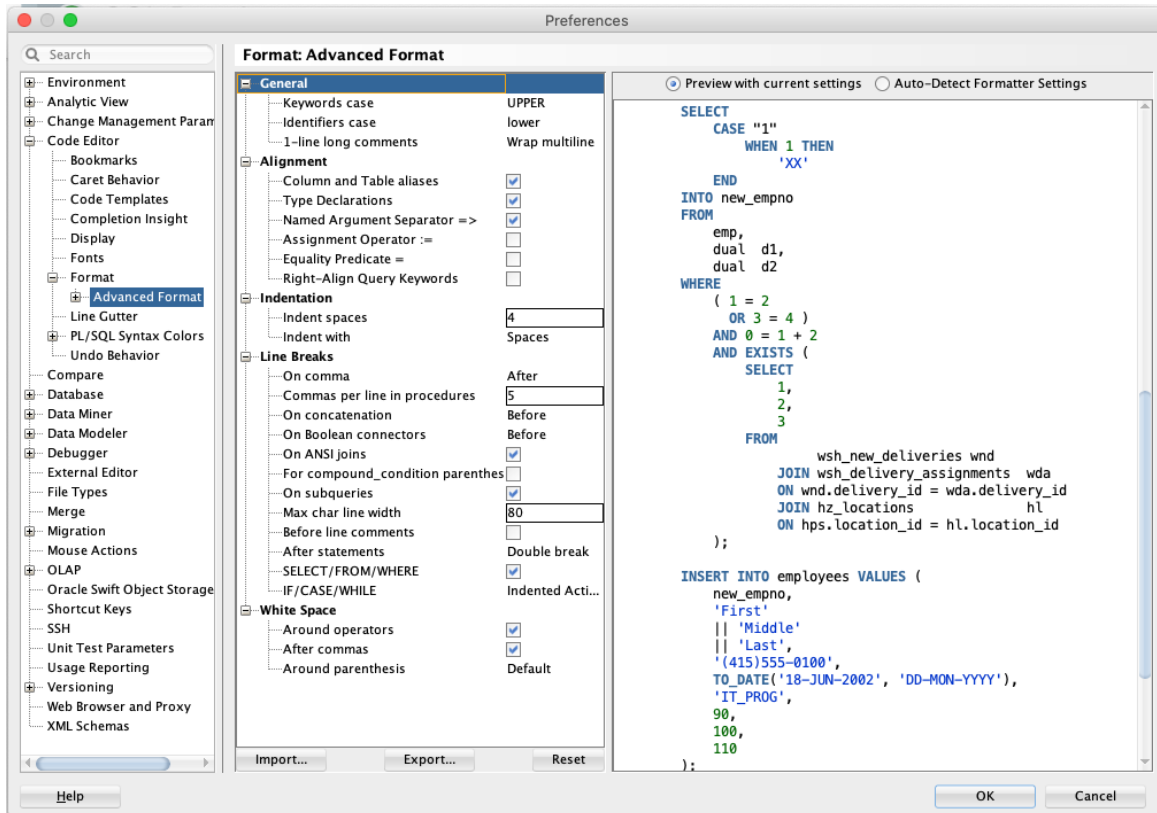
Line numbers are very crucial when you need to debug your SQL command. To display line numbers, click Preferences - Code Editor - Line Gutter - Show Line Numbers (Check Show Line Numbers):



SQL Code AutoFormat

We wish to configure SQL Developer so that it will reformat any SQL code 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. Note that the formatter does not format comments, you need to manually wrap them.

Preferences - Code Editor - Format - Advanced Format. As a starting point, we recommend the settings as shown below (Select OK when completed):

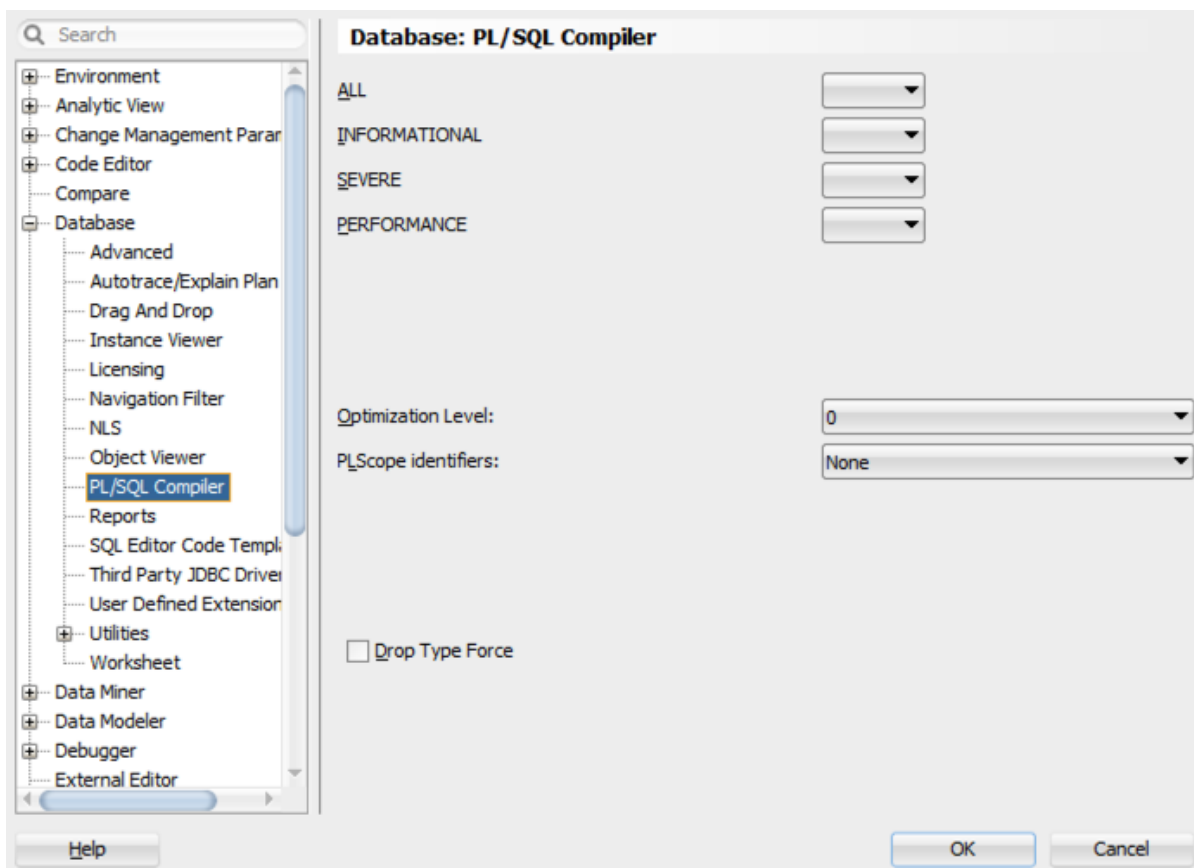


Depending on your personal preferences you might like to return to these settings later on in the unit and reconfigure them to your wishes. You are free to use any settings which you are happy with, the settings shown are a starting point for your study.

To auto format SQL code we now use the assigned format key combination - Ctrl+F7 (on both the Mac and Windows).

PL/SQL Scope Identifiers

It is very important that the PL/Scope identifiers, under Database, are set to "None":

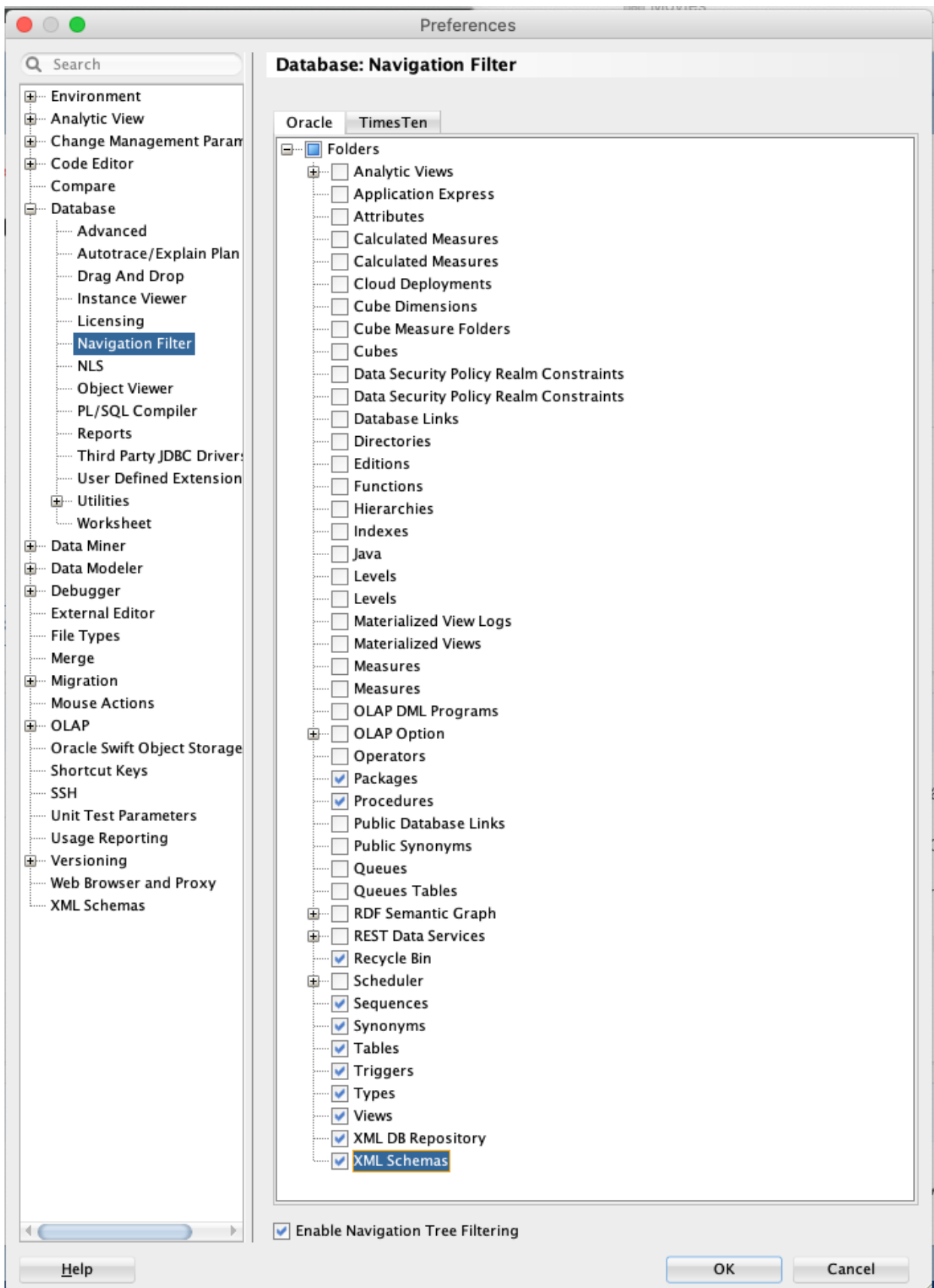


Navigation Filter (Optional)

SQL Developer displays a large, and often confusing array of items under its connection tree, these can be limited to the items we are interested in by applying a navigation filter (Database - Navigation Filter).

Select "Enable Navigation Tree Filtering"

Select to show nothing on the "Times Ten" tab. The suggested items for the Oracle tab are:



1.2.3 Git

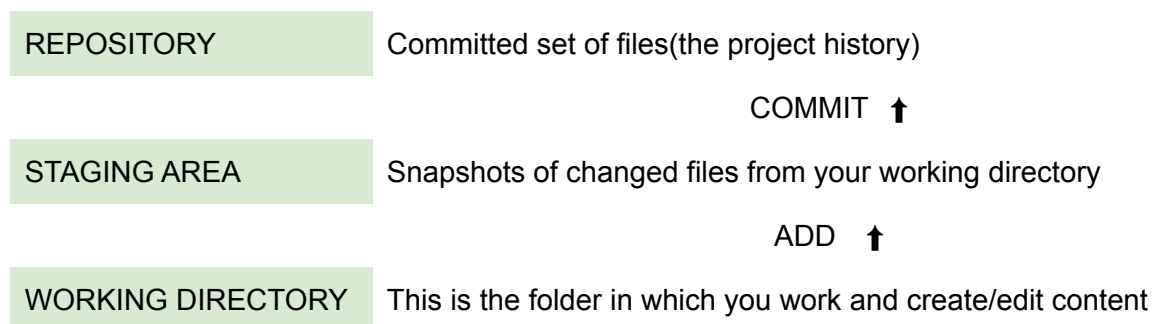
You are required to maintain your unit work on the FIT GitLab server

<https://git.infotech.monash.edu/> to both provide a secure repository for work completed and to demonstrate a clear development history. *This history of saved work is a component of your assignment gradings.*

Git is a distributed version control system, such systems allow:

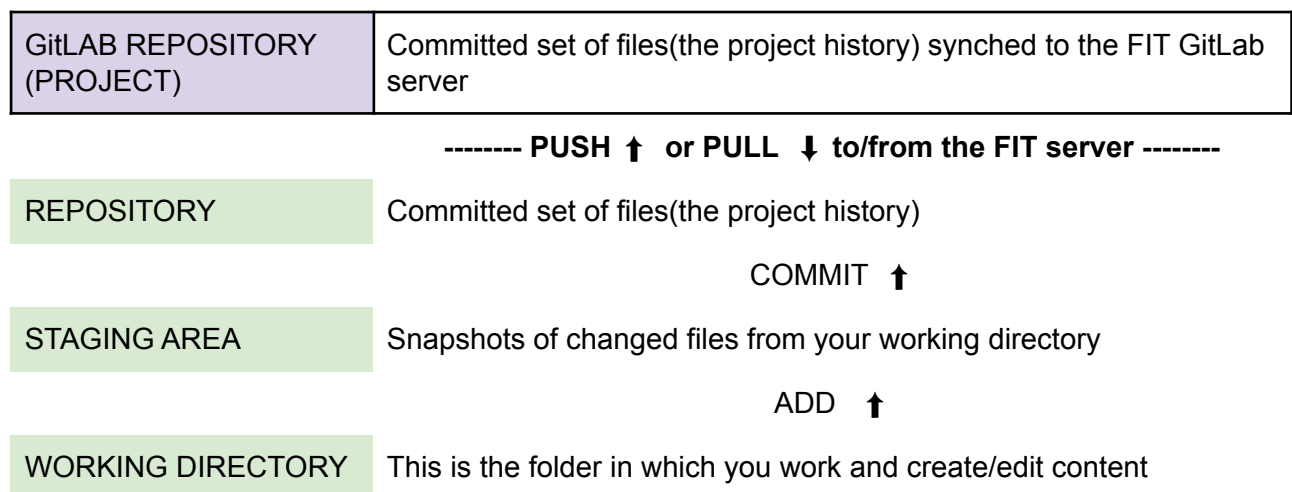
1. a secure repository (called a "Repo") which mitigates against failures such as hard disk crashes,
2. the maintenance of a history of versions of a project, and
3. multiple people to access and contribute to the same project

Locally you can visualise Git as a three-layered system:



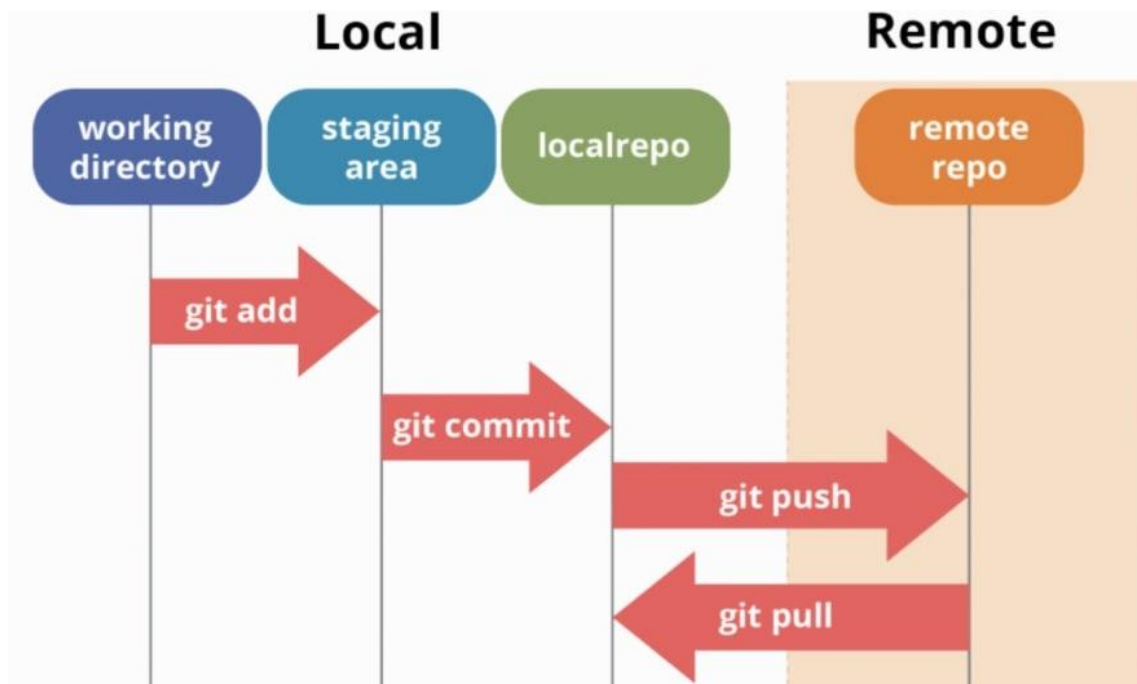
You do not need to be concerned about the location of the staging area or repository, they are in a hidden folder within your working directory. We call this local copy of your files, your **local repo**.

Across the full structure we have:



It is important to understand that the green items above exist in your working folder on your local hard disk (Alternative 1) or the University ADM file server (Alternative 2) , whereas the purple item exists on the FIT Git server. Your work is **not secure** until it has been **PUSHed** to the FIT Git server.

A further diagram which may help make this clearer is shown below:



<https://dev.to/mollynem/git-github--workflow-fundamentals-5496>

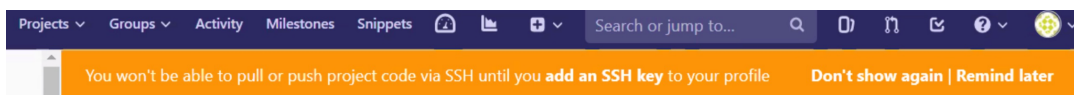
Note that you must follow the steps Add, Commit and Push to move local work to the Git server. The Git server is the **ONLY safe location for your work**, you need to ensure that your work is regularly pushed to Git.

Authenticating to the FITGitLab server

From a GIT client application you authenticate to the GitLab server by using your authcate username and a Personal Access Token (PAT).

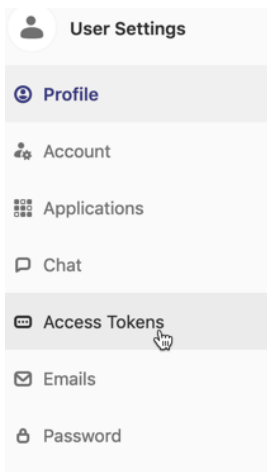
To set up your Personal Access Token, log in to the FITGitLab Server via the web:

<https://git.infotech.monash.edu> (this uses Monash SAML login - Monash single sign-on). If you see this message:



please click on "Don't show again" - our server does not support SSH, you *must not* attempt to set up an SSH key.

Select your profile icon in the top right-hand corner, select Settings. Then in the left panel select "Access Tokens"



Give your token a name such as "ProjectAccessToken" and set an expiry date (it is suggested you allow sufficient time so that the token can cover you across your entire course duration at Monash). Select the "api" scope (this will give this token full access to all of your projects/repos), and then click on the green Create personal access token button.

User Settings > Access Tokens

Personal Access Tokens

You can generate a personal access token for each application you use that needs access to the GitLab API.

You can also use personal access tokens to authenticate against Git over HTTP. They are the only accepted password when you have Two-Factor Authentication (2FA) enabled.

Add a personal access token

Pick a name for the application, and we'll give you a unique personal access token.

Name

Expires at

Scopes

☒ api

Grants complete read/write access to the API, including all groups and projects.

☐ read_user

Grants read-only access to the authenticated user's profile through the /user API endpoint, which includes username, public email, and full name. Also grants access to read-only API endpoints under /users.

☐ read_repository

Grants read-only access to repositories on private projects using Git-over-HTTP (not using the API).

Create personal access token

Copy the access token which is generated **from the top of the page** and save it in your password manager.

Your New Personal Access Token

7Tz5kJAvgfITWeDMGxJU

Copy personal access token to clipboard




Make sure you save it - you won't be able to access it again.

This is the **ONLY** time you will be able to copy and save this token. You will now have a new token listed in the Active Personal Access Tokens display:

You may revoke this token at any time you choose by clicking on the "Revoke" button - you might do this because:

- you have lost your copy of your token and need to generate a new one, or
- you no longer wish access to your projects/repos

Active Personal Access Tokens (1)

Name	Created	Expires	Scopes	
ProjectAccessToken		In almost 2 years	api	Revoke

REMEMBER when you clone, push and pull in SQL Developer you must use your **authenticate username** as the username and your **Personal Access Token** as the password to access your projects/repos.

1.2.4 Set your Local Repository using SQL Developer

Before you continue on this step, please ensure that you have a Gitlab username and personal access token (PAT) created from the above section

The process involves two steps:

- creating a working directory followed by
- cloning your remote (FITGitLab) repository to this working directory

Note you must ensure that NO PART of your path to the working directory contains any spaces or characters other than alphabetic (A..Z,a..z), numeric (0..9) or underscore (_) characters.

If you are using MoVE:

You must set the working directory under Monash/Users/ folder. Please watch the videos "[Step 2 - Set up working directory](#)" and "[Step 3 - Cloning your Repo](#)" from Moodle for more detail.

If you are working with a local install:

Firstly, create the working directory you intend to keep all of your unit files in (note that **ALL** database files must be created/stored and managed in this folder). You must set the working directory under your computer's **C:\Monash** folder (for Windows) or **/users/username/Monash/** folder (for Mac).

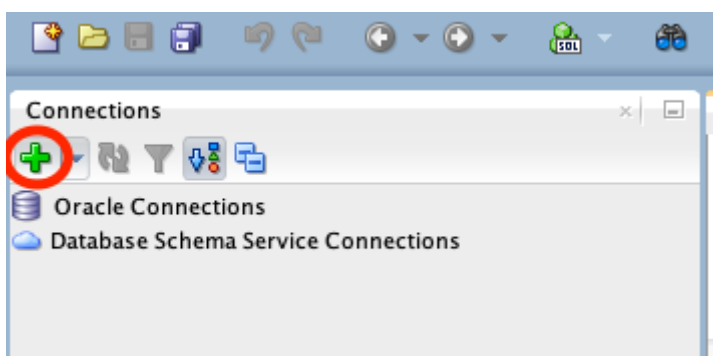
Secondly, clone (copy) the Git repository into your working directory. Please follow the instructions in the video "[Set Up your Working Directory and Clone your Repo](#)" available from Moodle.

1.2.5 Connecting to Oracle database using SQL Developer

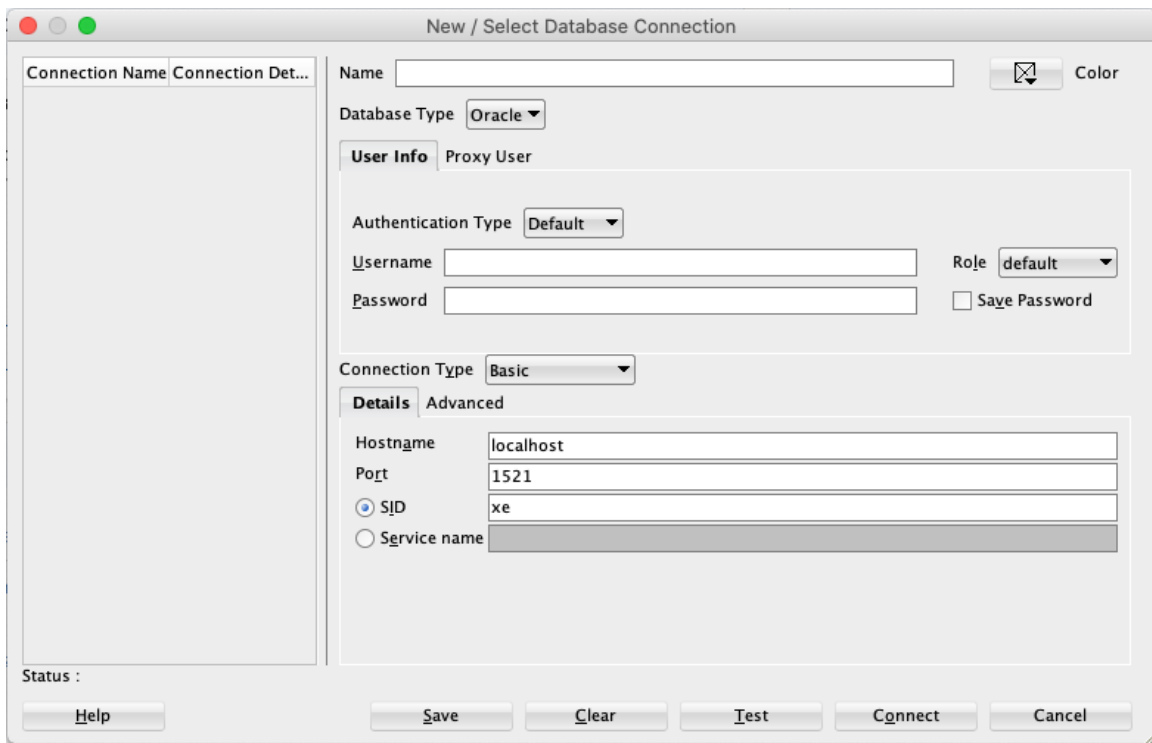
In the next few sections, you will learn how to use SQL Developer software to access an Oracle database.

Adding a new connection

After running SQL Developer, click on the add a Connection icon (the green cross), the new connection dialog will appear.

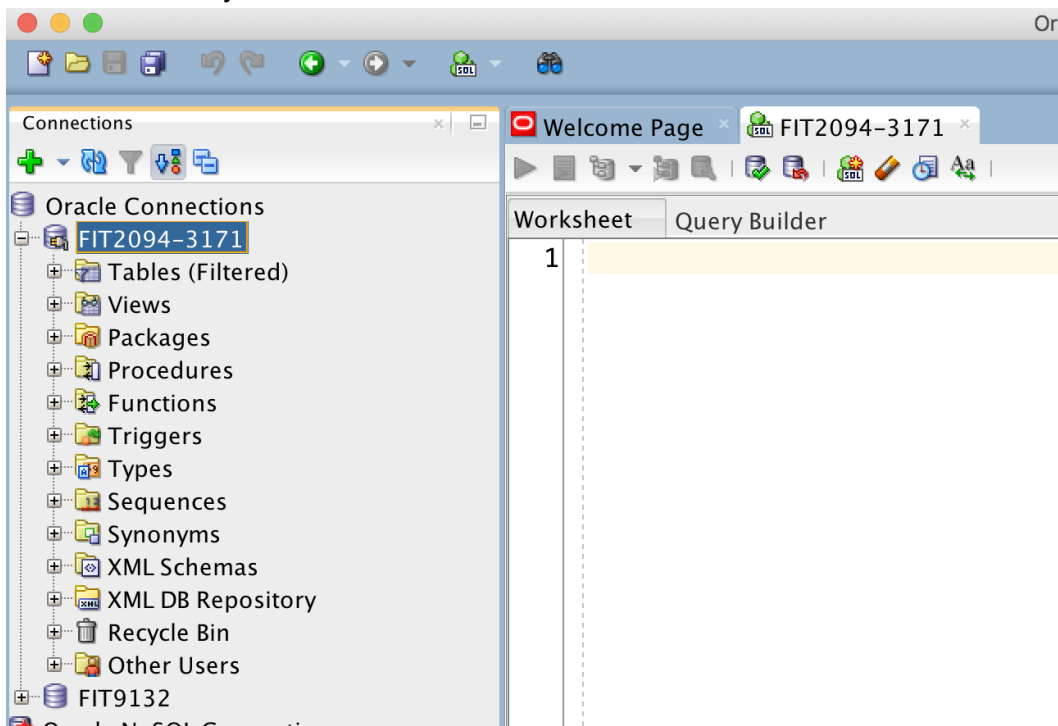


Now you will see the New / Select Database Connection window, as shown below.



The connection details that you need to connect to the Oracle database through SQL Developer are available on Moodle. As well as setting up this connection, it is very important that you ensure you have configured SQL Developer correctly (as explained at the start of this material).

After connection you will see:



SQL Statements can be entered in the right-hand panel, labelled "Worksheet".

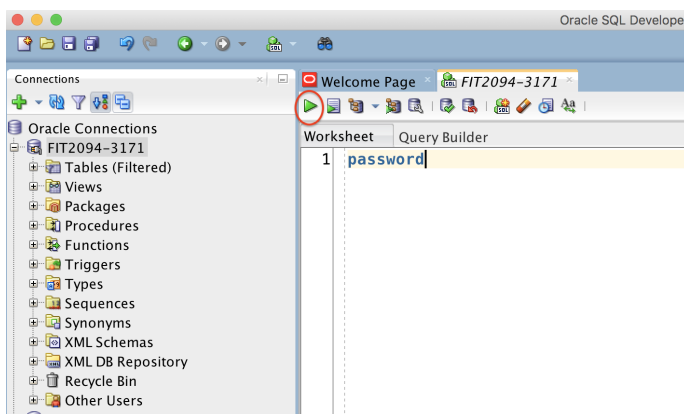
Changing your password

After logging in for the first time **you have to change your password** from the one supplied by the connection detail file on Moodle as soon as possible. **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**
- 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:



Key in your old password and new password



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.

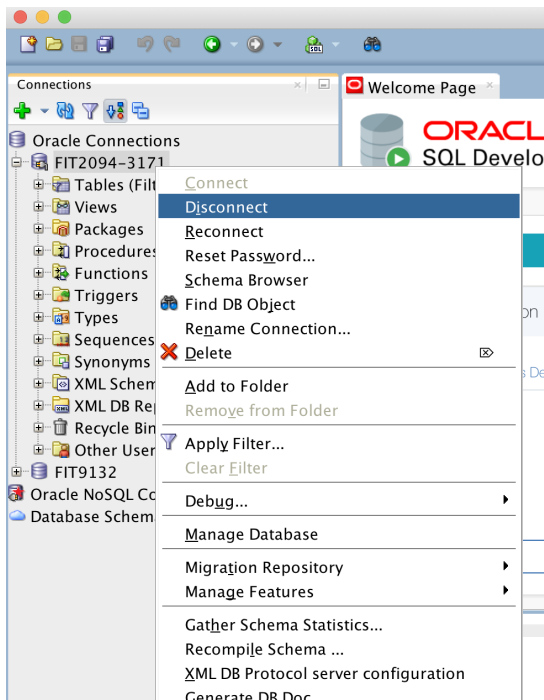
If at any stage you find that you are unable to login to Oracle due to password problems, such as:

- after this initial setup of your password due to an incorrectly chosen password, or
- later in the semester if you forget your password

please email your tutor to have your password reset (be sure to conform to the unit's email requirements or your message will not be responded to).

1.2.6 Disconnecting from Oracle

It is very important to disconnect from Oracle every time you have finished working with SQL Developer and before you close your laptop. To disconnect, right click on your active connection in the Connections bar, then click disconnect.



1.2.7 Closing SQL Developer

You **MUST** close SQL Developer correctly after you have finished working with it - please do not leave the software running and close your laptop, as you may do with other software. When finished with an SQL Developer session, disconnect all database connections, close all files (especially models - see later in the semester) and then select File - Exit. Failure to do so may result in corruption of your files and/or settings.

1.2.8 MoVE: If SQL Developer on MoVE Hangs

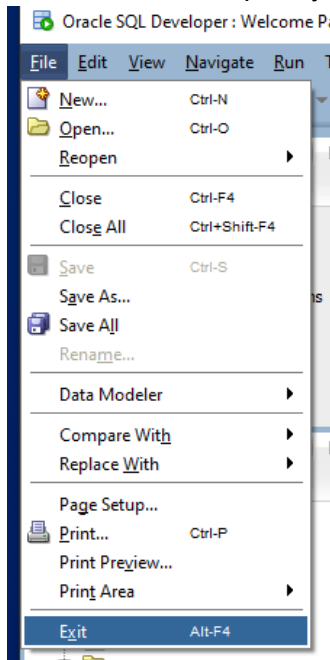
You will be using MoVE, your local repo and SQL Developer across the internet - a "glitch" on your connection or an error in your work in SQL Developer can cause the software to hang or behave incorrectly.

Simply closing your browser and restarting is not sufficient. MoVE runs an MS Windows Citrix virtual machine for you for each application you start. This virtual machine will not be reset if you simply close your browser. When you relogin to MoVE you will simply be returned to exactly the same situation you had prior to closing your browser since your virtual machine will still be present. To remove your virtual machine/s you must **explicitly log out of MoVE**.

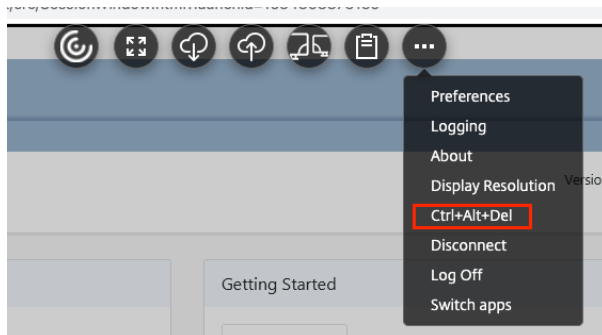
In such situations you must follow the following steps:

- If you are able to, ensure your data models are closed - File - Data Modeler - Close All (*if you have been working on modelling*)

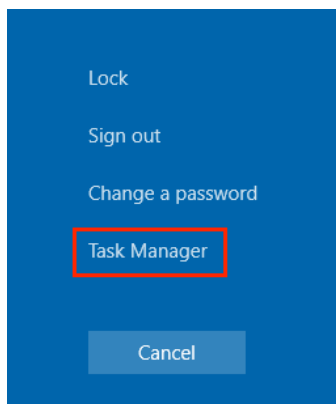
- Close SQL Developer by clicking File - Exit



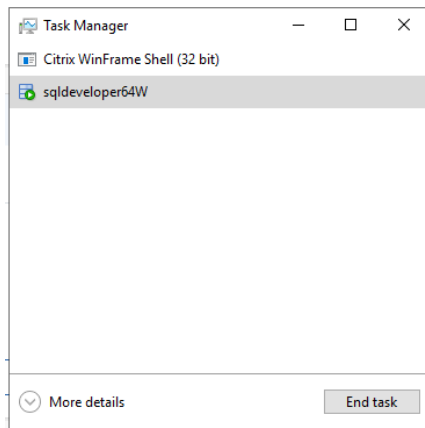
If your SQL Developer is "hung", then open the top menu via the semicircle icon in the top middle of your browser page, select the three dots on the right and then click Ctrl-Alt-Del in the menu,



then select Task Manager,

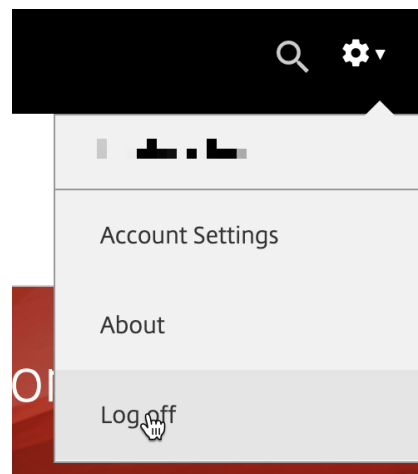


and End Task **both** sqldeveloper64W and Citrix WinFrame Shell (32 bit).



Your SQL developer window will close automatically.

- Return to the MoVE home screen. **Explicitly log out of MoVE** (Log Off in the top right) - **this is the key step**.



- Restart your browser and try again

If this does not work then you need to wait for 1.5 hours and then try again (the system should remove virtual machines after a 1 - 1.5 hour period if the machine has not been accessed).

If the problem still persists you will need to contact the unit staff.