Oracle Installation Guide

Version 32
For Oracle 11g and Oracle 12c

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Introduction

These instructions are used by students enrolled in the Master of Science in Computer Information Systems and other Computer Science Department programs in both on-campus and online programs. In some places these instructions say that you should contact your instructor. Online students should normally contact their facilitator first.

The document begins with a discussion of Oracle, connecting to the Oracle web site, creating an Oracle Technology Network account, then downloading, unzipping, and installing Oracle. We continually update this document; please let us know of problems you encounter or questions not answered.

The examples in the main document are for the Microsoft Windows family, including Windows XP, Windows 7 and Windows 8. If you are installing on an operating system other than the Windows family, such as Linux or Solaris, then follow these instructions to join OTN, except download the version of Oracle for your platform rather than the Windows version. The *Quick Installation Guide* and the full *Installation Guide* for your operating system can be found in the *Install* directory created when you unzip the file you will download as part of these instructions.

These setup instructions are for Oracle 11g Release 2 and for Oracle 12c Release 1. The installation instructions are similar, and the screen shots in these instructions are from installations of both Oracle 11gR2 and Oracle 12cR1. Oracle has maintained upward compatibility for SQL between Oracle versions for many years. If you cannot install Oracle 11g or 12c on your own machine, and you have ready access to an Oracle installation you may be able to use it. All of the exercises in MET CS579 and CS669 can be completed using Oracle 8i or later. Some of the exercises in MET CS779 require Oracle 9i or later. CS 779 students may wish to use a recent version of Oracle, such as 12c if you choose to do a term project using container databases or another feature only available in the latest release. Students in CS 674 Database Security are normally provided with a virtual machine which has Oracle Enterprise and Enterprise Manager pre-installed, so all the students need to do is install the virtual machine, which installs like a regular application.

Also included are instructions for setting up Oracle Express Edition, a smaller edition of the full product. Although it has limitations with regard to the amount of memory, size, and number of tables allowed, it is quite usable for our classes, and it introduces a much lighter load on your computer. Note that CS674 Database Security makes use of the Enterprise Manager which is **not** included with the Oracle Express Edition. You should also install the Enterprise Edition if you plan to do a term project in MET CS 779 with large databases, Oracle Grid, Enterprise Manager or other features that are not in the Express Edition.

Oracle is continually updating Oracle.com, so the screens that you see on Oracle.com will probably be a little different than what is shown in this document. If you can't determine how

to proceed because what you see is too different, or if something goes wrong ask your facilitator or instructor for help. Good luck, and have fun!

Oracle Overview

About Oracle

Oracle has most of the advanced features in any relational or object-relational database management system. Because of this, many of the new ANSI/ISO SQL standards are based on Oracle, so when you learn Oracle you are mainly close to the portable standards. Unlike MSSQL Server, Oracle runs on all common platforms from huge symmetric multiprocessors to ordinary PCs. Oracle is also very scalable, and it supports both clustering and grid computing to surpass the performance and reliability of any single platform. Oracle is broadly considered as the standard by which other database management systems are measured, and when you learn to use Oracle your skills will transition well to other database management systems.

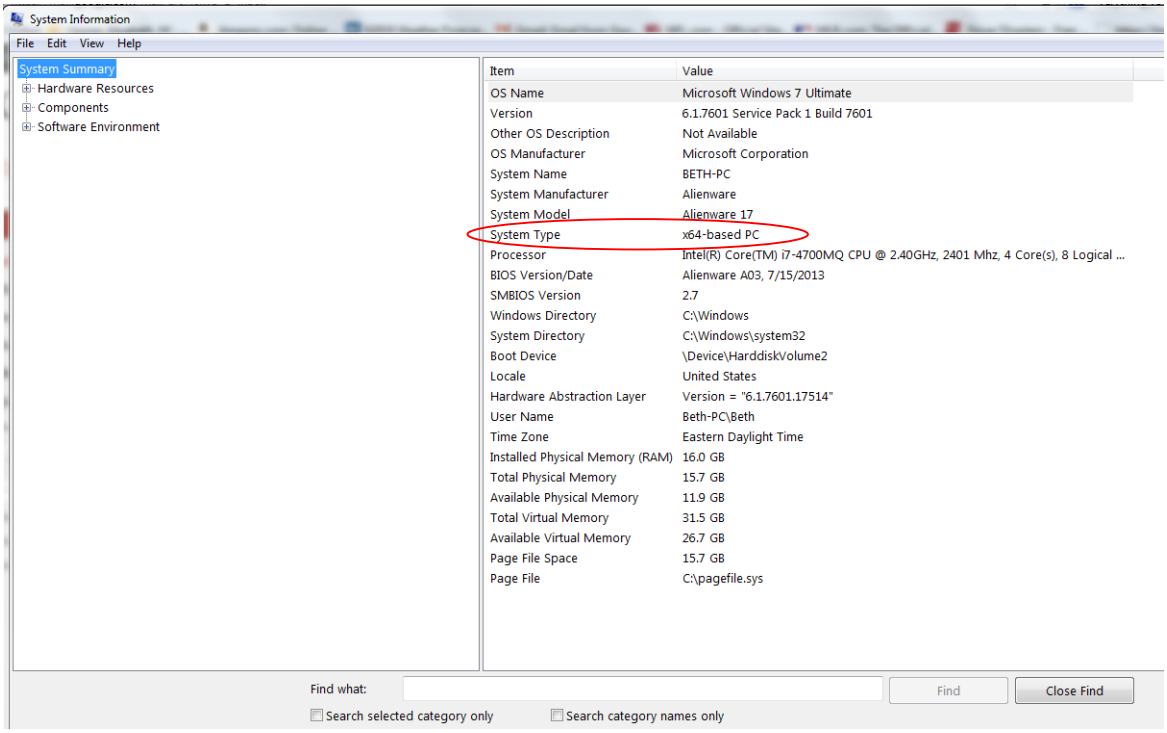
Oracle runs on ordinary machines. Oracle runs on the largest multiprocessors, but Oracle also runs very well on ordinary PCs and recent Macintoshes. PCs are the most common Oracle hardware platform, and there are Oracle versions for many PC operating systems, including the Windows family and Linux.

The following instructions are for the default configuration, the easiest of the Oracle installations. Oracle is very flexible and can be configured to use less or more in the way of machine resources. There are suggestions in the instructions below for minimizing hard disk usage. The easiest way to minimize the use of resources on your machine is to download and install Oracle Express, which requires about half the RAM of the other Oracle editions. If you want to run Oracle on a platform other than Windows, please see the platform notes at the end of the document or contact your instructor for assistance.

Hardware Requirements

The following information is based on best practices and the hardware requirements specified by Oracle's installation documentation. If you are installing any release and edition of Oracle 12cR1, you must have 64-bit hardware with at least 2GB RAM and at least 10GB free of disk space.

If you are not sure if you have a 32-bit or 64-bit operating system, click on “Start>>Accessories>>System Tools>>System Information”. Under the entry for “System Type”, it will indicate what type of hardware you have. It will look something like this:



If you do not have 64-bit hardware, the entry for “System type” might be something like “X86-based PC”. If so, you can only install Oracle 11gR2. Oracle 12c only works on 64-bit hardware.

If you are installing Oracle 11gR2 Express Edition, Oracle recommends that you have at least 1.5 GB of disk space available, and 256-512 MB of RAM. If you are installing any edition other than Oracle 11g Express, Oracle recommends that your system have at least 1GB RAM and roughly 5GB of free disk space. If these hardware requirements are a problem for you please contact your instructor for assistance.

Oracle Editions

Oracle 11g can be installed in one of five editions -- Enterprise, Standard Edition, Standard Edition One, Personal Edition, and Express Edition. Oracle 12c can be installed in one of three editions – Enterprise, Standard Edition, and Standard Edition One. All editions come with the core relational DBMS along with full SQL support. The main difference in functionality between the editions is how many advanced features are supported, including features pertaining to high availability, scalability, performance, manageability, data warehousing, and business intelligence. Licensing is different for each edition, which is important when the DBMS is installed in a production environment.

Unless you need the advanced features provided by the Enterprise or Standard Editions, it is recommended that you install Standard Edition One or Express Edition.

Common Platforms

Oracle runs on all common platforms, including the Windows family, the latest Macintosh operating systems, several Linux variants, and several Unix variants. Oracle supports the features that we use in our courses on all platforms, and it doesn't matter what platform your Oracle runs on. You will connect to Oracle using a SQL client, for example Oracle SQL Developer, TOAD, or SQL*Plus. Oracle can be on the same machine as the client or on another machine on the same LAN or anywhere on the Internet.

Platform Independence

Oracle behaves the same regardless of the platform except for database size limitations and performance. Your exercises will behave the same way across all Oracle platforms.

Preparations and Setup

You can obtain a copy of Oracle by downloading Oracle database software directly from Oracle. If you experience downloading difficulties, please contact your facilitator, lead facilitator, or course instructor. Most people with broadband should be able to complete the download and install the program with minimal difficulty.

Setting up Oracle is not like setting up an ordinary application. Oracle and other DBMS are more deeply integrated with the operating system than ordinary applications. Oracle installs do many more things than application installs. The installer will check for the many problems that can occur on your system. Oracle installations on unmodified environments usually occur without significant issues, but many things can go wrong, particularly with modified operating system environments. Expect the unexpected, and don't feel embarrassed if something unexpected happens. Unexpected events are common for database installations. Just contact your facilitator, who will help you.

Oracle Express Edition

The Express Edition is a smaller version that places limits on the size of the database, the number of connections that may be opened, and the number of tables.

For MET CS 669, we have found that the Express Edition is suitable and has the advantages of a much smaller load on the computer and a simpler installation. Oracle Express 11g does not come with the Enterprise Manager, for which you will need to install Oracle Enterprise Edition.

Instructions for installing the Express Edition are located in Appendix C.

Downloading and Installing Oracle

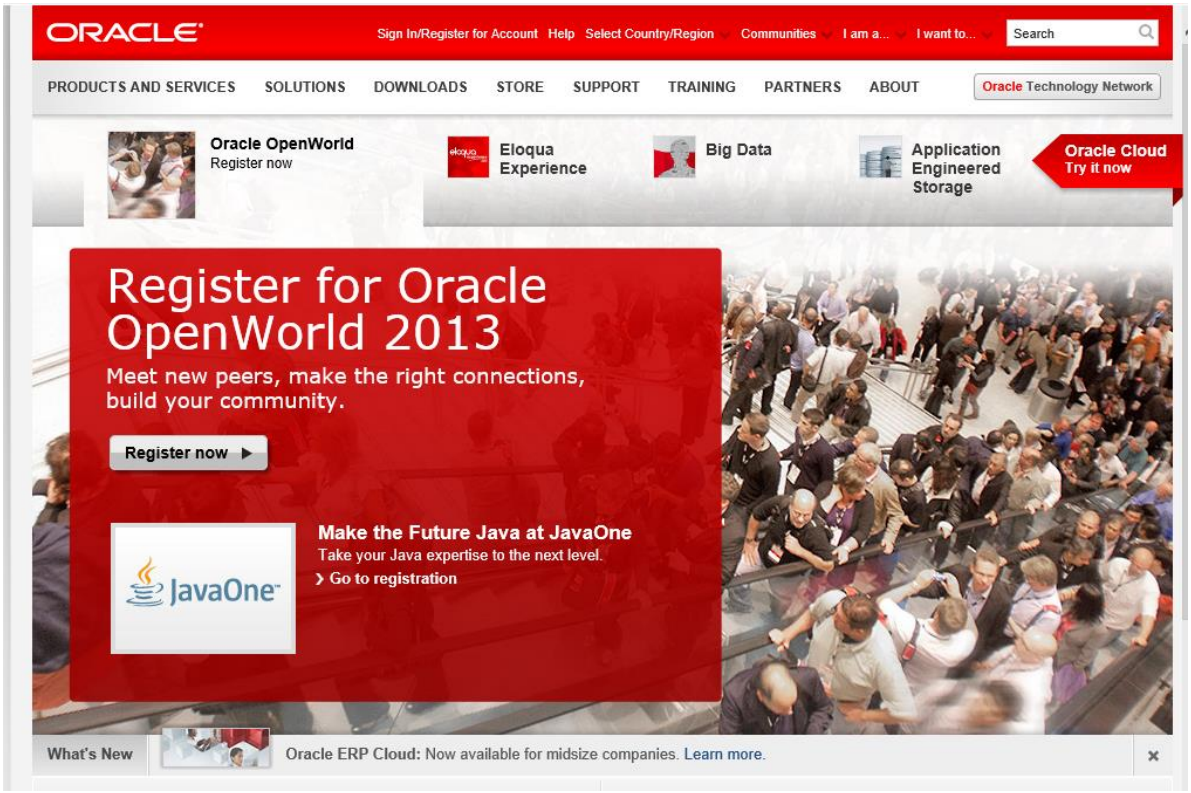
Step 1: Creating an OTN Account

Introduction

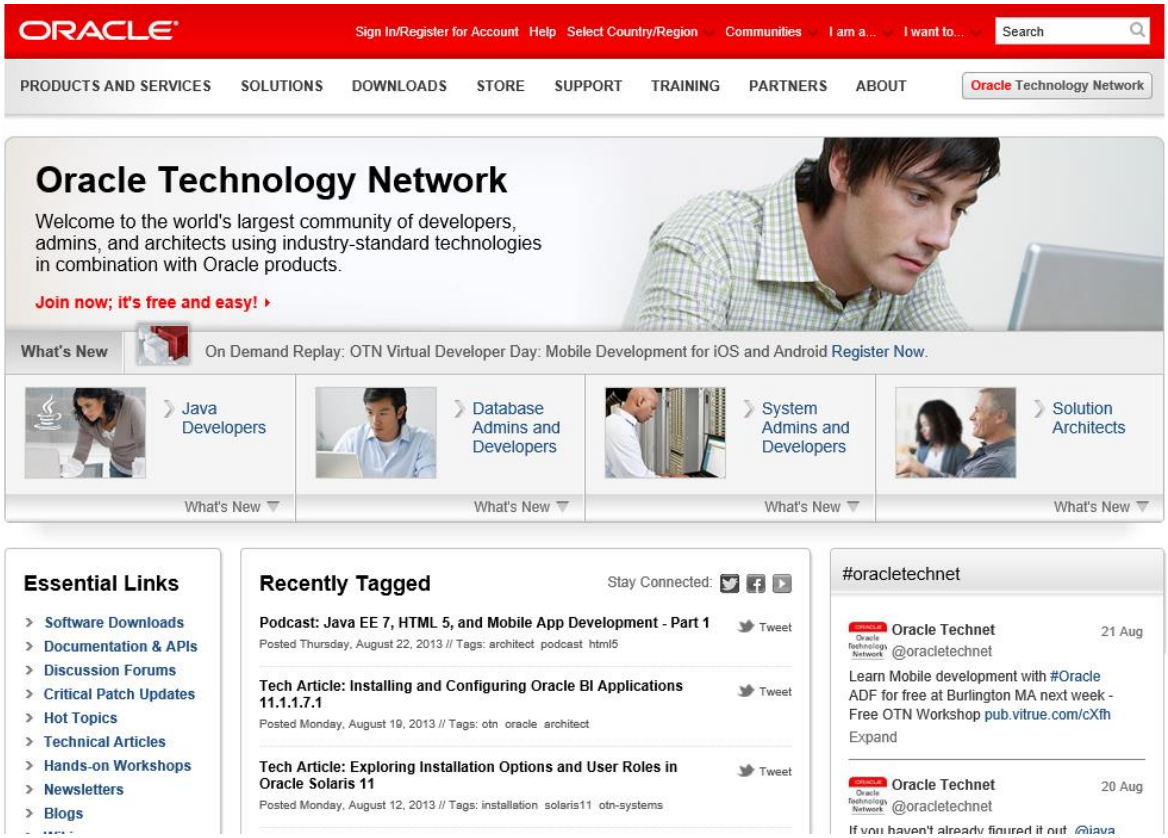
This section guides you through the sub-steps to create your own Oracle Technology Network (OTN) account. Before you can download Oracle you must create and login to an Oracle Technology Network account.

Log On to OTN

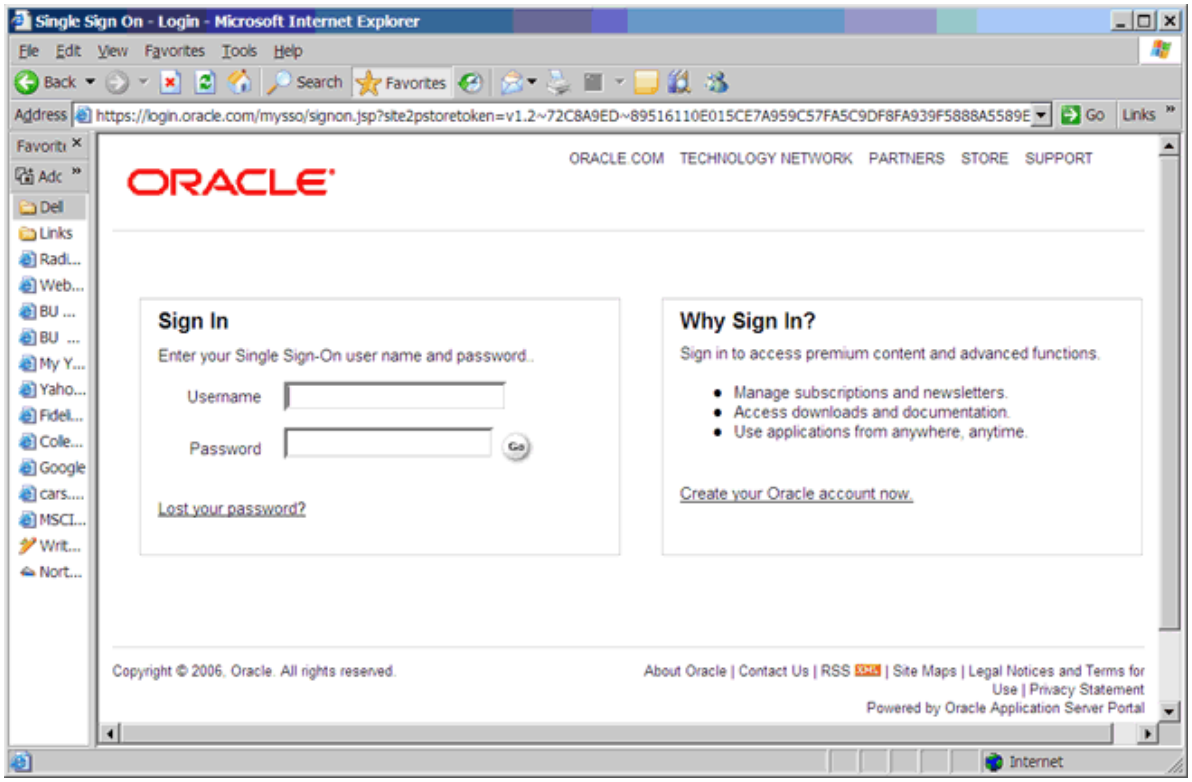
Go to http://www.oracle.com to log onto the Oracle Technology Network. Oracle is regularly updates their web site, so what you see may be different than the following.



Click on the "Oracle Technology Network" tab at the top or just enter http://www.oracle.com/technology into your browser and you will see something like this:



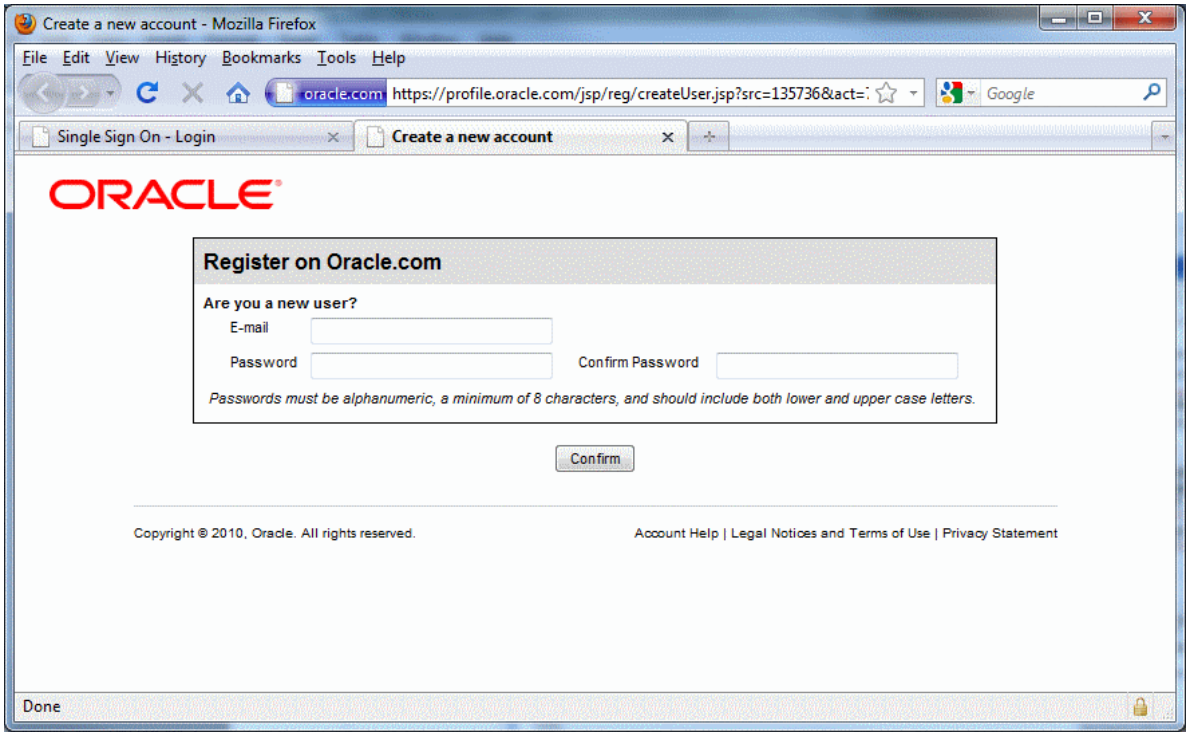
Click on “Sign In/Register for Account” in the top bar. You should see something like this:



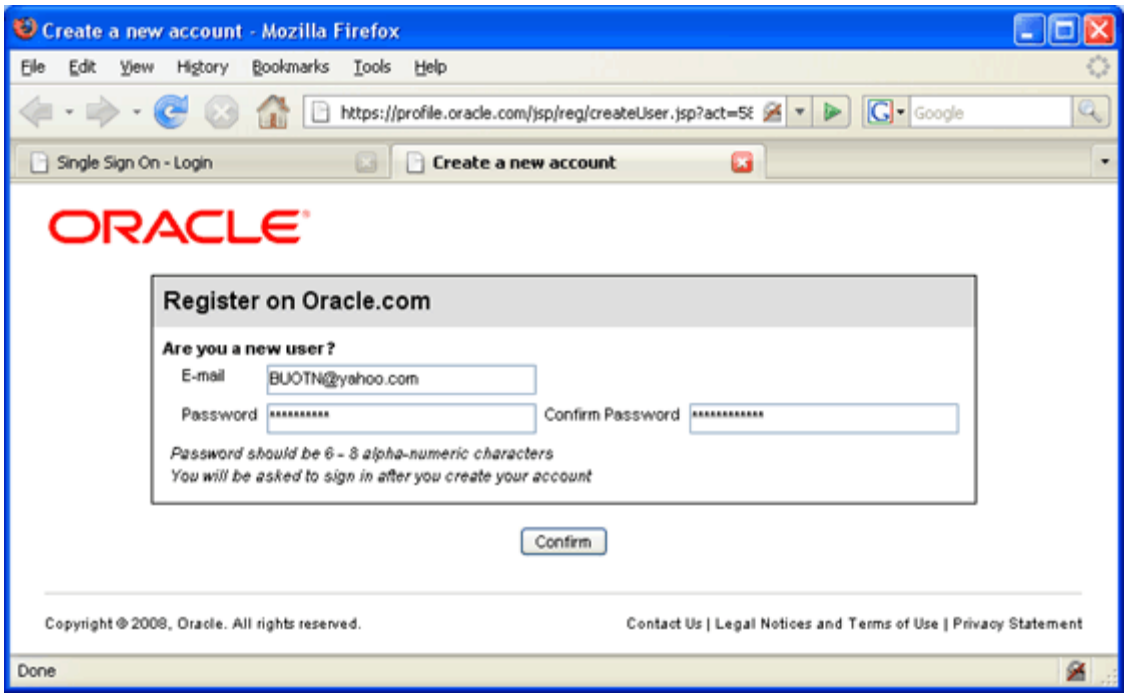
If you already have an Oracle account, enter your new username and password, and then click the "Go" button to continue.

Sign Up For your Oracle OTN Account

If you don't already have an Oracle account, click on “Create your Oracle account now” at the bottom of the right box. You should see something like the following:



- Type in your email address and a password for your new OTN account.
- Click *Confirm*. Note that Oracle uses the portion of your email address to the left of the "@" sign as your OTN user name. If the site complains that the user name is already taken, you will need to use another email address, or create a new one. It is easy to create a new email account at sites like yahoo.com. I used such a Yahoo email address below.



You will then be presented with a long form asking for your name, address, etc. Complete the form and click "continue." You will find yourself logged into the OTN. Click on the “Downloads” tab to get to the Oracle database downloads.

If you look in the upper right hand corner you should see your first name and “Sign Out”, which indicates that you are logged onto OTN.

Click on the “Download Database 12c” link to download 12c Release 1, or click on one of the links next to “Database” to get to the downloads page.

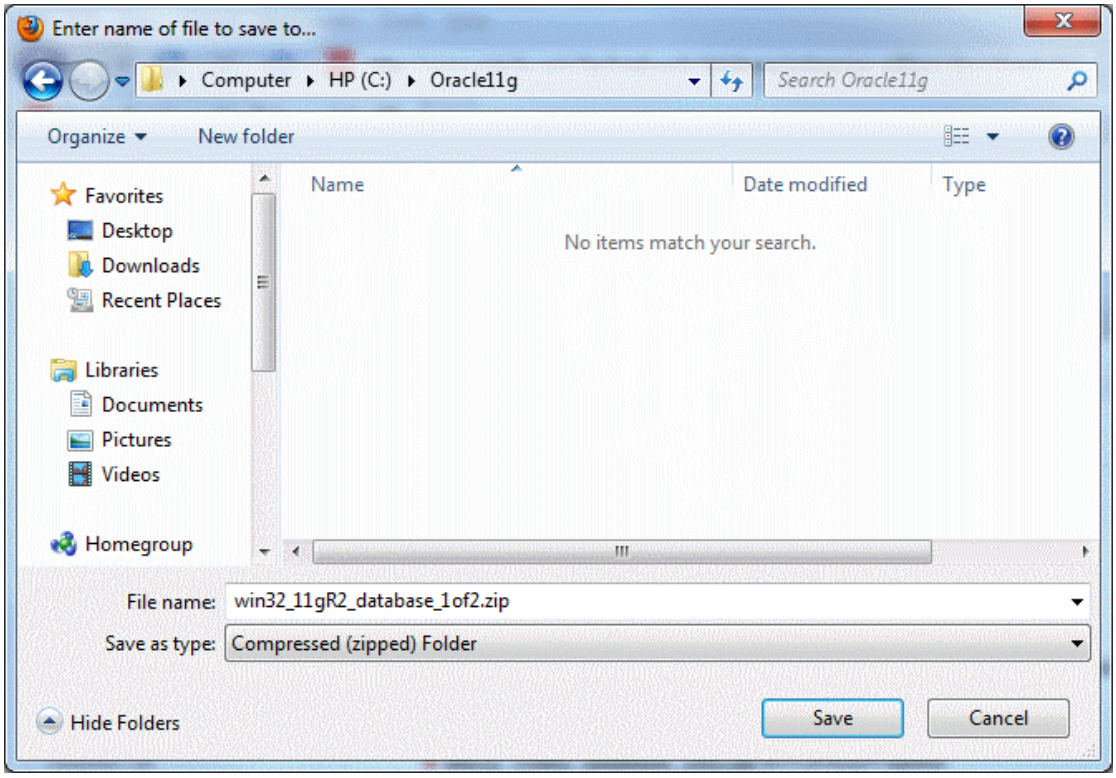
Step 2: Downloading Oracle 11g Release 2

Introduction

The following instructions guide you through the sub-steps to download the Oracle zip file appropriate for your operating system.

Save the Zipped Installation File

Create a directory for the download, such as C:\Oracle11g, and download both files into that directory. You will see something similar to the following:



Click the Save button, and give time for the file to download in full.

Sometimes a small file is transferred, and the download ends within a few seconds. If this happens it usually works to just try again, sometimes a few times, until a large download is underway. This is a large download, and will take anywhere from fifteen minutes to hours to download, depending upon the speed of your Internet connection.

Repeat these steps to download the second zip file named "win32_11gR2_database_2of2.zip."

While you are waiting is a good time to turn off *On-Access Scanning* in MacAfee Antivirus and other antivirus (AV) programs that scan data that is accessed by the file system. On-access scanning will greatly slow some of the later stages of the installation. Your AV software may behave differently, but you should just be aware that some AV programs inject themselves in the middle of the large Oracle install file system data transfers. You may therefore want to adjust your AV configuration to shorten the install time. The install

can succeed with on-access scanning enabled, but it will take a lot longer. Your perimeter AV defenses will not interfere with the install, and they should be left on.

Sometimes it happens that downloads time out or otherwise fail. This usually has to do with the internet connection that you are using. If this happens repeatedly to the point where you are unable to obtain the zipped file in a timely manner, contact your facilitator.

When the download is complete, you now have Oracle 11g installation media on your hard drive, and you can log out from your Oracle OTN login.

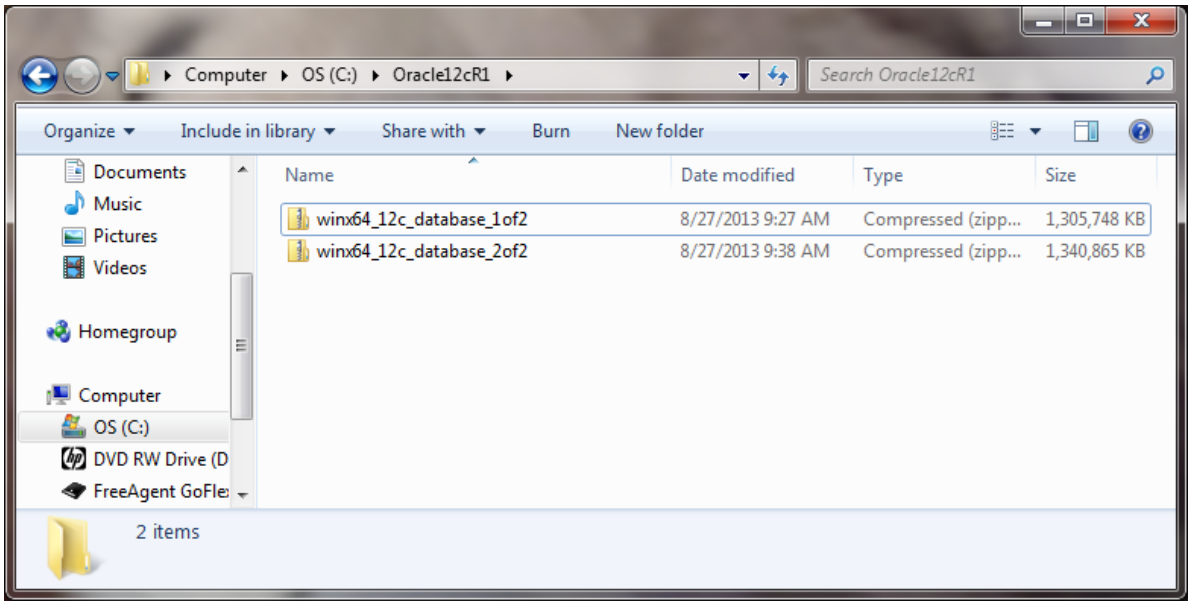
Downloading Oracle 12c Release 1

Introduction

The following instructions guide you through the sub-steps to download the Oracle zip file appropriate for your operating system.

Save the Zipped Installation File

Create a directory for the installation files, such as C:\Oracle12cR1, and download the two zip files into that directory. You will see something similar to the following:



While you are waiting for the download to finish is a good time to turn off *On-Access Scanning* in MacAfee Antivirus and other antivirus (AV) programs that scan data that is accessed by the file system. On-access scanning will greatly slow some of the later stages of the installation. Your AV software may behave differently, but you should just be aware that some AV programs inject themselves in the middle of the large Oracle install file system data transfers. You may therefore want to adjust your AV configuration to shorten the install time. The install can succeed with on-access scanning enabled, but it will take a

lot longer. Your perimeter AV defenses will not interfere with the install, and they should be left on.

Sometimes it happens that downloads time out or otherwise fail. This usually has to do with the internet connection that you are using. If this happens repeatedly to the point where you are unable to obtain the zipped file in a timely manner, contact your facilitator.

When the download is complete, you now have Oracle 12c installation media on your hard drive, and you can log out from your Oracle OTN login.

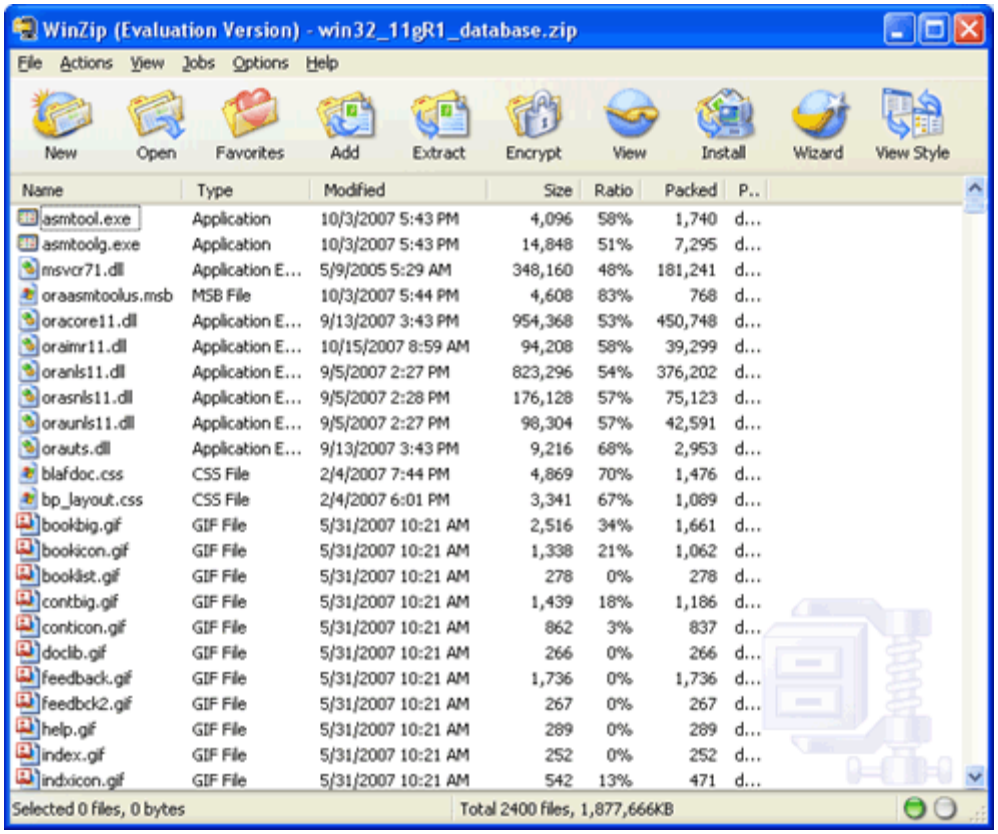
Step 3: Unzipping Oracle

Introduction

The following instructions guide you through the sub-steps to unzip the zipped files that you just downloaded.

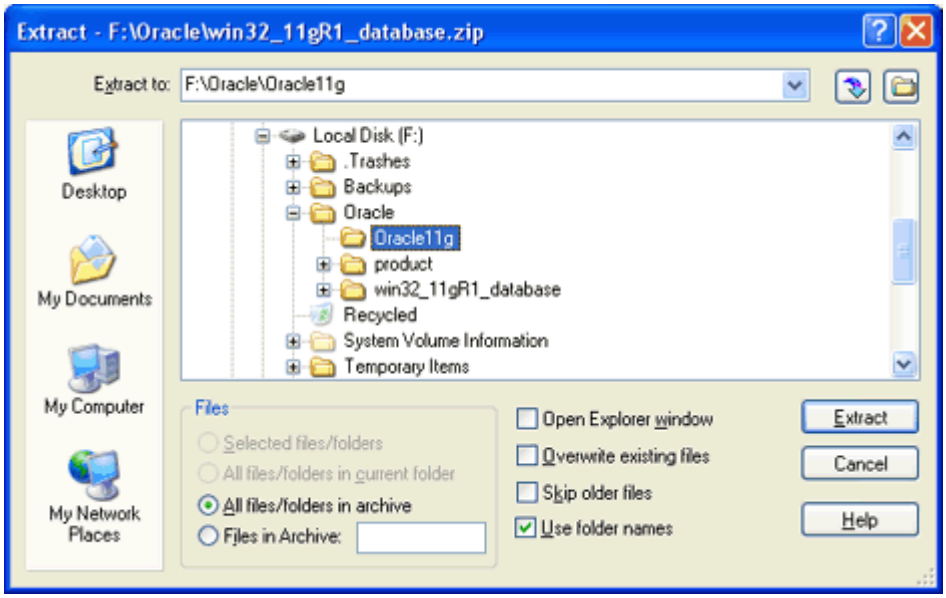
Unzip Oracle Installation File

If a zip program is present or your operating supports unzipping just double click on the first file you downloaded. The zip program should launch. In WinZip, the resulting screen looks similar to this:

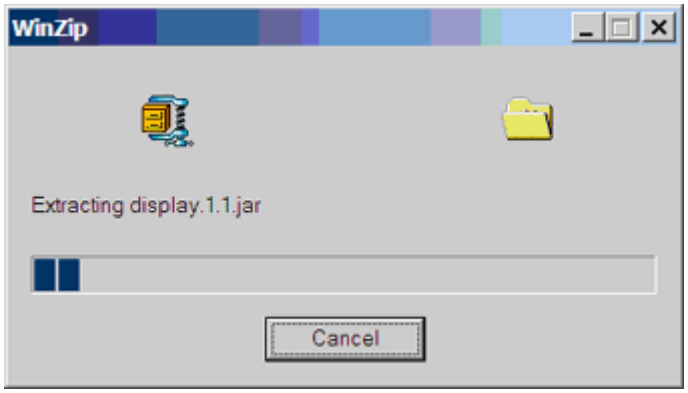


We are next going to extract all files into the same directory where we downloaded the zip file. Click *Extract* in the toolbar at the top.

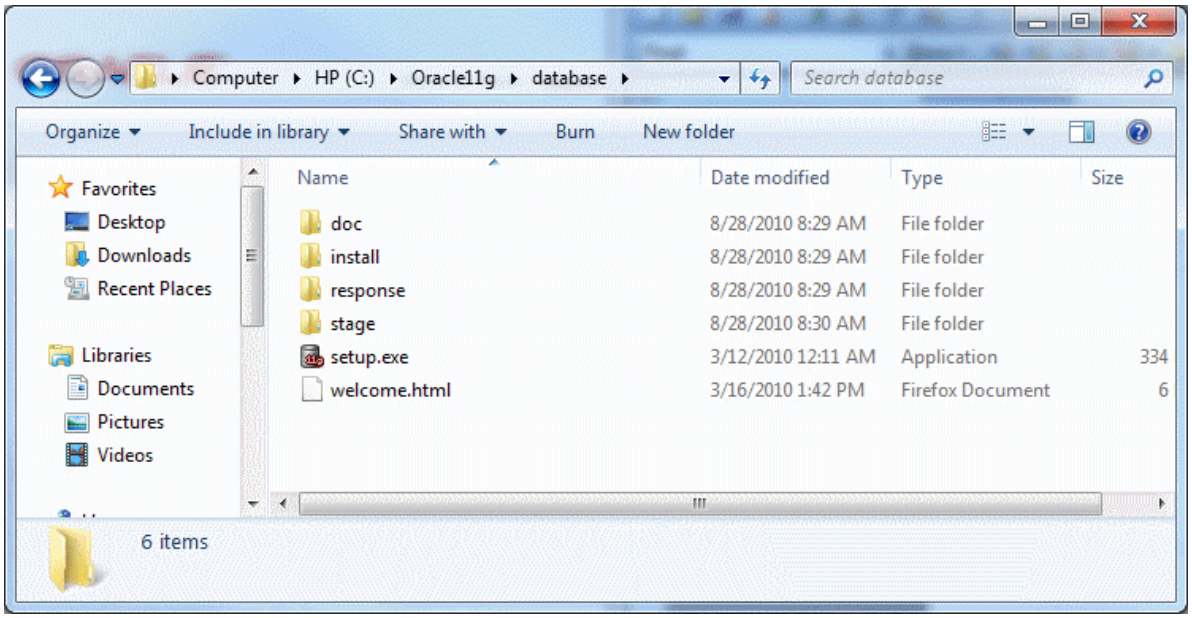
You will see a window like the following. Navigate to the folder to which you downloaded the zip, as in this example:



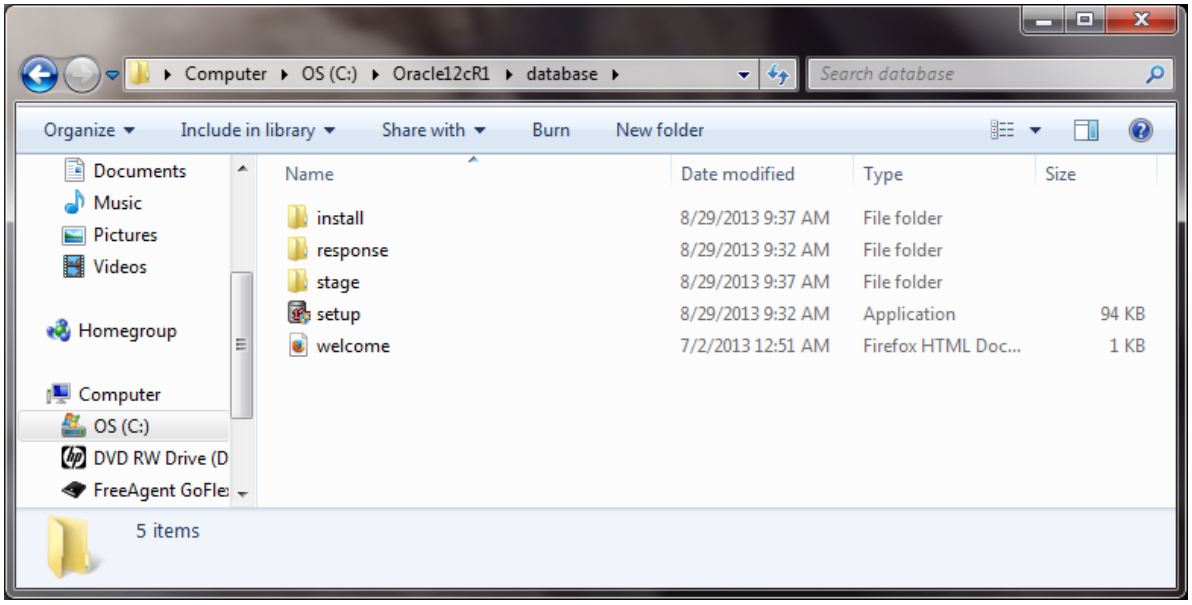
Then check that the radio button for *All files/folders in archive* is selected and that the *Use folder names* box is checked, as above. Then click *Extract*. You will see something like this:



While this is extracting is a good time to take a look at the download directory that you created, such as *C:\Oracle11g*. The Oracle11g directory should look something like this in detailed view.



An Oracle12c directory will look like this:



Notice that all of the Oracle files are being unzipped under the *database* folder. The unzipped files will not be much bigger than the compressed zip files, because all of the larger files that are being unzipped are compressed jar files, which cannot be compress much further.

After a few minutes the unzipping will finish, and you need to repeat these steps for the second file you downloaded. After unzipping both files, you have now completed the steps of downloading and unzipping Oracle. If you are short of disk space you can now delete the zip files.

Important: For your Oracle installation to succeed, the contents of the extraction of both zip files must end up in the same directory. Oracle has provided you with two files for a better download experience; however, the installer expects there to be a single directory structure containing all of the contents from both zip files. There are two primary ways to accomplish this. The first is to unzip each zip file into the same directory. The second is to unzip each zip file into different directories, but then manually copy the contents of the second directory into the first.

Step 4: Installing Oracle 11g

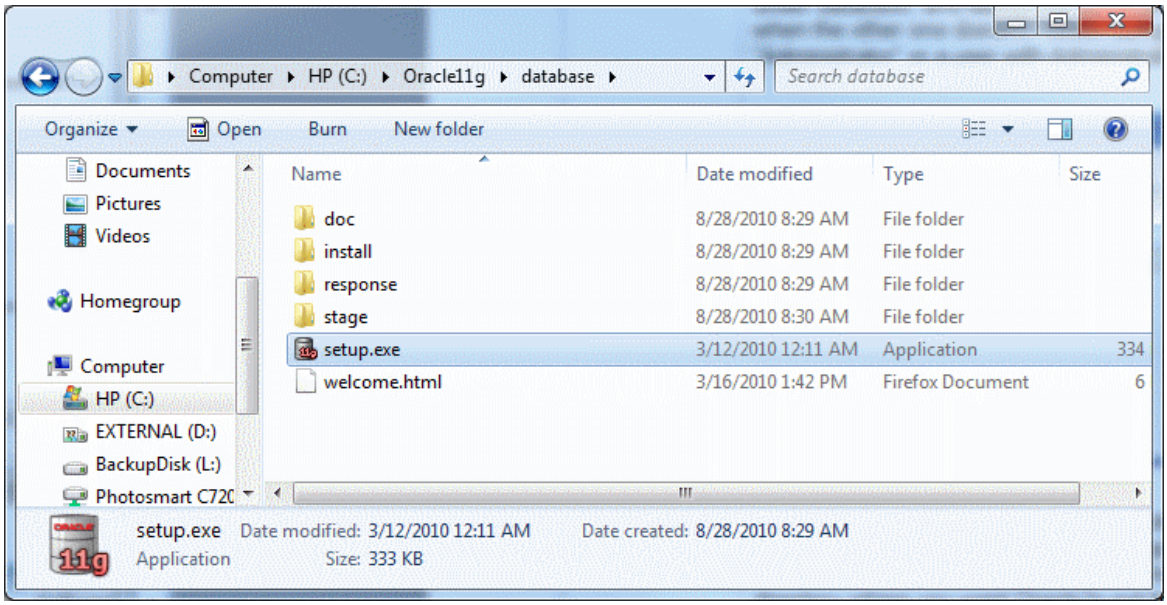
Introduction

This section contains step-by-step instructions for installing Oracle 11g from the unzipped files on your hard disk.

Before beginning the install you should download the latest Windows updates and close other applications on the machine. Closing other applications frees up resources for the install. If you have not done so already you should temporarily disable any on-access scanning in your antivirus software.

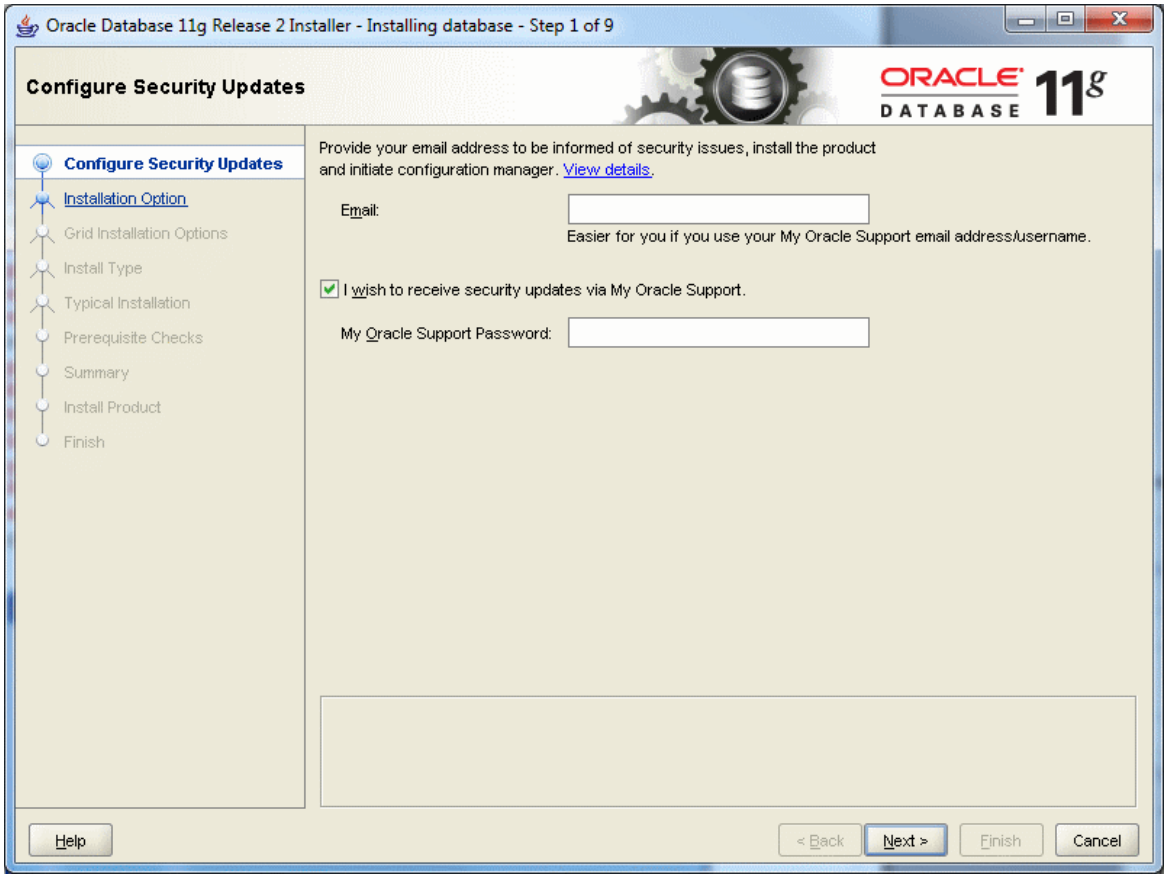
Install Oracle

Next launch the Oracle Installer by navigating to the database directory, then double-clicking on the file *setup.exe*.

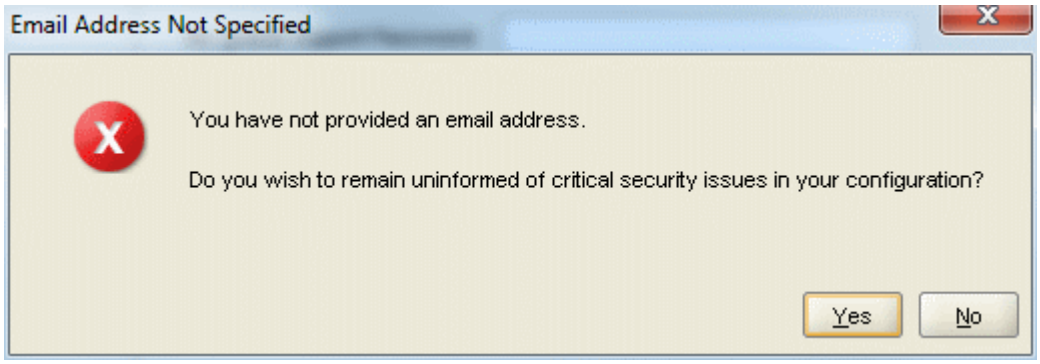


If the setup.exe program launches, but the Oracle installer doesn't start after a couple of minutes, there may be a problem with your Java installation. When using Windows 7 or 8, be sure to run the setup as "Administrator" or a user with Administrative privileges.

It may take several minutes for the Oracle Universal Installer to launch, during which time you will see a DOS-style text window reporting the checks before the launch. When the Oracle Universal Installer launches, you will see a screen like the following.

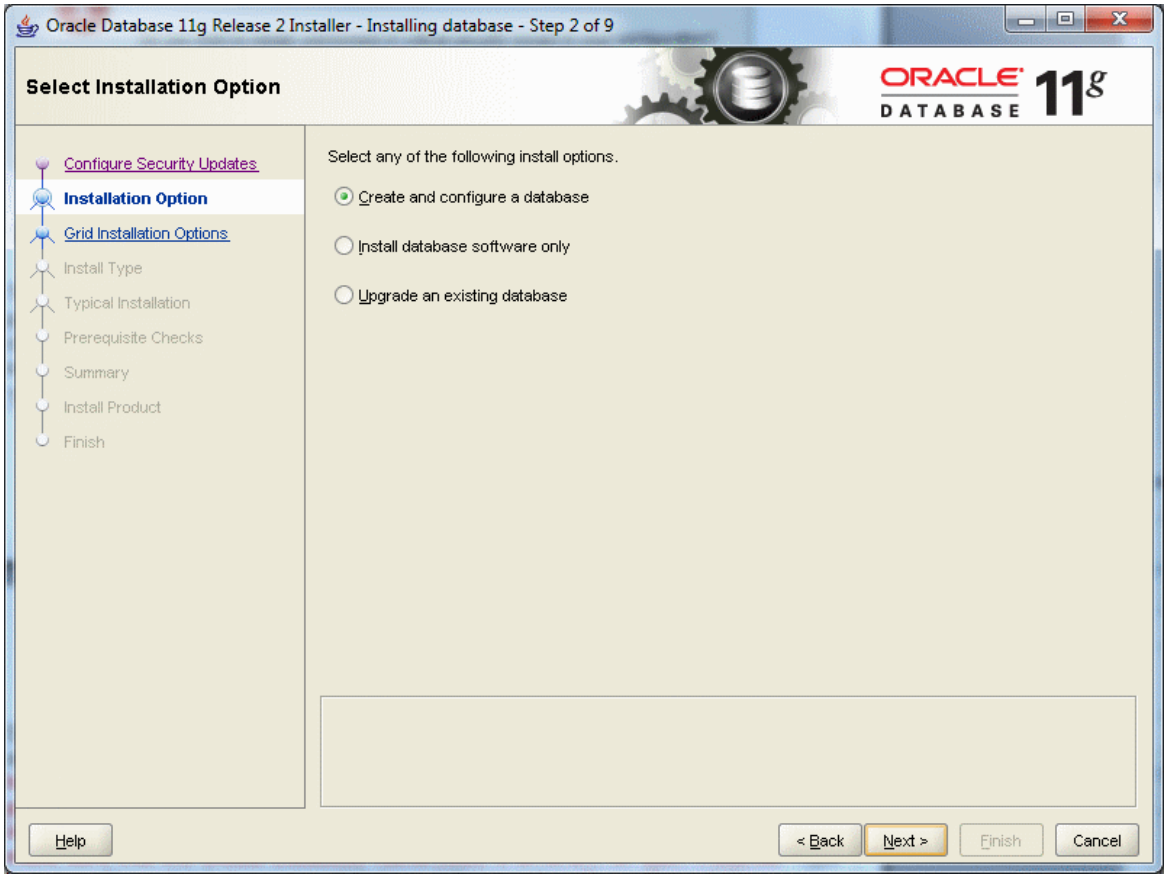


Click the Next > button, and you will see the following warning:



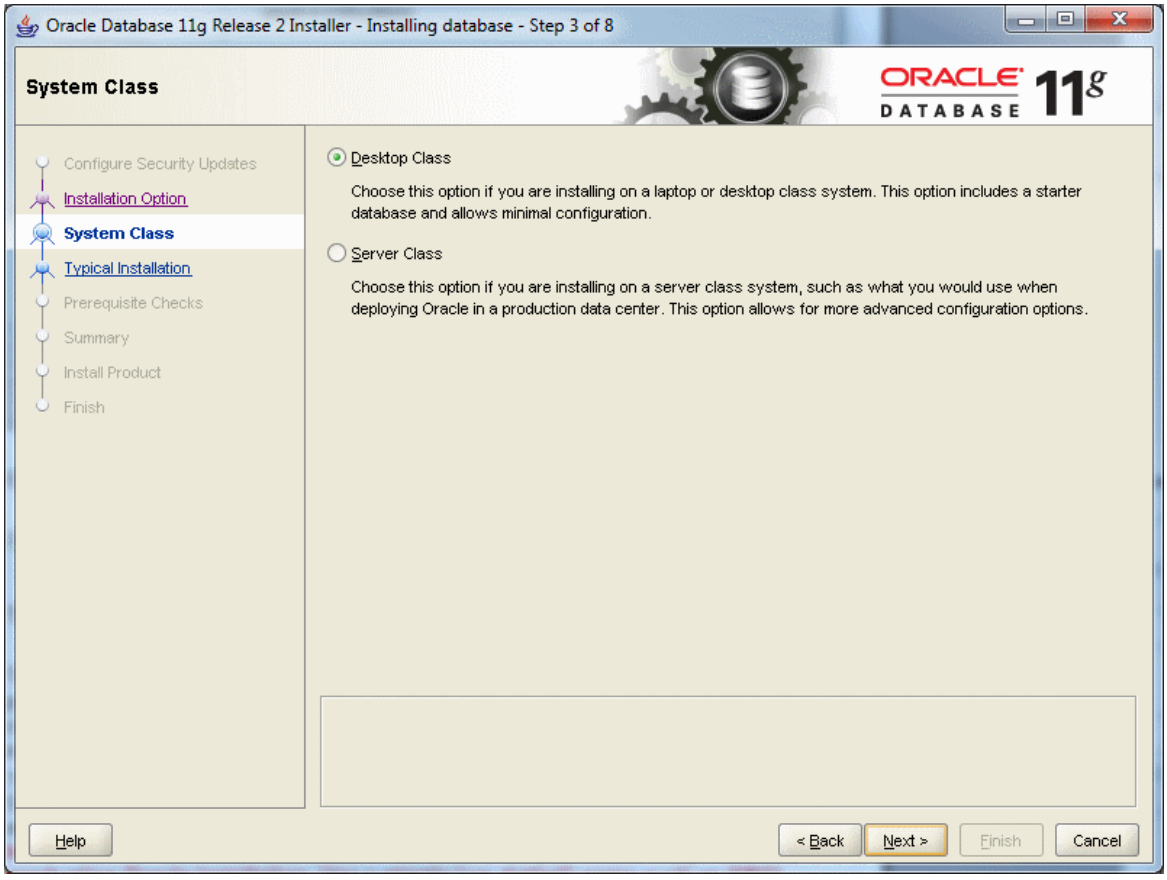
Click the Yes button.

The "Step 2 of 9" screen appears.



Ensure that the following radio button is selected:

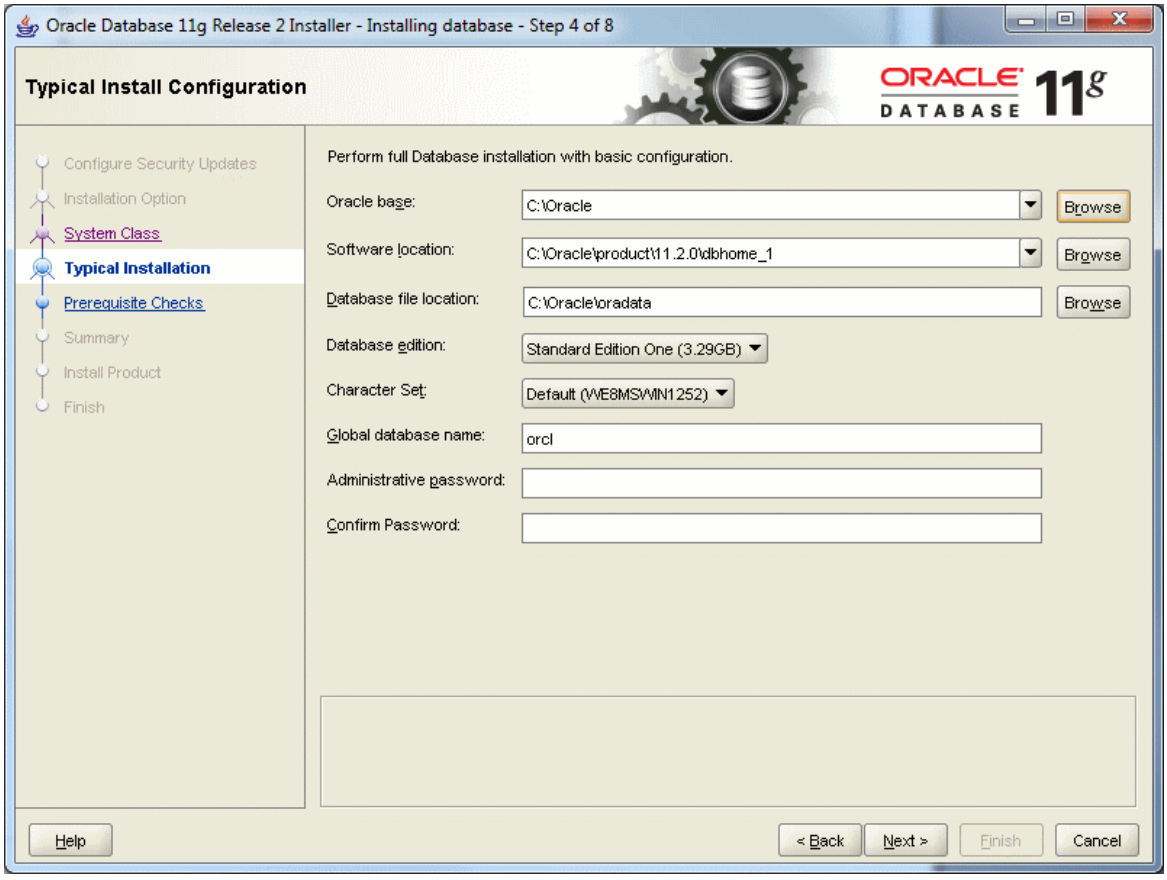
Then click the button. The following screen appears.



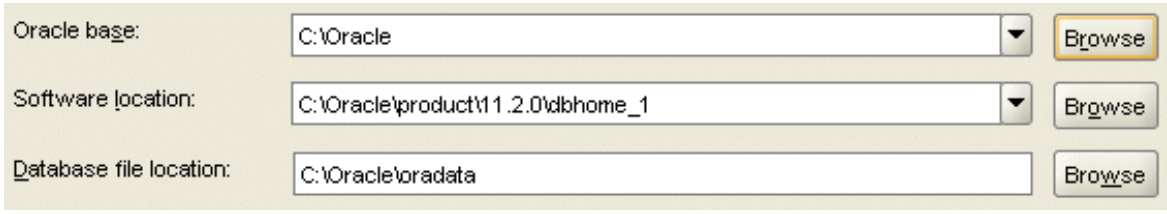
Ensure that the following radio button is selected:

Then click the

button. The next screen titled "Installing database - Step 4 of 8", appears.



There are many options to specify here, so we will go over each in turn. For purposes of the BU courses, it is usually sufficient to give an Oracle base of "C:\Oracle". When you do so, "Software location" and "Database file location" will be updated automatically to use this base. When the Oracle base has been changed, you should see the following:

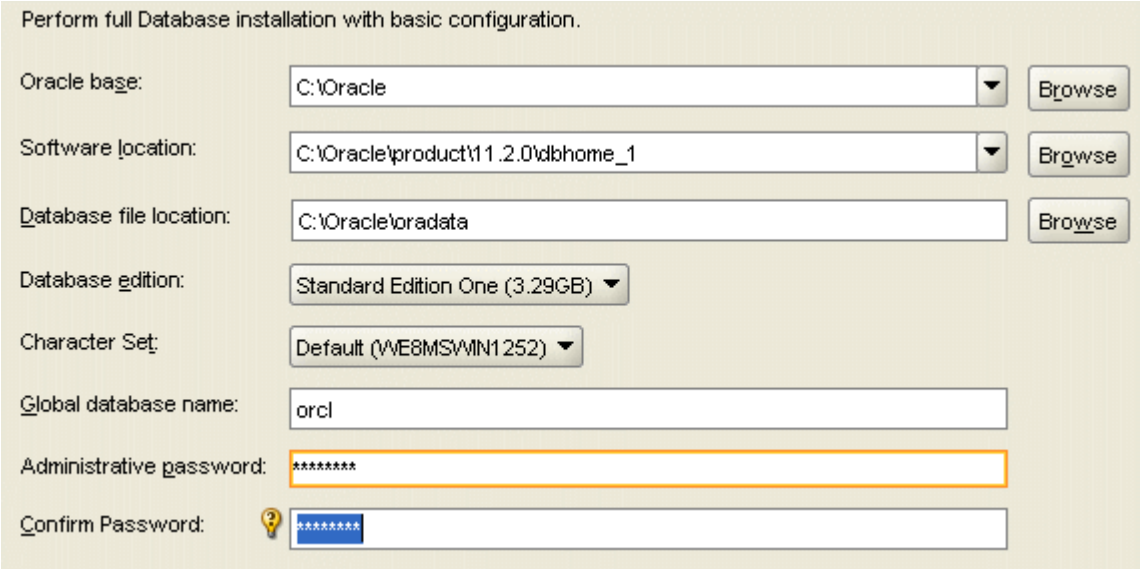


Unless you are in need of the advanced features of Enterprise Edition or Standard Edition, choose Standard Edition One for your database edition. Note that at Boston University, Enterprise Edition is only required for CS674 Database Security.

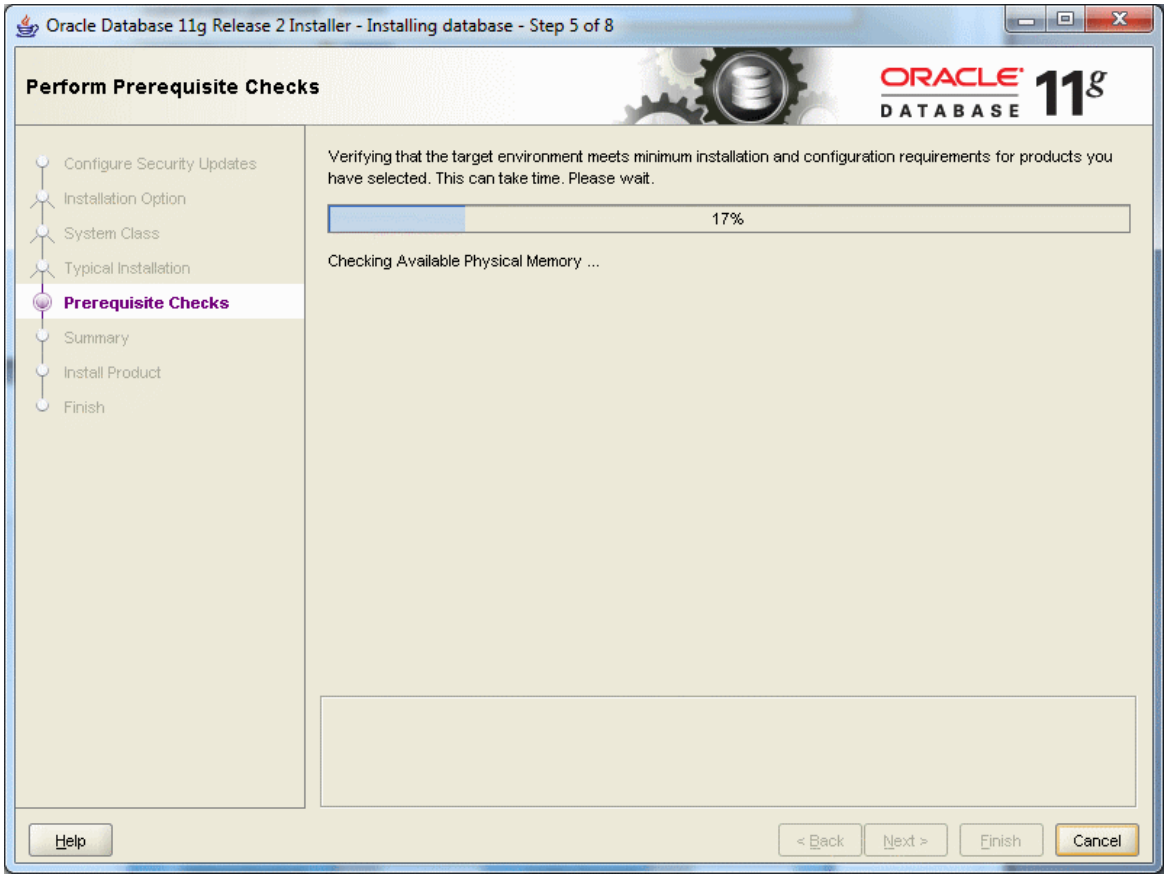
Do not modify the character set, and choose "ORCL" for your global database name. Type in a simple Global Database Name. **Do not use the domain.name Global Database Name format (e.g. myDomain.mySID) unless you have a domain controller and static IP for Oracle, as you would likely have in a production Oracle installation. Use a simple "un-dotted" name such as ORCL instead. If you have more than one Oracle instance running on your machine, make sure that the Global Database Name (SID) is different for each instance**.

Type in and confirm an administrative password that you will remember. **You will need this password later to create your user login, so you should write the password down. Keep the password simple. Security is not an issue for your student database, but forgetting your password can be a real problem if you can't login to your database later. For class databases I recommend the memorable password "password". If you don't follow these instructions and later can't remember your password see Appendix D for how to reset your SYSTEM password on Windows platforms without reinstalling Oracle.**

After all options have been entered, your screen will look like the following:



Click the Next > button. Oracle will now perform prerequisite checks to ensure that your system is compliant with its requirements.

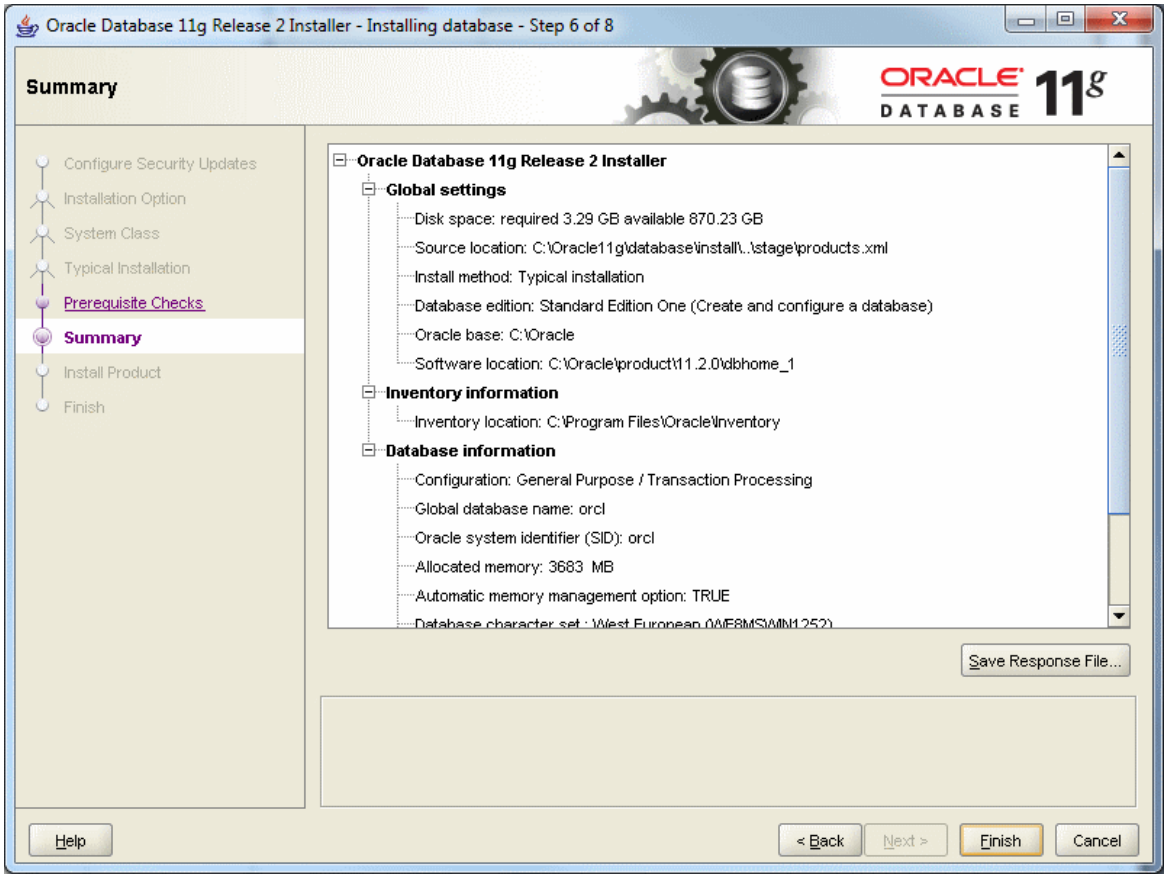


If all checks pass, you will only see this screen for a short time.

If all checks do not pass, the screen will inform you in what areas your system is not compliant with Oracle's requirements. The fix for each of these will be individualized to your system. A common prerequisite failure is the fact that your machine does not have a static IP address. Many desktops and laptops dynamically obtain their IP address through DHCP, and if so, you will need to install the Microsoft Loopback Adapter with a static IP address. Reference Appendix B for more information on installing and configuring the Microsoft Loopback Adapter.

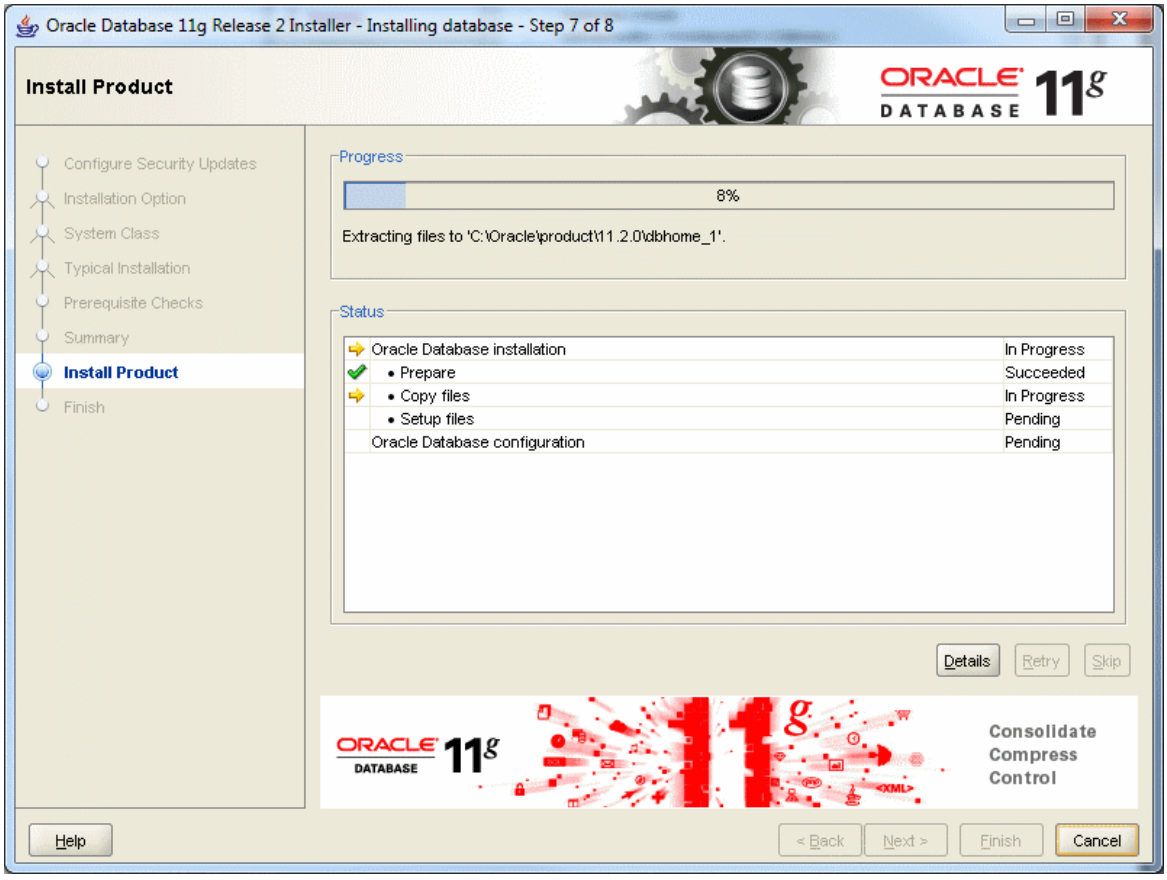
Another common prerequisite failure is that your PATH environment variable will exceed the maximum after Oracle appends its own directory. See the troubleshooting section, and Appendix E, for more information on how to solve this issue.

After all prerequisite checks pass, you will see a summary screen similar to the following:



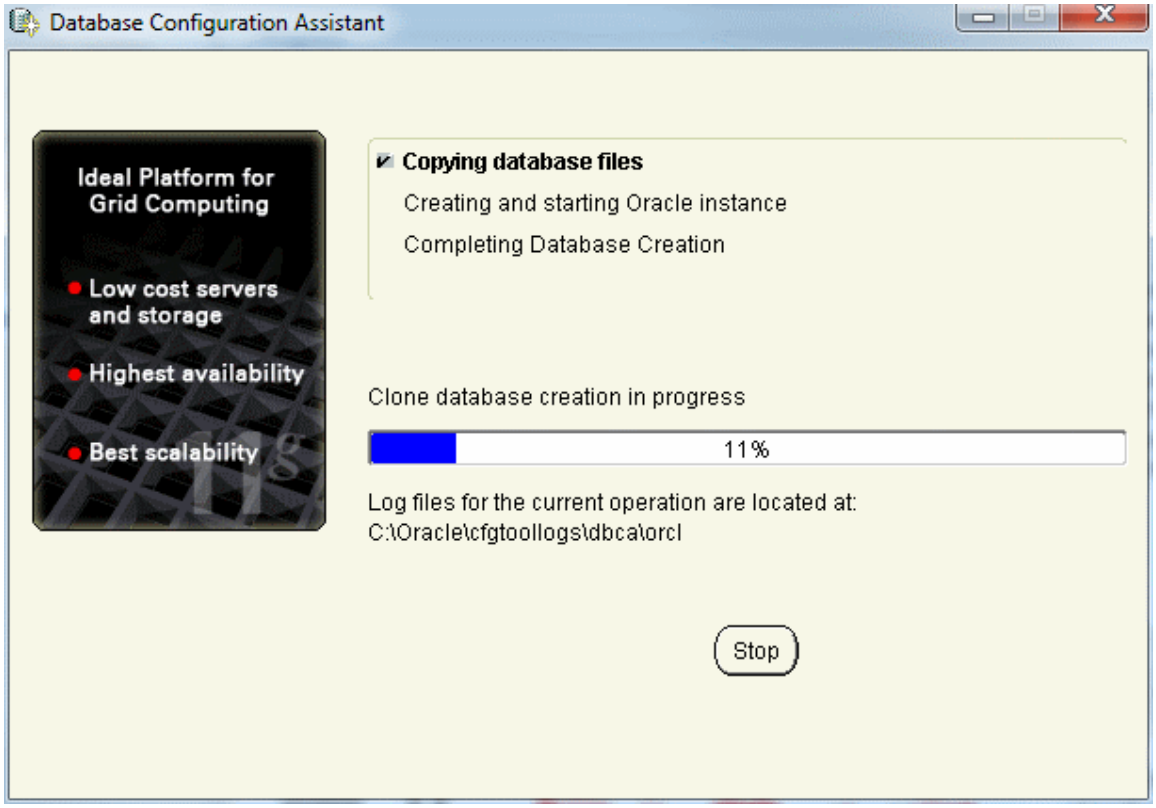
After reviewing the installation options, click the

button to begin installation. You will see an installation screen with a progress bar, and Oracle is now performing many steps to ensure a complete and successful installation. This step will take from between several minutes to an hour or so, depending on the speed of your computer. I usually try to glance over at the screen from time to time to see if there have been any exceptions that cause the Installer or Windows to ask me questions.



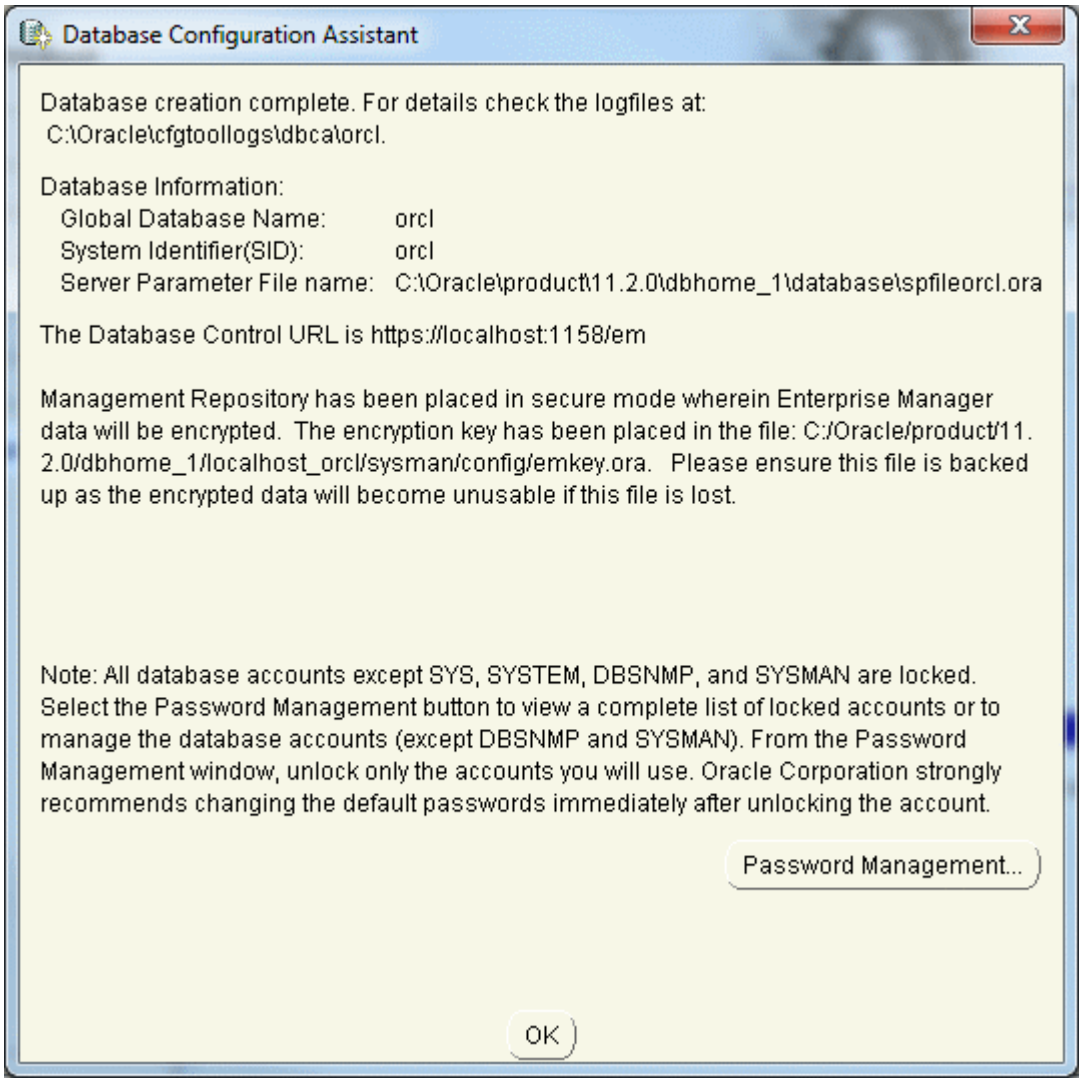
Configure the Oracle Install

When the main install finishes, the Oracle installer will launch the Database Configuration Assistant window.

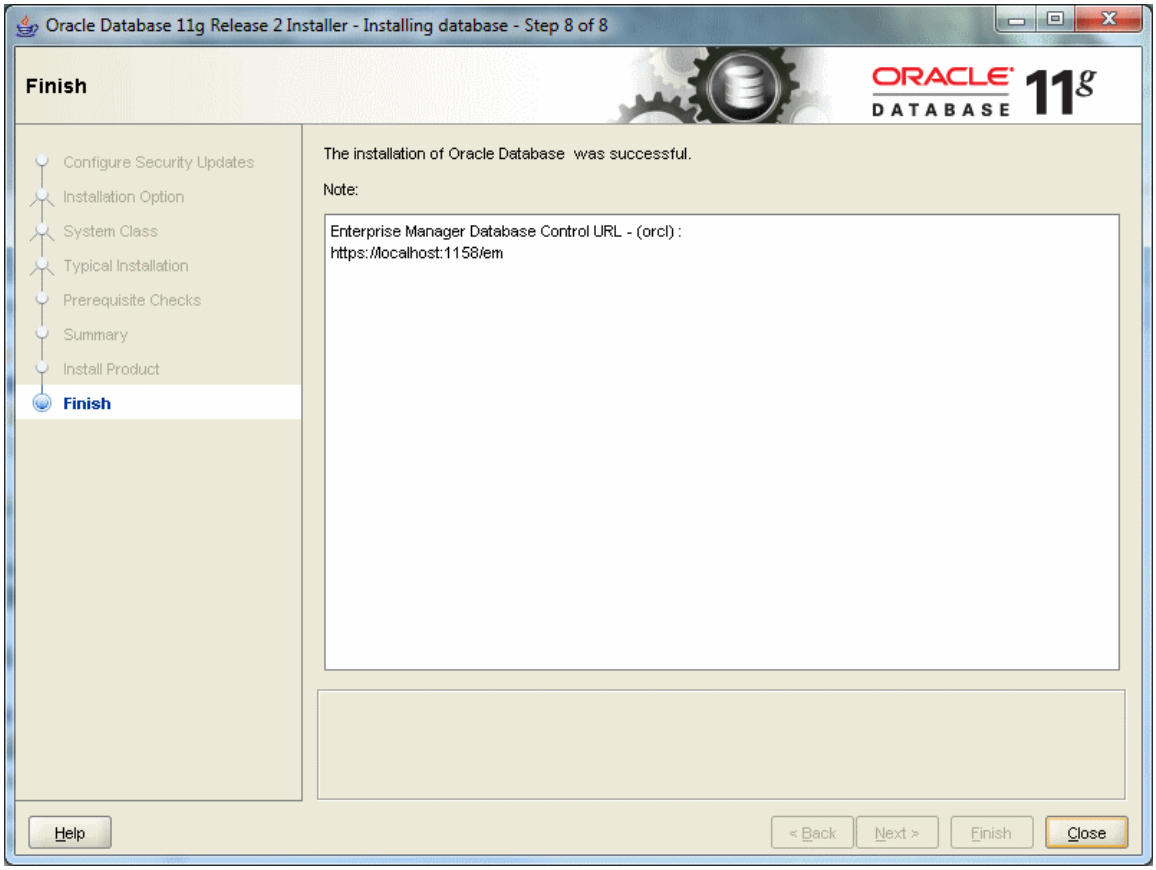


If you see the following popup from Windows Firewall, just click *Unblock*. You may see this several times. Your machine may be very sluggish when the database creation assistant is running. This is normal.

Typically the database configuration assistant will complete successfully without requiring any interaction from you. When completed, the Oracle installer will display the following window:



Click the "OK" button, and you will see the following screen, which indicates that the database configuration was successful:

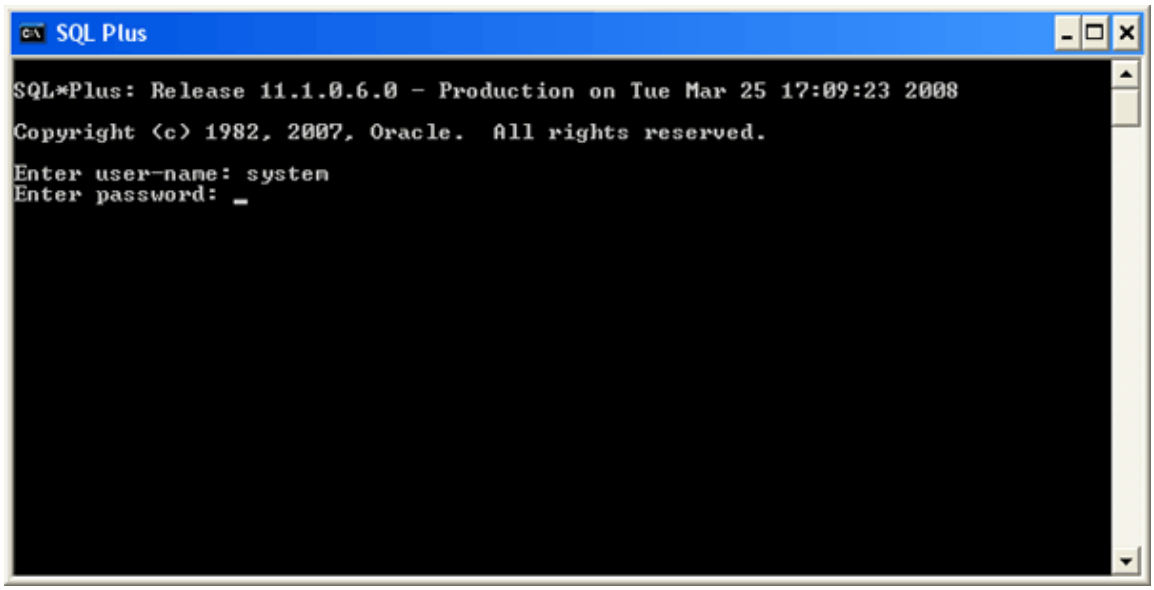


Click the "CLOSE" button, and the Oracle installer will exit.

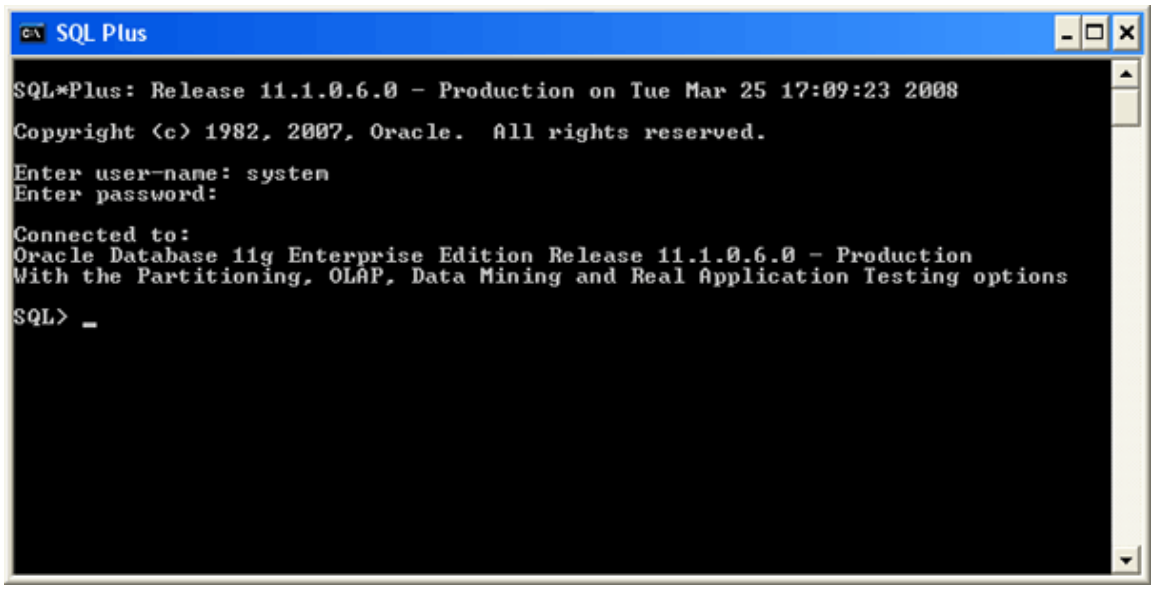
Verify a Successful Install

To verify that the install was successful, we will connect to our new Oracle instance.

Go to Start / All Programs/Oracle – OraDb11g_home1 / Application Development and launch SQLPlus. Fill in the username with SYSTEM, and type in the password that you chose during the install. You do not need to enter a Host String if your Oracle database is on the same machine as SQLPlus.



Click OK to login. If you see a screen similar to the following, then Oracle has successfully run many production-strength integrity checks against the database and allowed you to connect.



Congratulations! You have now successfully installed Oracle, started the database, and verified that it is accepting connections.

Installing Oracle 12c

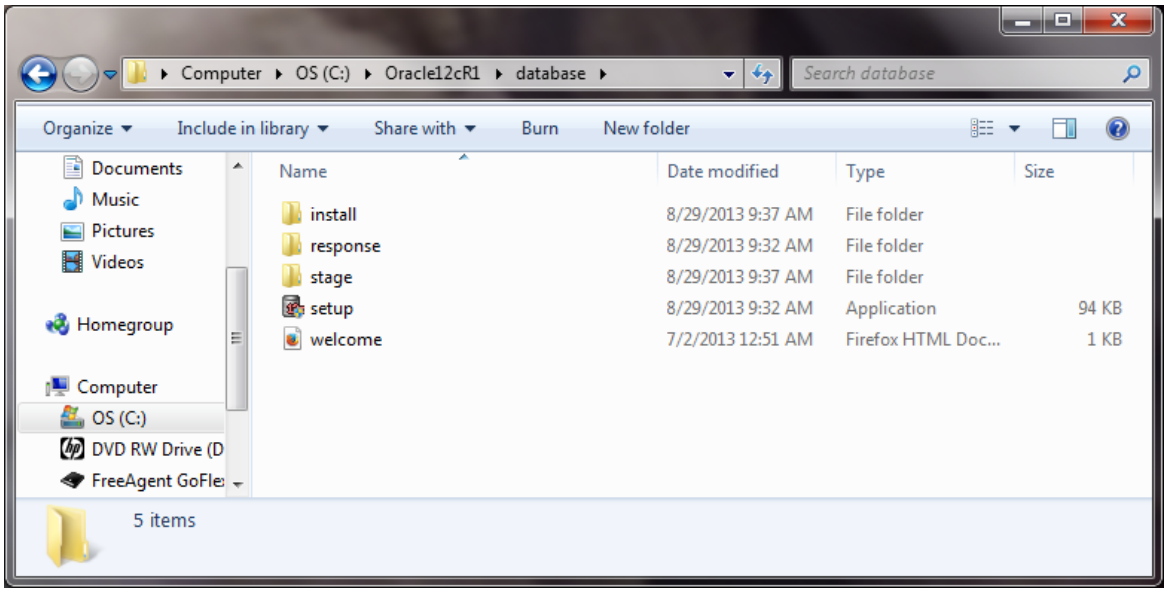
Introduction

This section contains step-by-step instructions for installing Oracle 12c from the unzipped files on your hard disk.

Before beginning the install you should download the latest Windows updates and close other applications on the machine. Closing other applications frees up resources for the install. If you have not done so already you should temporarily disable any on-access scanning in your antivirus software.

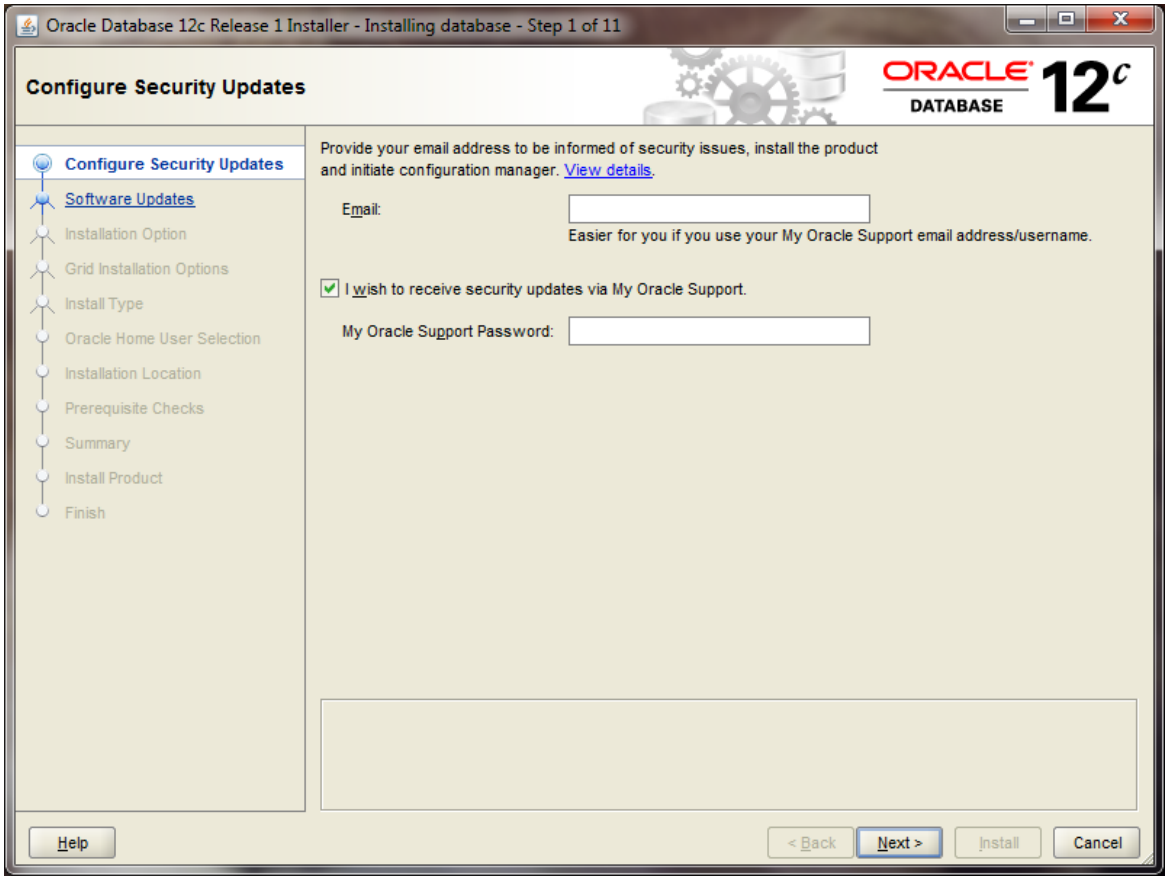
Install Oracle

Next launch the Oracle Installer by navigating to the database directory, then double-clicking on the file *setup.exe*.

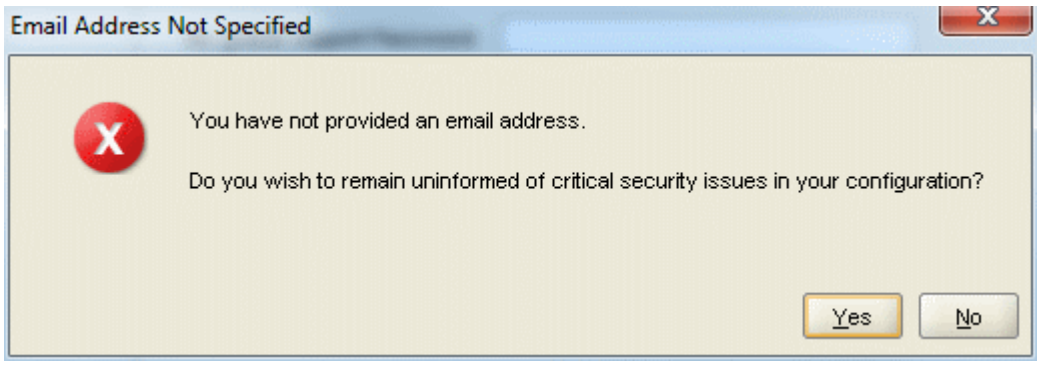


If the setup.exe program launches, but the Oracle installer doesn't start after a couple of minutes, there may be a problem with your Java installation. When using Windows 7 or Windows 8, right click on *setup.exe* as choose the option "Run as Administrator".

It may take several minutes for the Oracle Universal Installer to launch, during which time you will see a DOS-style text window reporting the checks before the launch. When the Oracle Universal Installer launches, you will see a screen like the following.

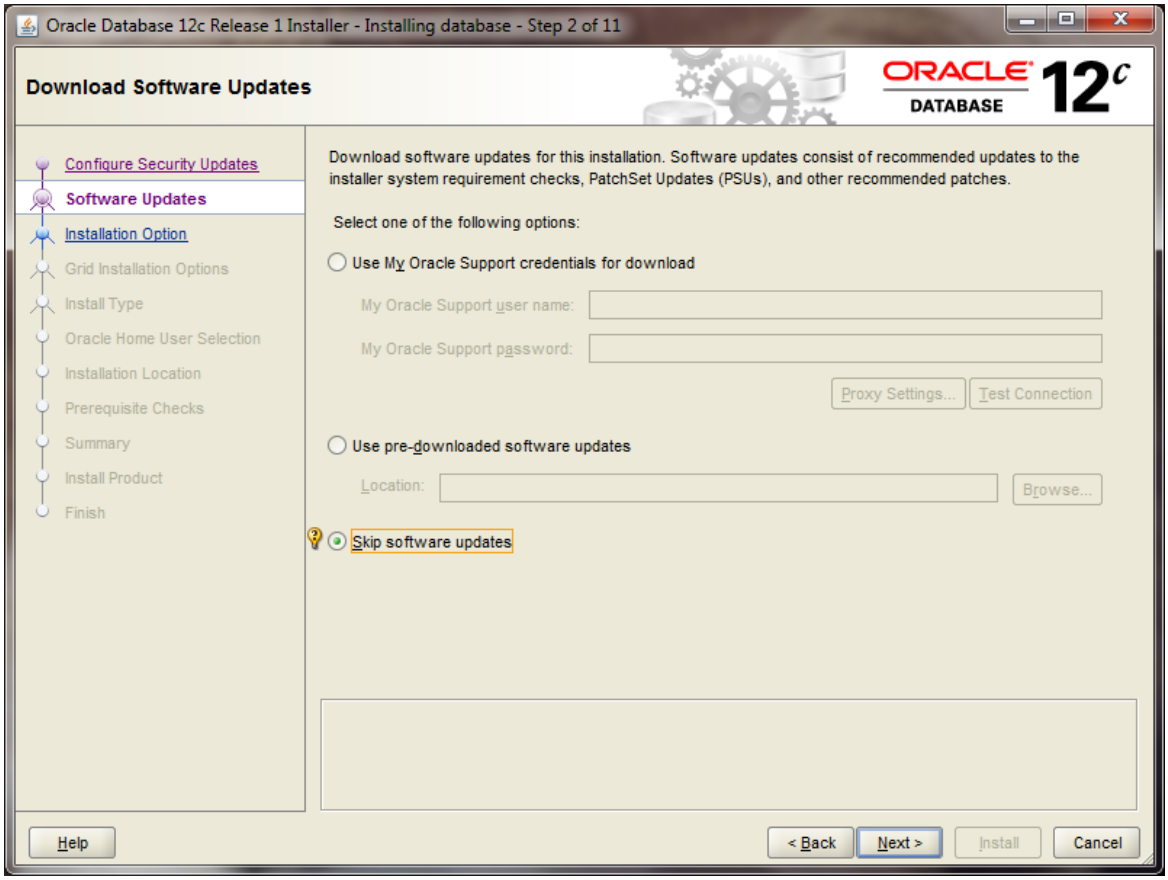


Click the Next > button, and you will see the following warning:



Click the Yes button.

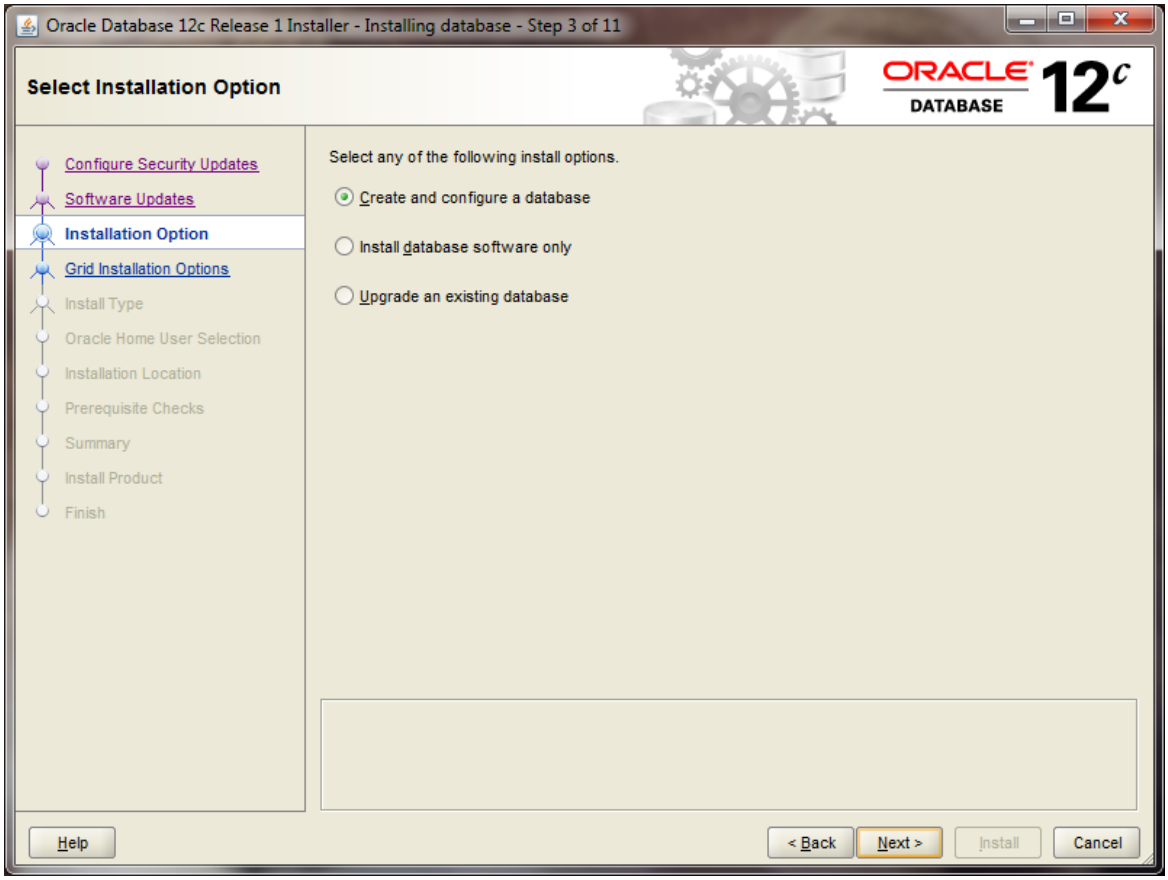
The "Step 2 of 11" screen appears.



Ensure that the following radio button is selected:

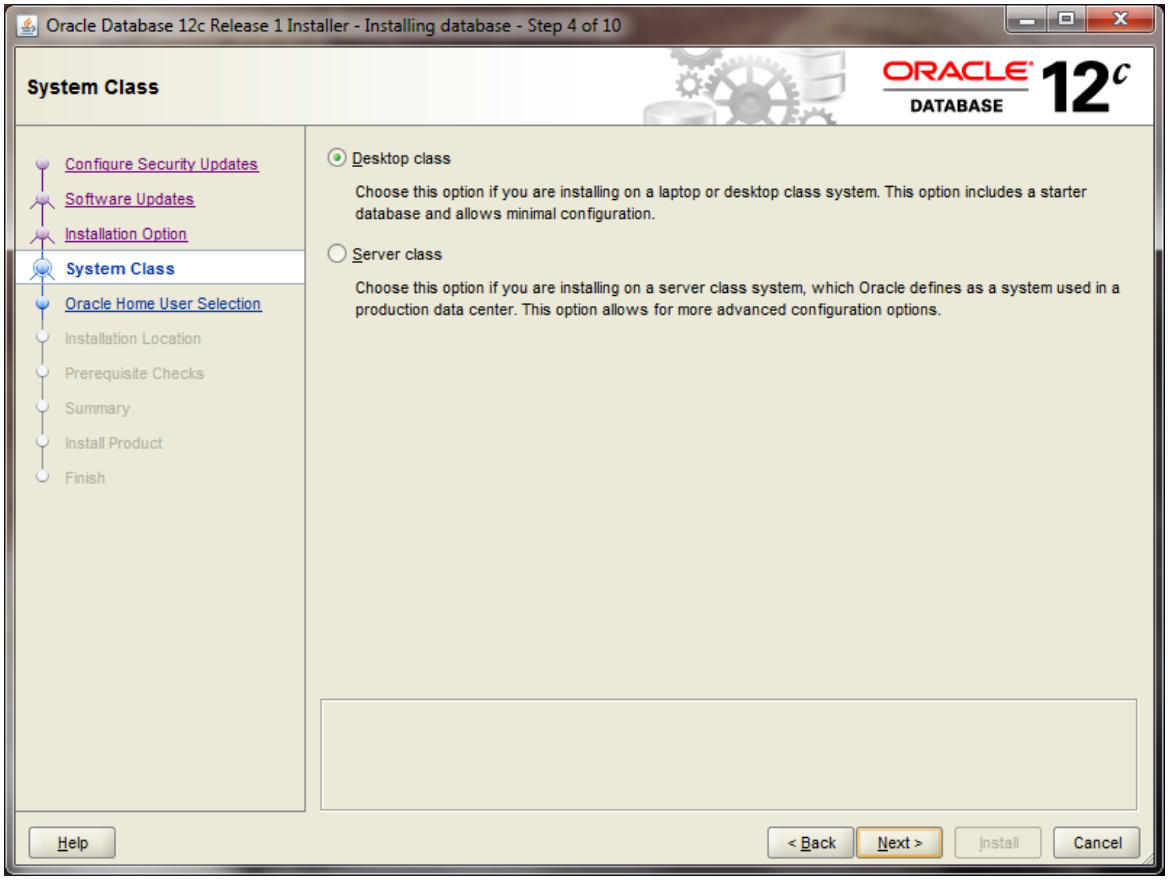
Then click the

button. The following screen appears.



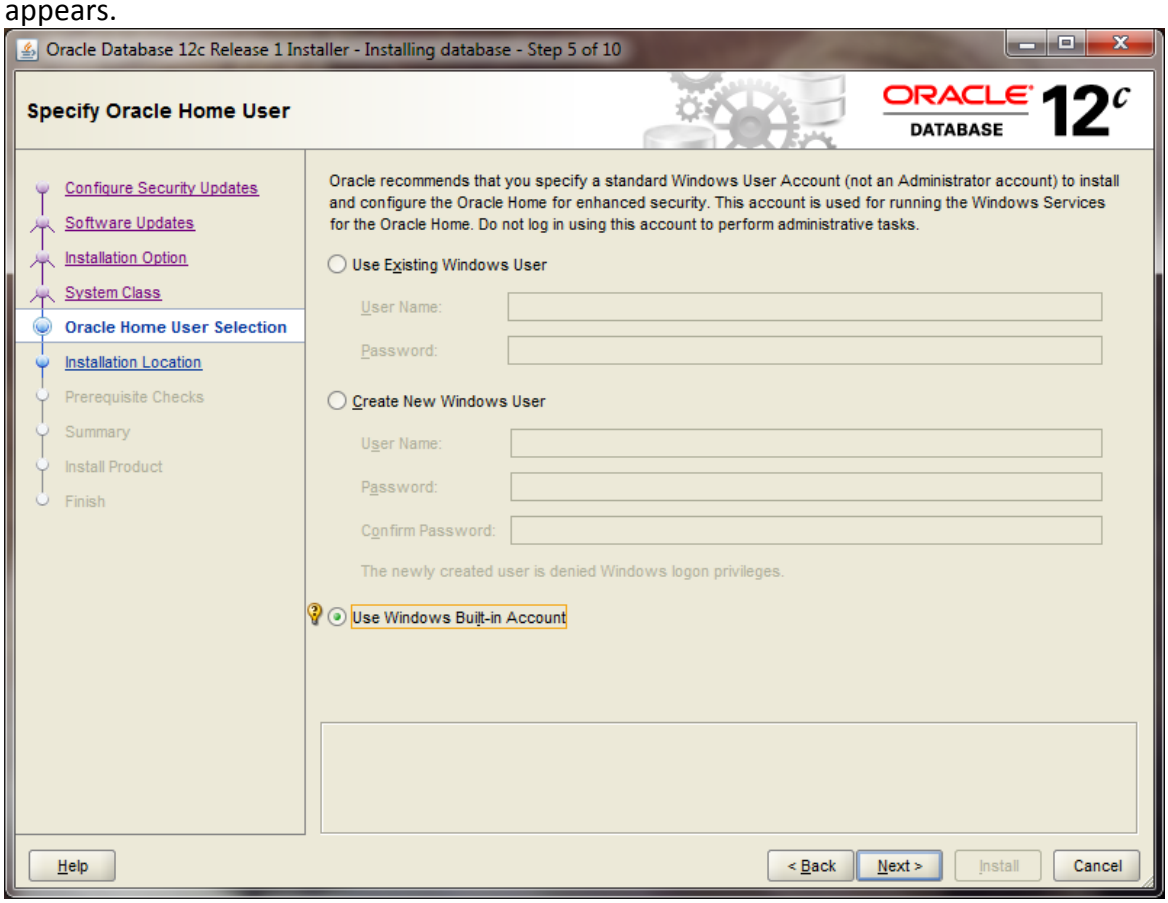
Ensure that the following radio button is selected:

Then click the button. The following screen appears.



Ensure that the following radio button is selected:

Then click the Next > button. The next screen titled "Installing database - Step 5 of 10", appears.

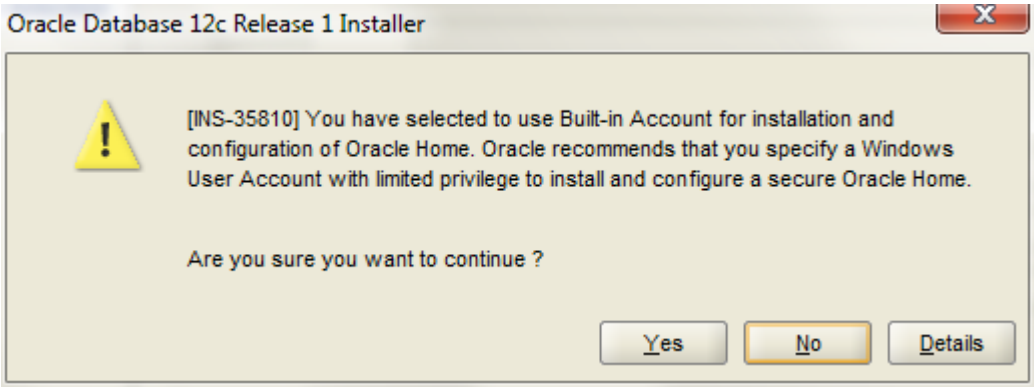


You have three options for this screen:

1. “Use Existing Windows User” will let you use the account you’re logged in with provided the account does not have Administrator privileges.
2. “Create New Windows User” will create a new local Windows user for the account which will not have Administrator privileges.
3. “Use Windows Built-in Account” will use the built-in account on Windows.

In a production environment, it is better to use a standard Windows account rather than the Windows Built-in Account for additional security. For our purposes, the Windows Built-in Account will be fine.

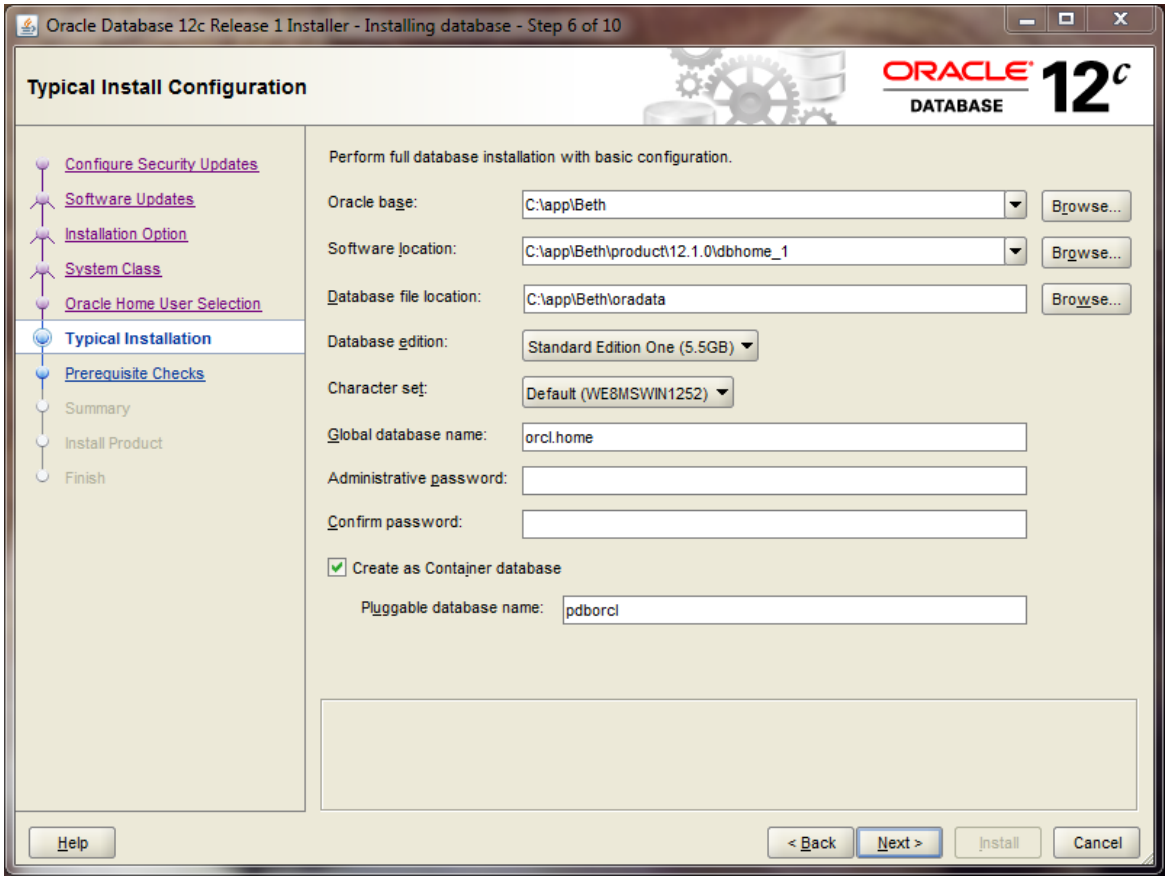
Selecting the Built-in Account may bring up this message



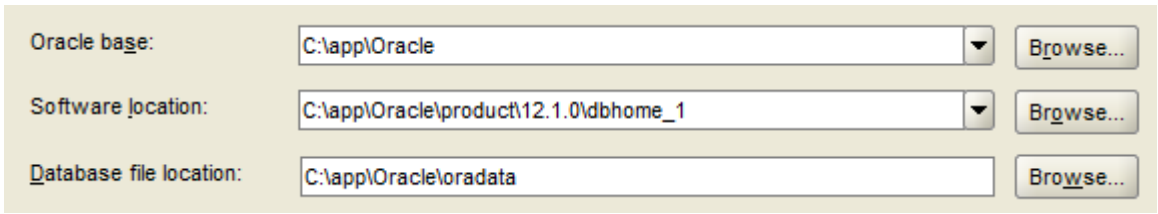
Select “Yes” to continue.

You should now see this screen:

NOTE: There are important parameters that must be checked on this screen so that the installation of the software and the creation of your database will complete successfully. GO SLOWLY !



There are many options to specify here, so we will go over each in turn. The default "Oracle base" pathname is *drive:\app\UserName*. When you change this, "Software location" and "Database file location" will be updated automatically to use this base. When the Oracle base has been changed, you should see the following:

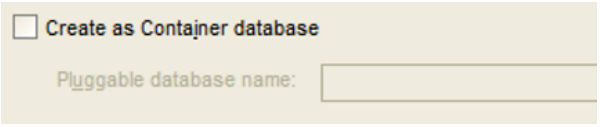


Unless you are in need of the advanced features of Enterprise Edition or Standard Edition, choose Standard Edition One for your database edition. Note that at Boston University, Enterprise Edition is only required for CS674 Database Security.

Do not modify the character set, and choose "ORCL" for your global database name. Type in a simple Global Database Name. **Do not use the domain.name Global Database Name format (e.g. myDomain.mySID) unless you have a domain controller and static IP for Oracle, as you would likely have in a production Oracle installation. Use a simple "un-dotted" name such as ORCL instead. If you have more than one Oracle instance running on your machine, make sure that the Global Database Name (SID) is different for each instance**.

Type in and confirm an administrative password that you will remember. **You will need this password later to create your user login, so you should write the password down. Keep the password simple. Security is not an issue for your student database, but forgetting your password can be a real problem if you can't login to your database later. Oracle requires that a password should have more than 8 characters, and combine both letters and numbers. If you later can't remember your password see Appendix D for how to reset your SYSTEM password on Windows platforms without reinstalling Oracle.**

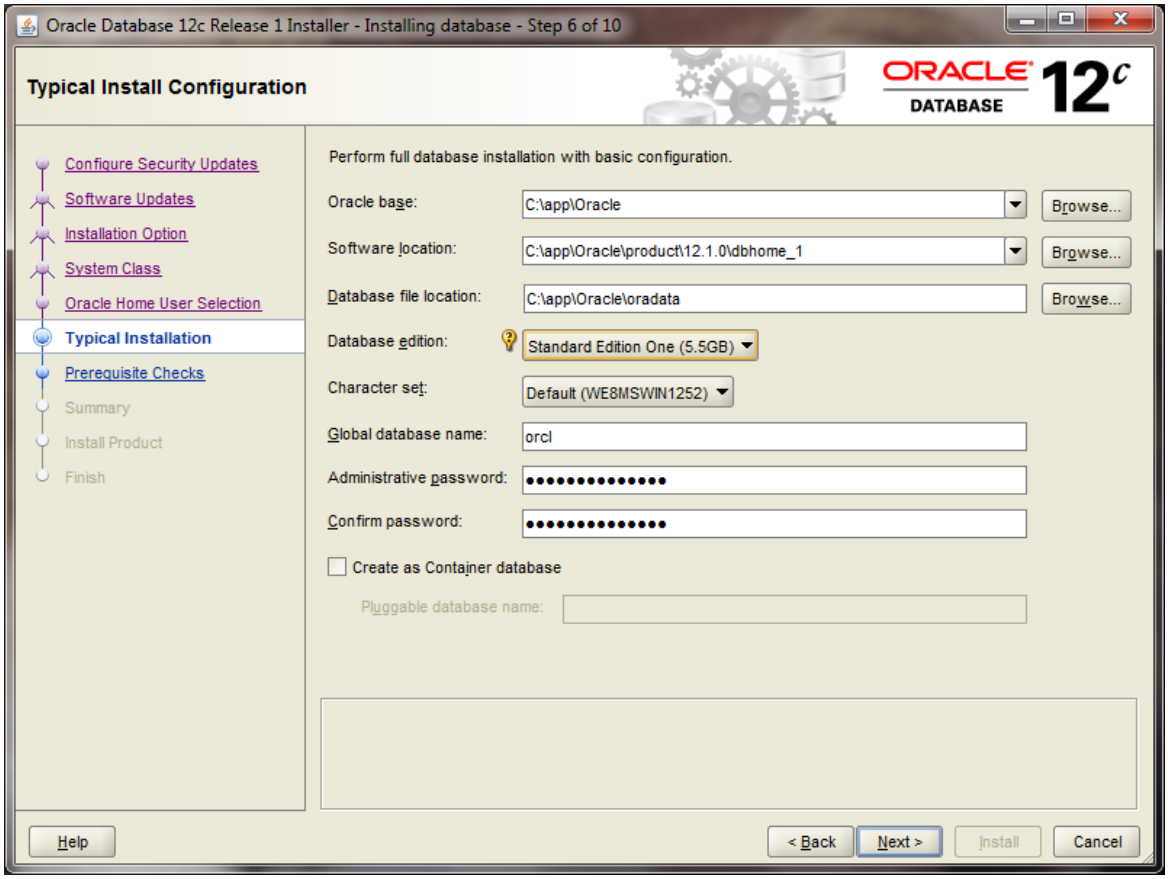
Next you see this option on the screen:



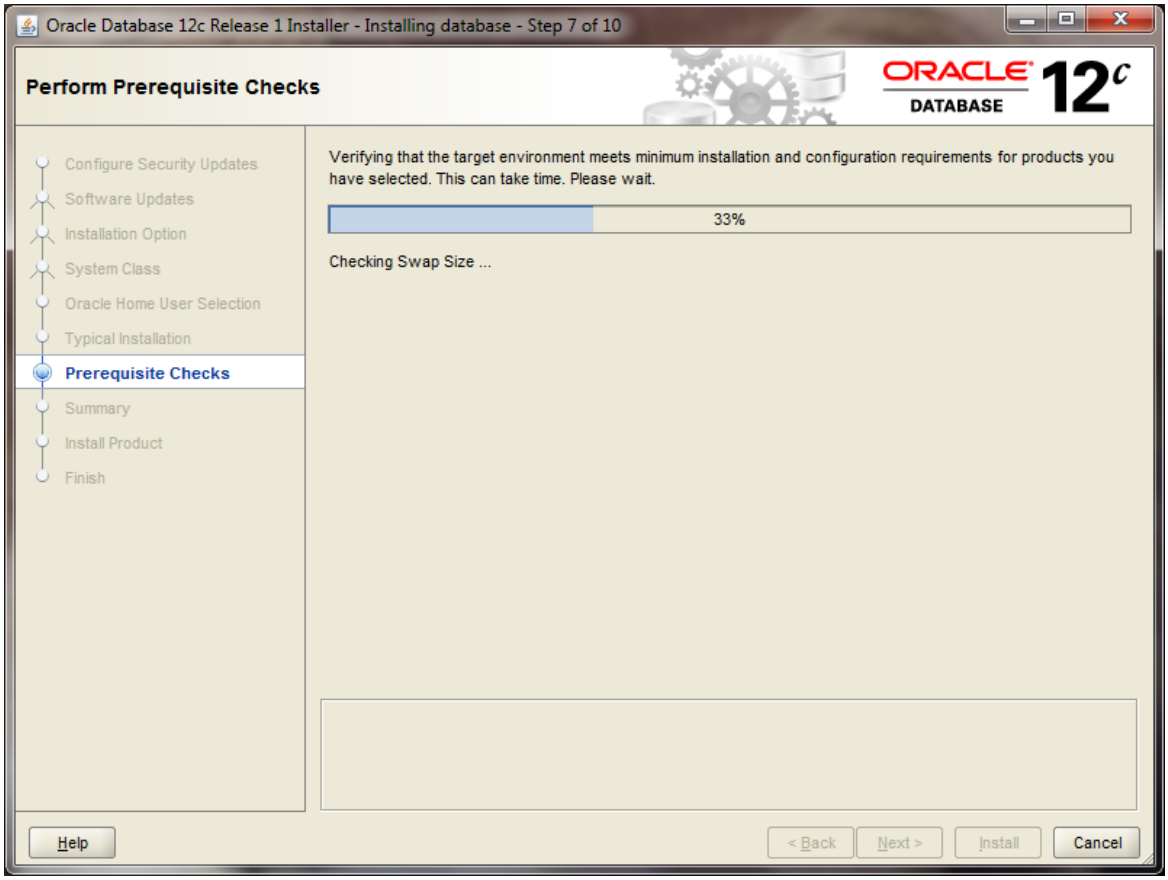
Make sure to *uncheck* this option. A "Container Database" is a concept new with Oracle 12c, and you do not need a container database for BU courses. Using a

container database will make your database harder to use, and will cause some steps in this installation guide to fail.

After all options have been entered, your screen will look like the following:



Click the button. Oracle will now perform prerequisite checks to ensure that your system is compliant with its requirements.

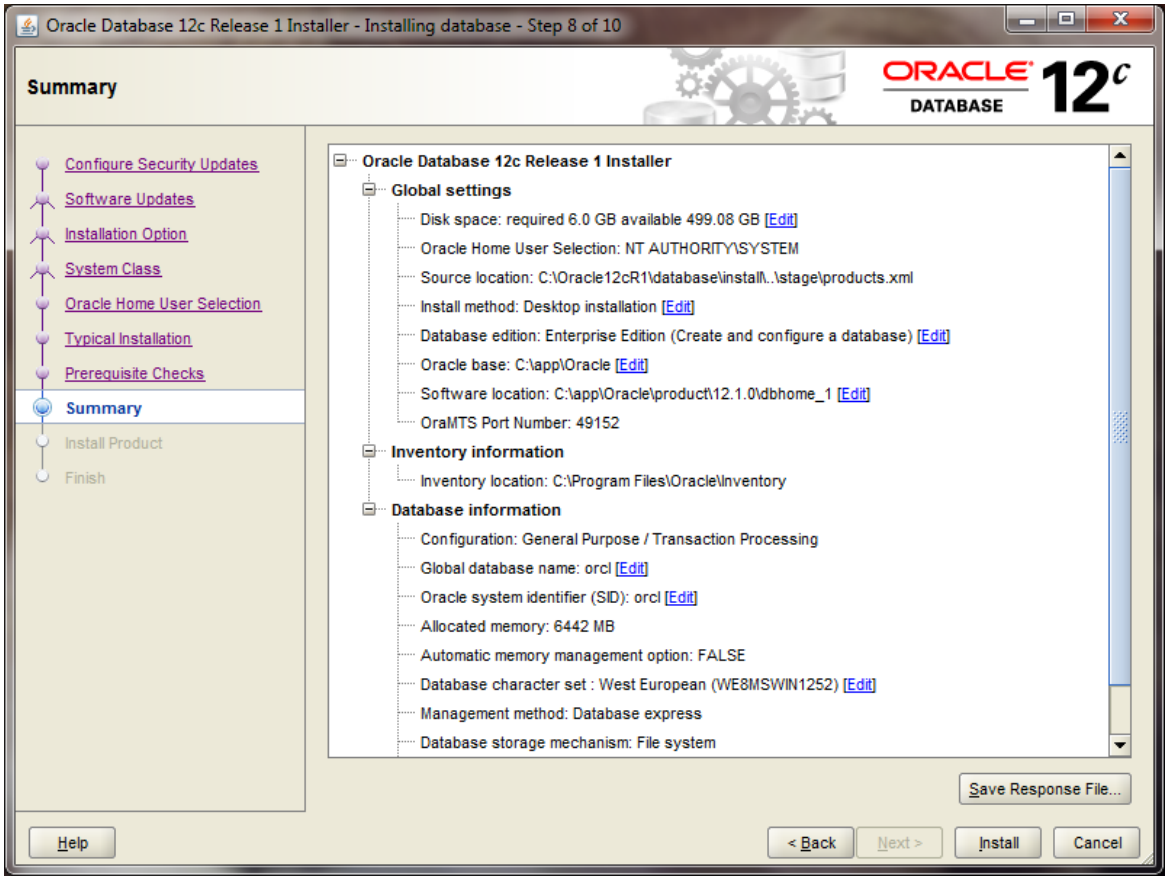


If all checks pass, you will only see this screen for a short time.

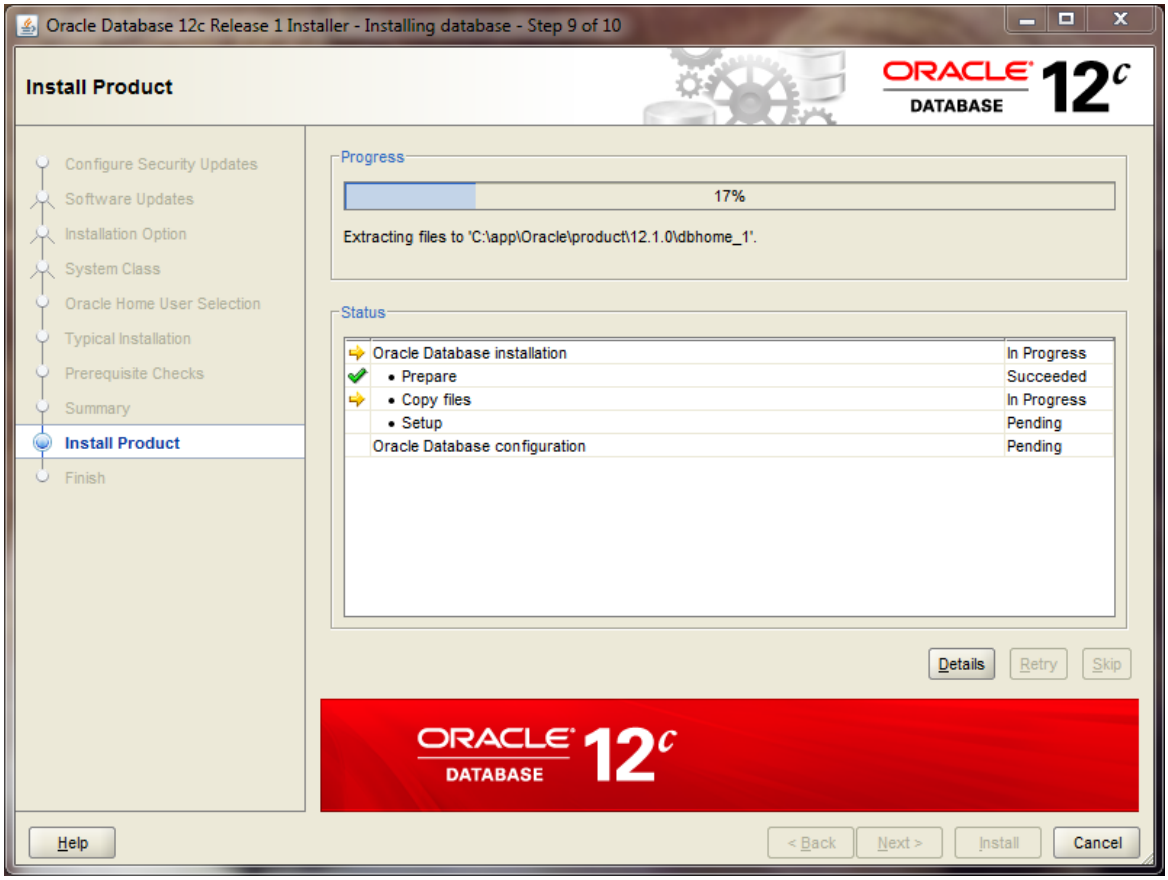
If all checks do not pass, the screen will inform you in what areas your system is not compliant with Oracle's requirements. The fix for each of these will be individualized to your system. A common prerequisite failure is the fact that your machine does not have a static IP address. Many desktops and laptops dynamically obtain their IP address through DHCP, and if so, you will need to install and the Microsoft Loopback Adapter with a static IP address. Reference Appendix B for more information on installing and configuring the Microsoft Loopback Adapter.

Another common prerequisite failure is that your PATH environment variable will exceed the maximum after Oracle appends its own directory. See the troubleshooting section, and Appendix E, for more information on how to solve this issue.

After all prerequisite checks pass, you will see a summary screen similar to the following:

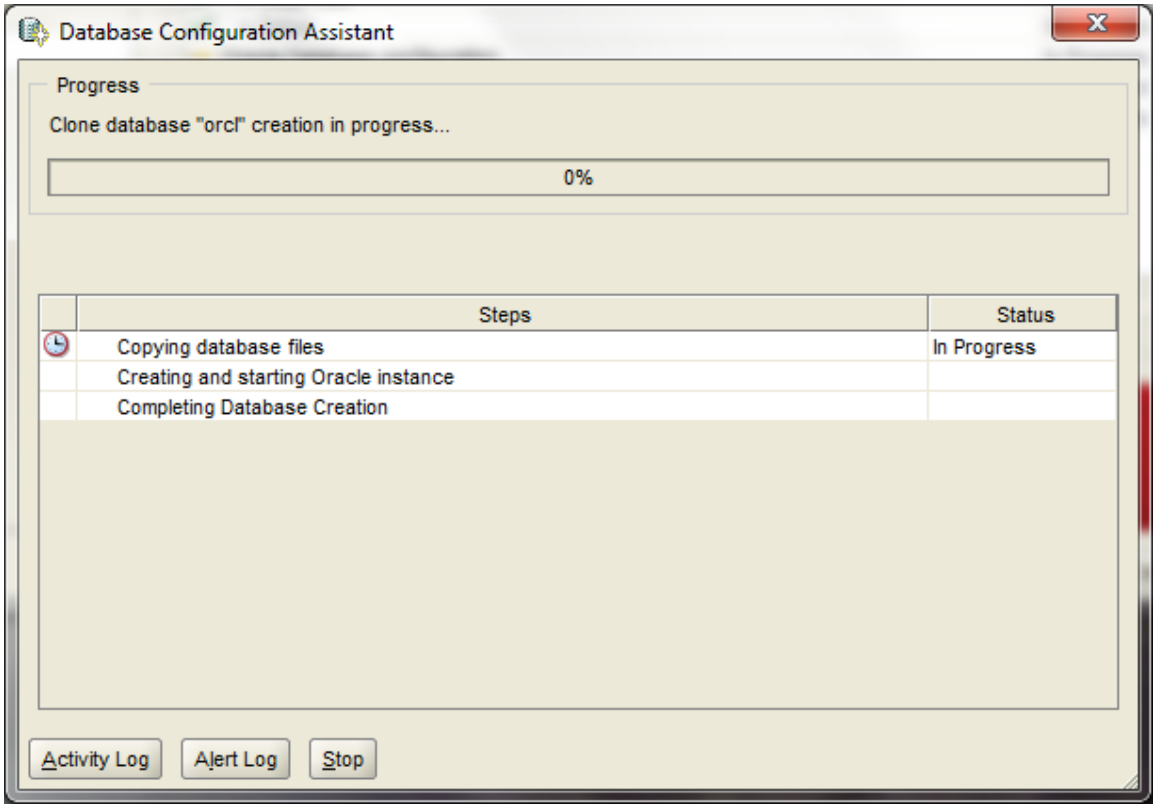


After reviewing the installation options, click the button to begin installation. You will see an installation screen with a progress bar, and Oracle is now performing many steps to ensure a complete and successful installation. This step will take from between several minutes to an hour or so, depending on the speed of your computer. I usually try to glance over at the screen from time to time to see if there have been any exceptions that cause the Installer or Windows to ask me questions.



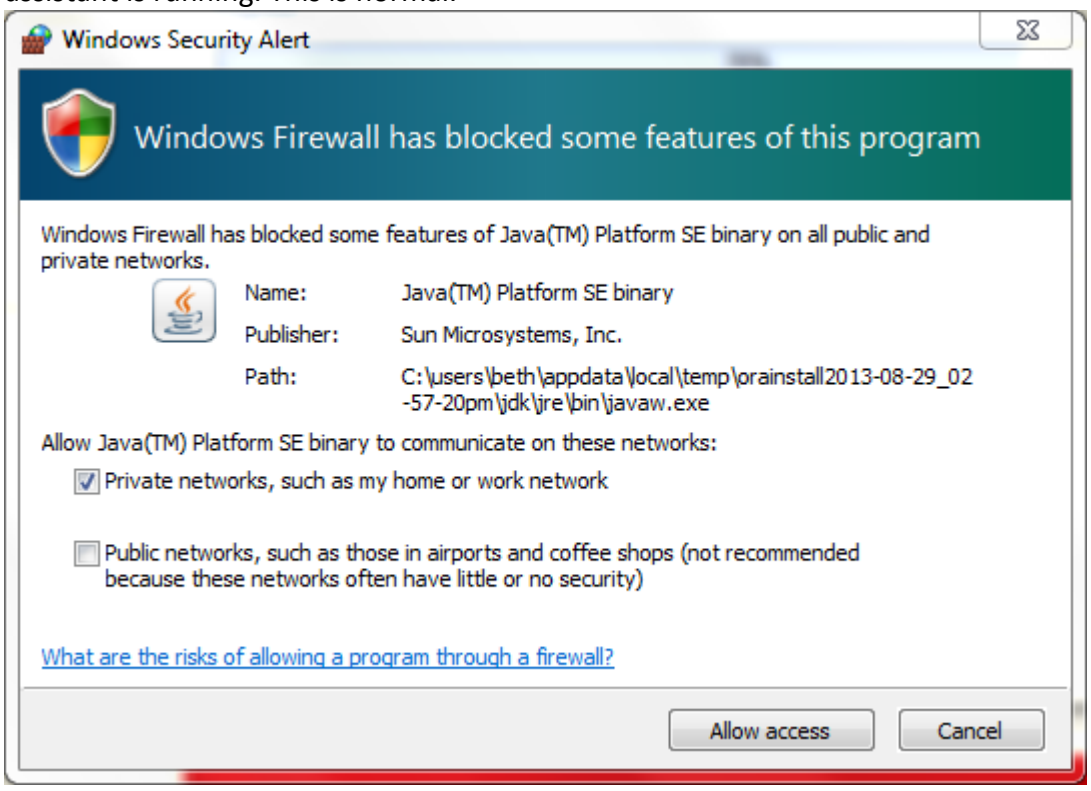
Configure the Oracle Install

When the main install finishes, the Oracle installer will launch the Database Configuration Assistant window.

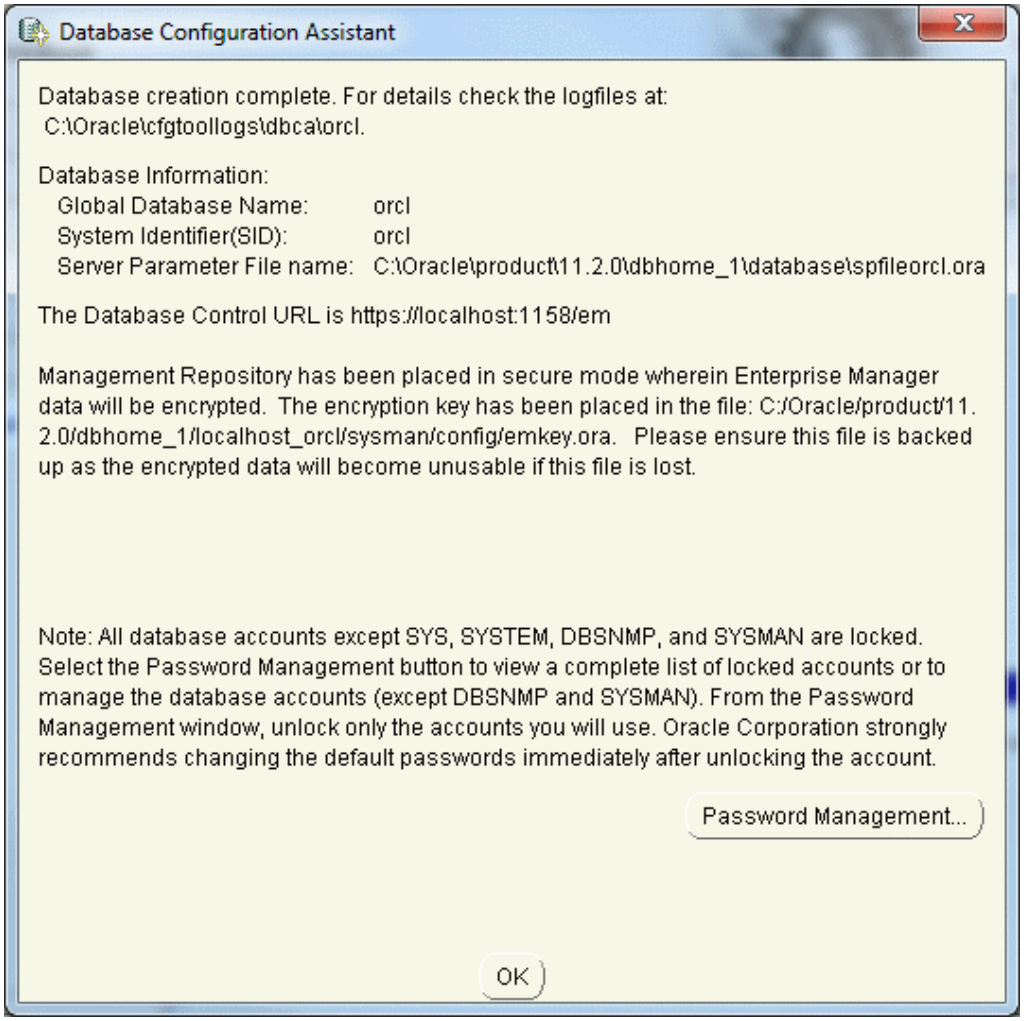


If you see the following popup from Windows Firewall, just click *Allow access.* You may see this several times. Your machine may be very sluggish when the database creation

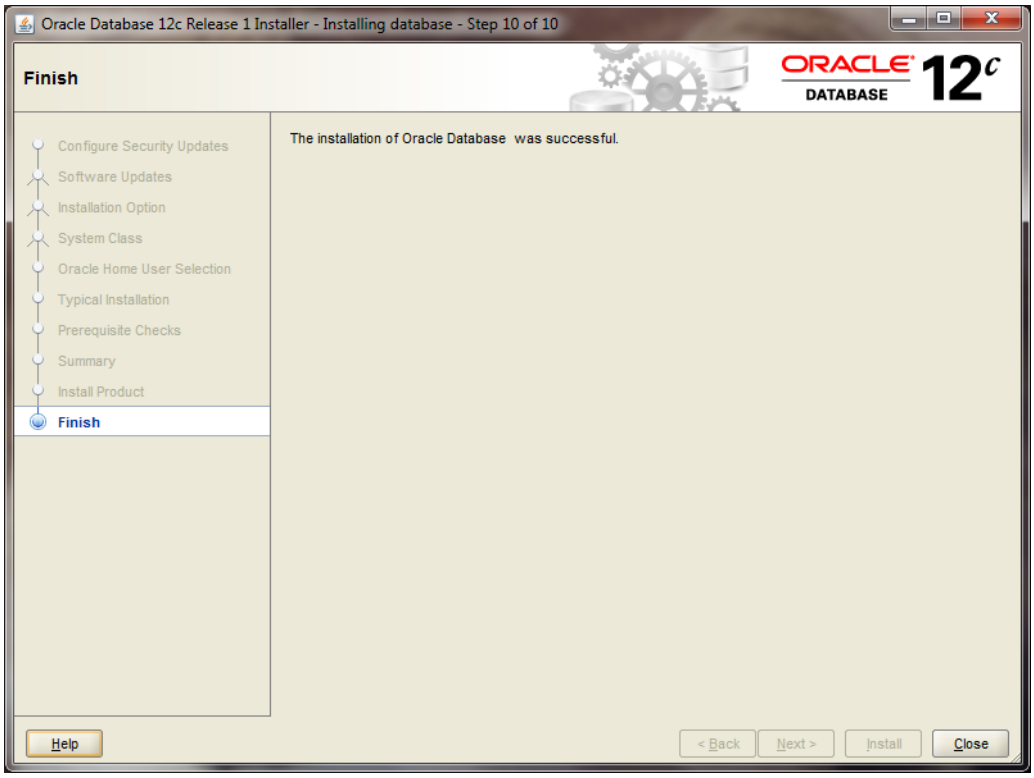
assistant is running. This is normal.



Typically the database configuration assistant will complete successfully without requiring any interaction from you. When completed, the Oracle installer will display the following window:



Click the "OK" button, and you will see the following screen, which indicates that the database configuration was successful:

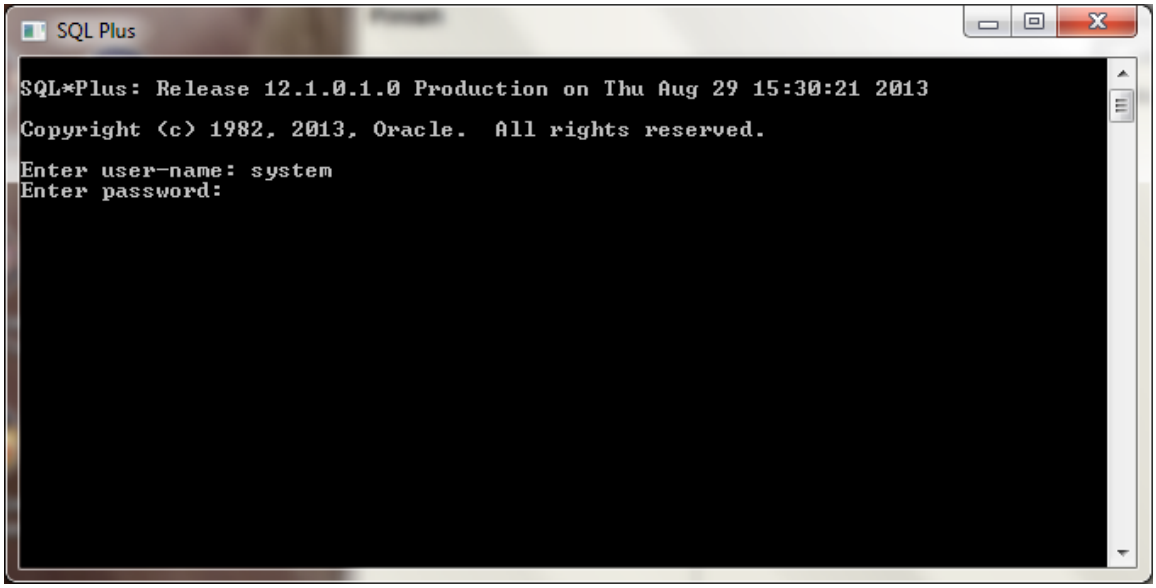


Click the "CLOSE" button, and the Oracle installer will exit.

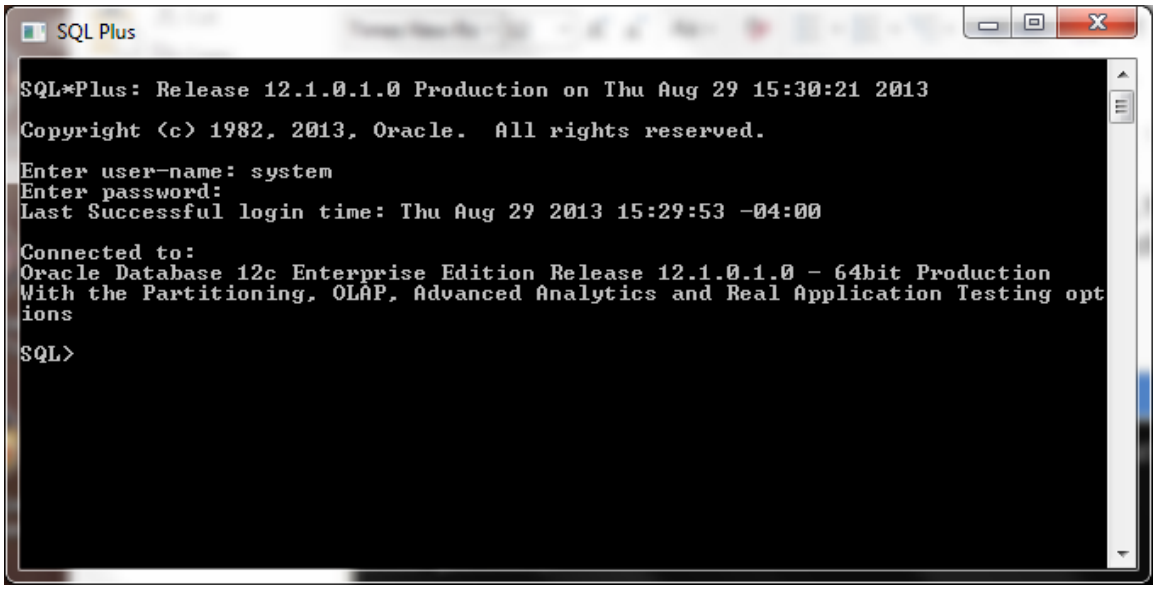
Verify a Successful Install

To verify that the install was successful, we will connect to our new Oracle instance.

Go to Start / All Programs/Oracle – OraDB12_Home1 / Application Development and launch SQLPlus. Fill in the username with SYSTEM, and type in the password that you chose during the install. You do not need to enter a Host String if your Oracle database is on the same machine as SQLPlus.



Click OK to login. If you see a screen similar to the following, then Oracle has successfully run many production-strength integrity checks against the database and allowed you to connect.



Congratulations! You have now successfully installed Oracle, started the database, and verified that it is accepting connections.

Installing the Oracle SQL Developer Client

Step 1: Downloading Oracle SQL Developer

Introduction

With the database installed, you now need to download and use a client that is capable of connecting to the database. Although you can use SQLPlus if you choose, its command line interface is not what we are used to in today's modern development environments, and many people prefer to use a graphical tool. If you already have a working copy of a SQL client you prefer, you do not need to complete this section. Simply setup a connection to your installed database and continue with the next section. Otherwise, it is recommended that you install the free Oracle SQL Developer client. This section contains step-by-step instructions for downloading and using Oracle SQL Developer.

Download Oracle SQL Developer

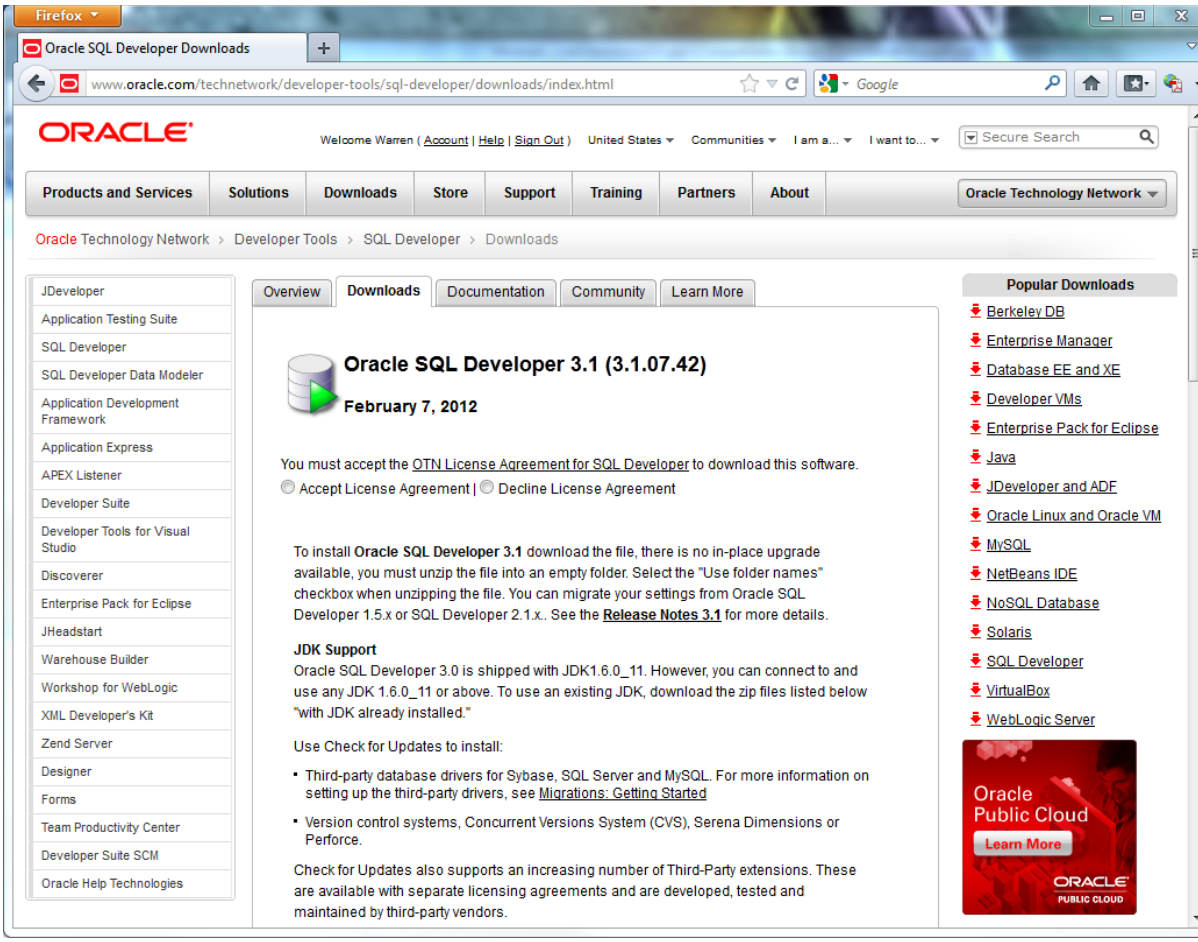
You can get to the Oracle Technology Network directly by following this link:

http://www.oracle.com/technology/index.html

Select in the following order from the OTN home page above:

- Downloads tab
- then SQL Developer

This will take you to a page of Oracle SQL Developer downloads for different platforms and different Java configurations.



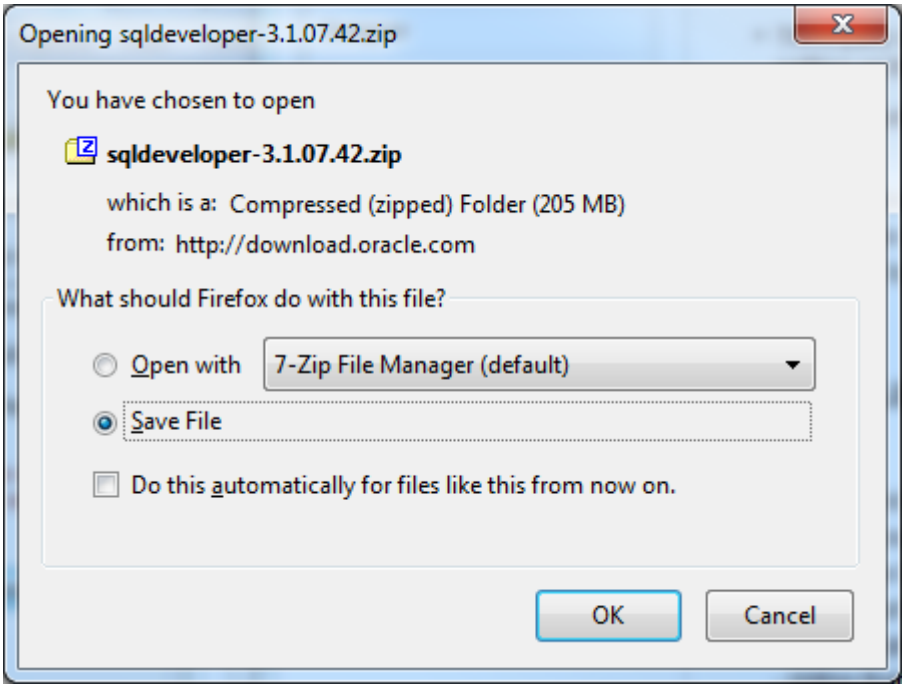
Before downloading, you must first accept the license agreement. Then click on the link with the following text:

Oracle SQL Developer for 32-bit Windows (This zip file *includes* the JDK1.6.0_11)

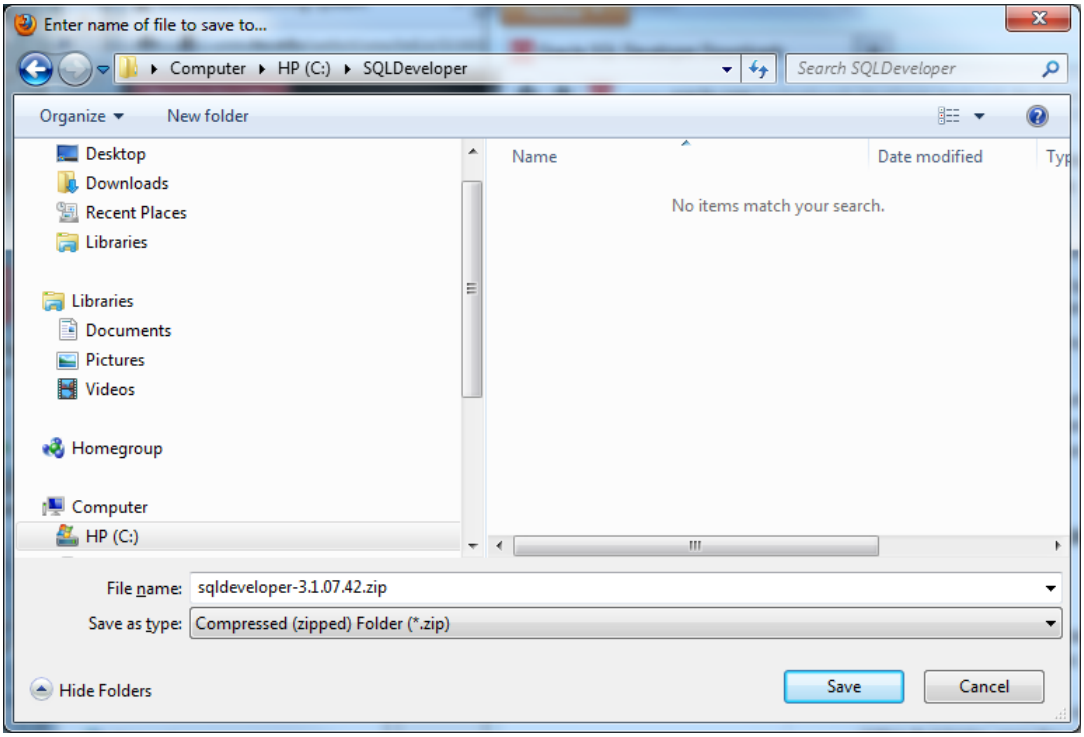
Notice that this link is for the configuration that includes the Java development environment. Using this configuration eliminates the complexity of installing and configuring Java separately.

Also keep in mind that although you see the words “32-bit”, that this will work just fine in 64-bit Windows environments, as 32-bit applications run fine on 64-bit operating systems.

Since you have already logged into the OTN to download Oracle, clicking on the link here should immediately begin the file download. The file name will start with “sqldeveloper”, and then be followed by the version that is being downloaded. Different browsers will show the download dialog in different ways. Below is the dialog that appears using Firefox 11.0.



You will want to save the file into a directory easy to remember, because you will travel to this directory to unzip and run the program. This example will show you placing it into the C:\SQLDeveloper directory.

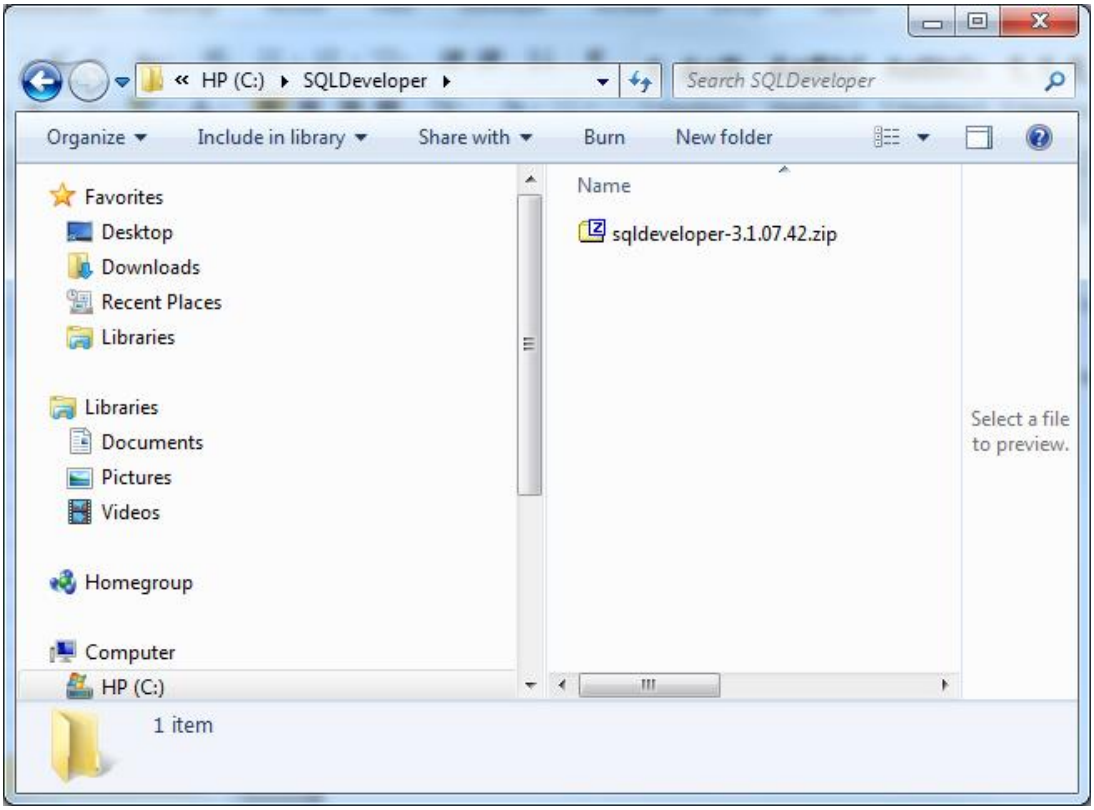


The file is fairly large and so may take a while to download.

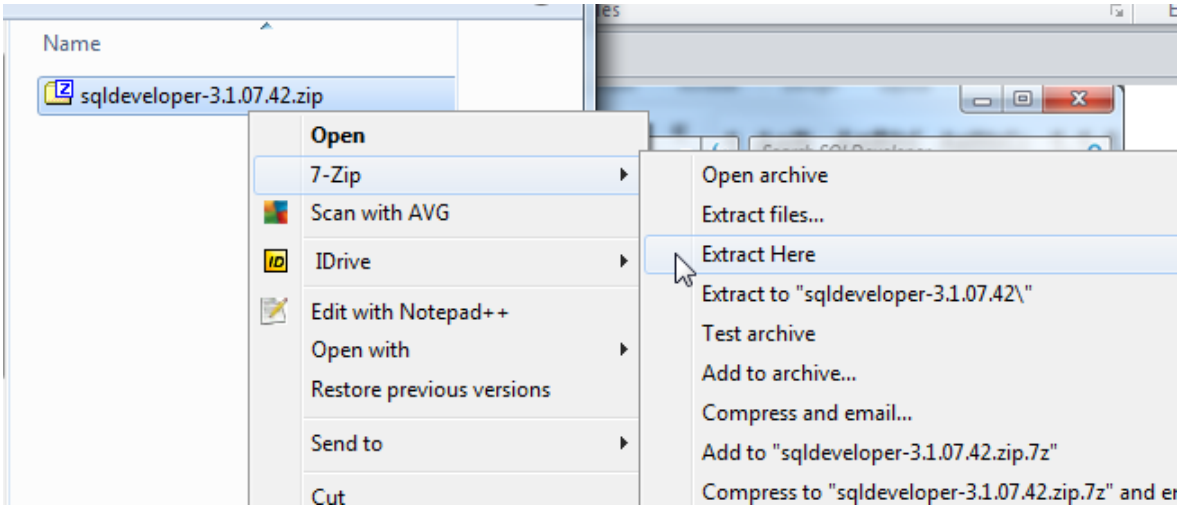
Step 2: Unzipping and Launching Oracle SQL Developer

Unzip Oracle SQL Developer

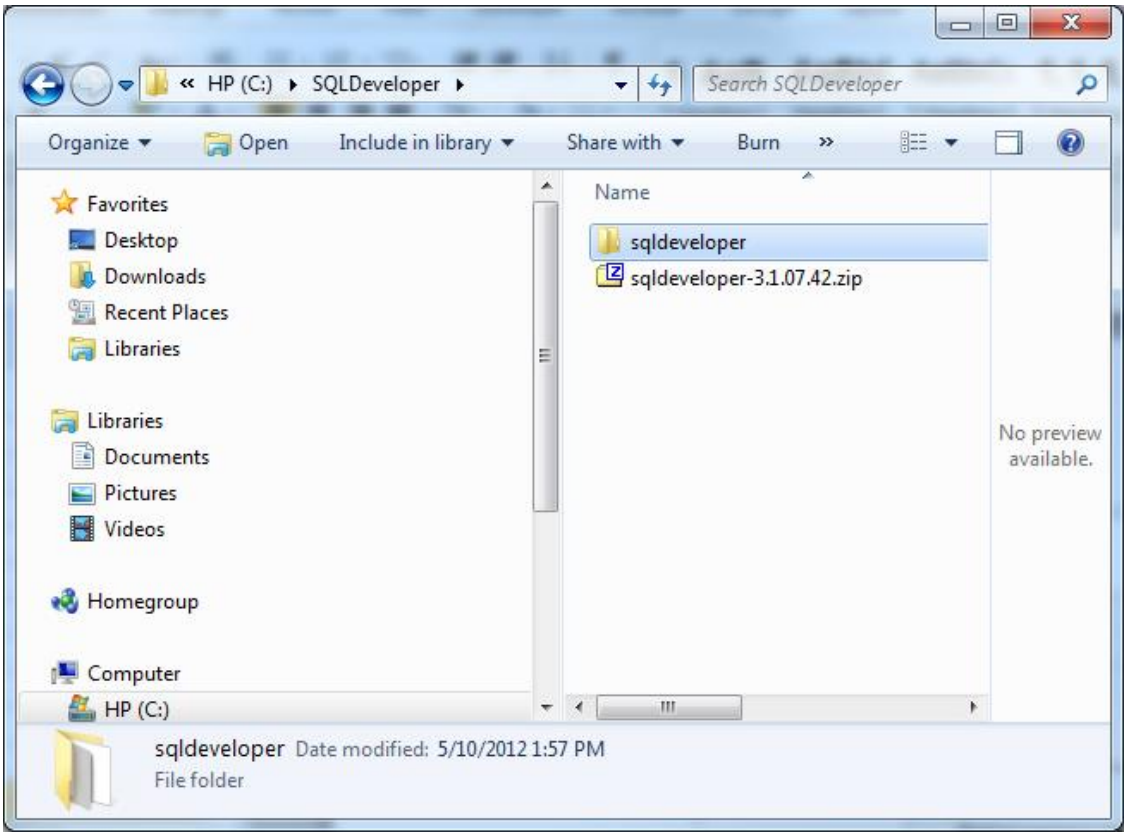
After the download completes, open up Windows Explorer or Computer and travel to the download directory.



Unzip the file into the same directory. There are many unzip programs available. These instructions show you how to unzip using the free 7zip unzip program. Right-click on the file, then choose 7-Zip/Extract Here.

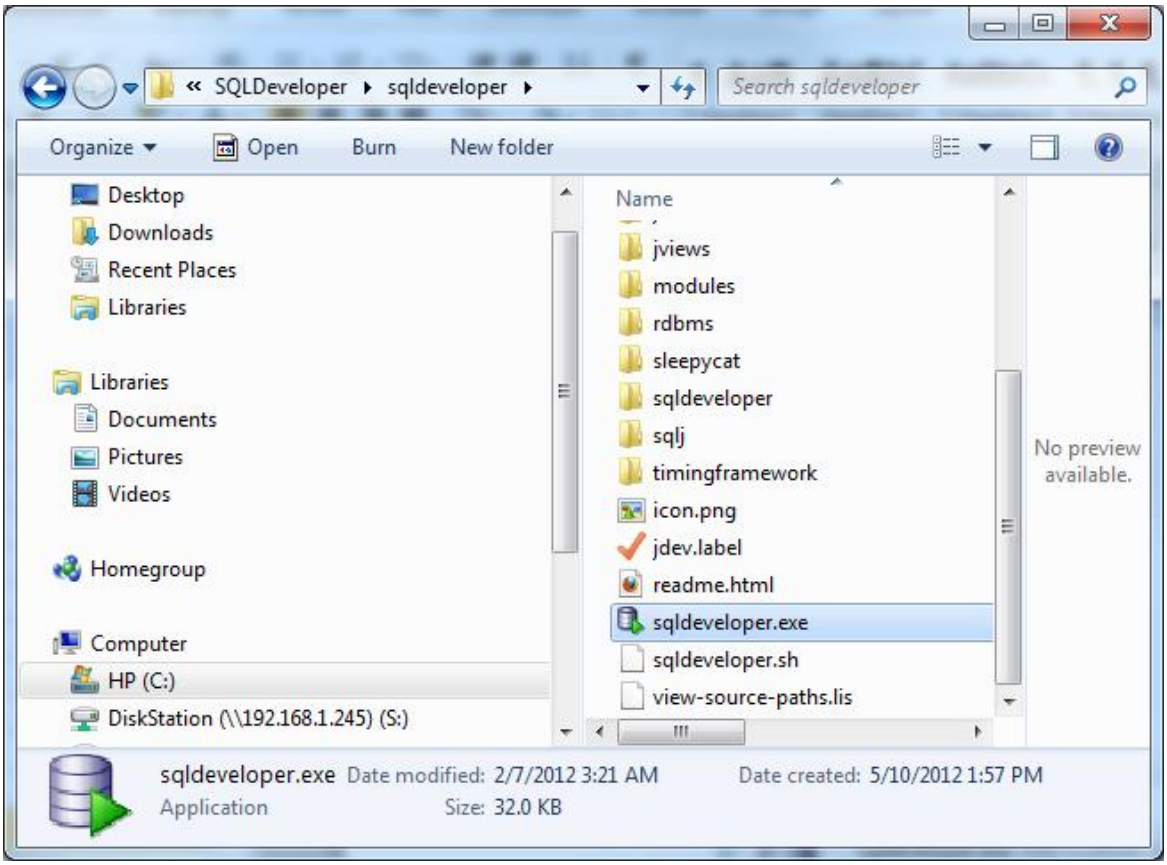


After the unzip is complete, you should see a new “sqldeveloper” folder.

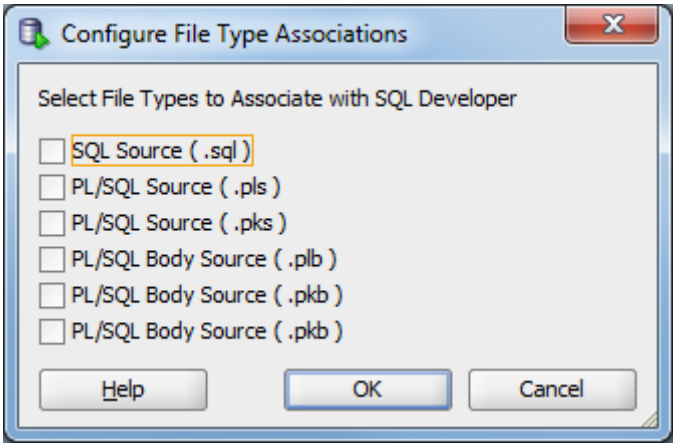


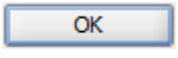
Launch Oracle SQL Developer

To launch Oracle SQL Developer, simply navigate into the newly created “sqldeveloper” directory, and execute “sqldeveloper”. This standalone client does not require an installation before being used.



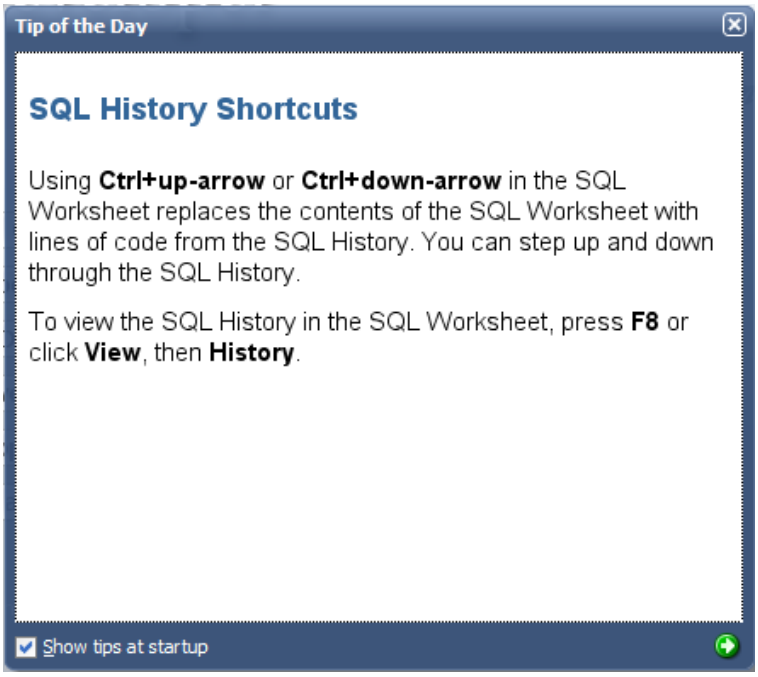
Simply double-click “sqldeveloper” to launch the program. You can return to this directory each time you wish to launch Oracle SQL Developer, or you can create a shortcut and place it on your desktop. When launched for the first time, Oracle SQL Developer will display a dialog asking you about associating file extensions.



We will not require that file extensions be associated with particular files in our courses, and so it is fine to simply click the 

button to close this dialog.

Next, Oracle SQL Developer will display a tip of the day.



Close this dialog by clicking the button.

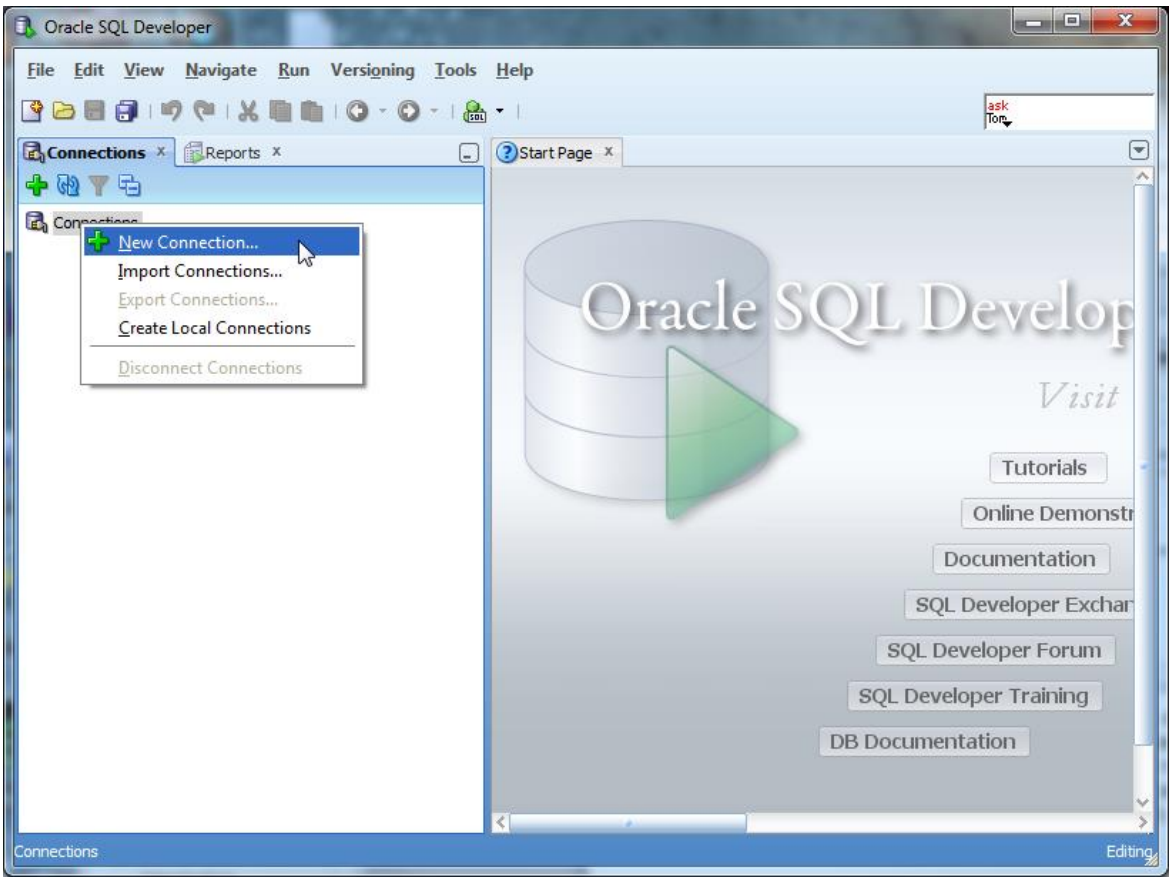
Step 3: Connecting to Your Database

Introduction

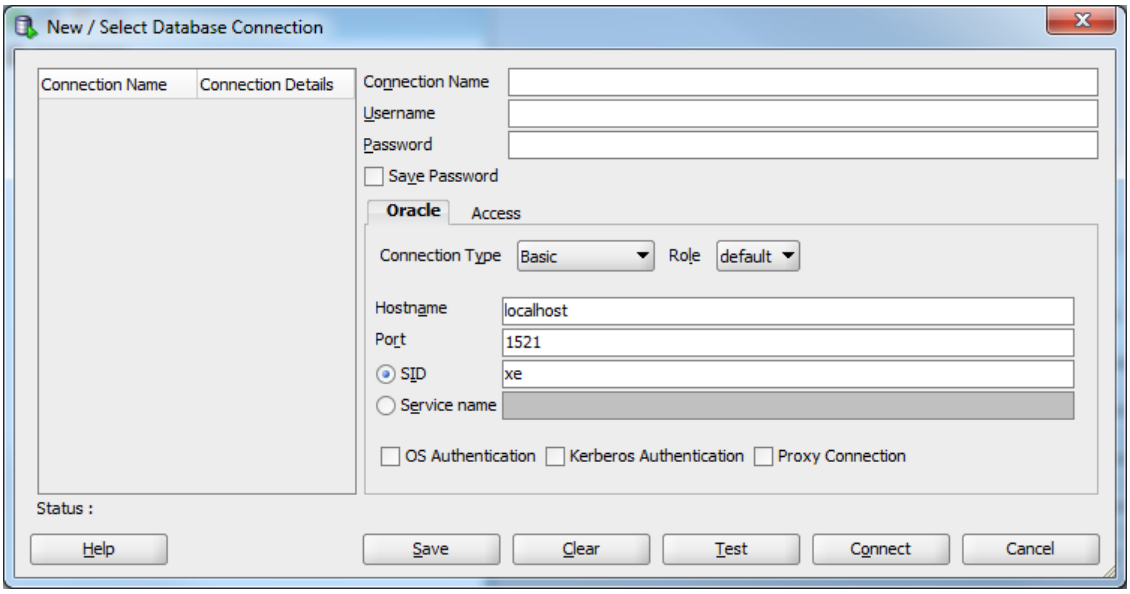
In any SQL client, we must first establish a connection to the database before typing our SQL commands. A connection opens a communication pathway between the client and the database. In Oracle SQL Developer, the term "connection" is overloaded to indicate both inactive and active communication pathways, as well as all of the configuration information necessary to connect again and again to the same database.

Connecting as the System User

We first need to connect to the database as the "system" user, so that we can create our own user to complete the assignments. To start, right click on the Connections category, then select "New Connection…" from the context menu.

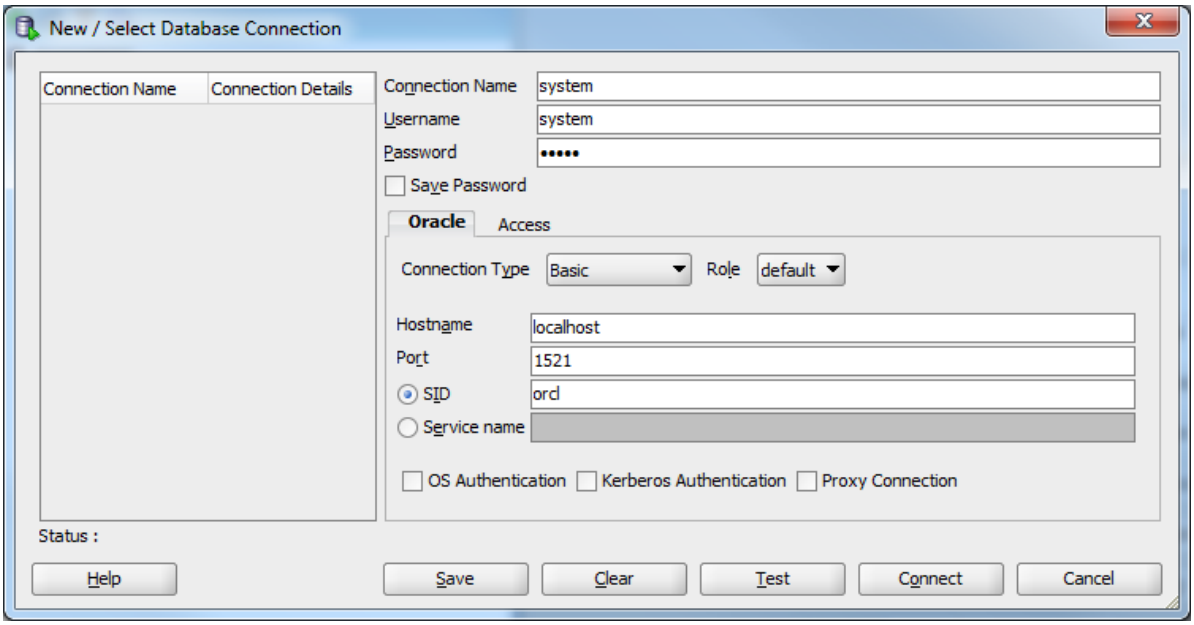


Oracle SQL Developer will launch the New Connection dialog, which requests configuration information about this new connection.

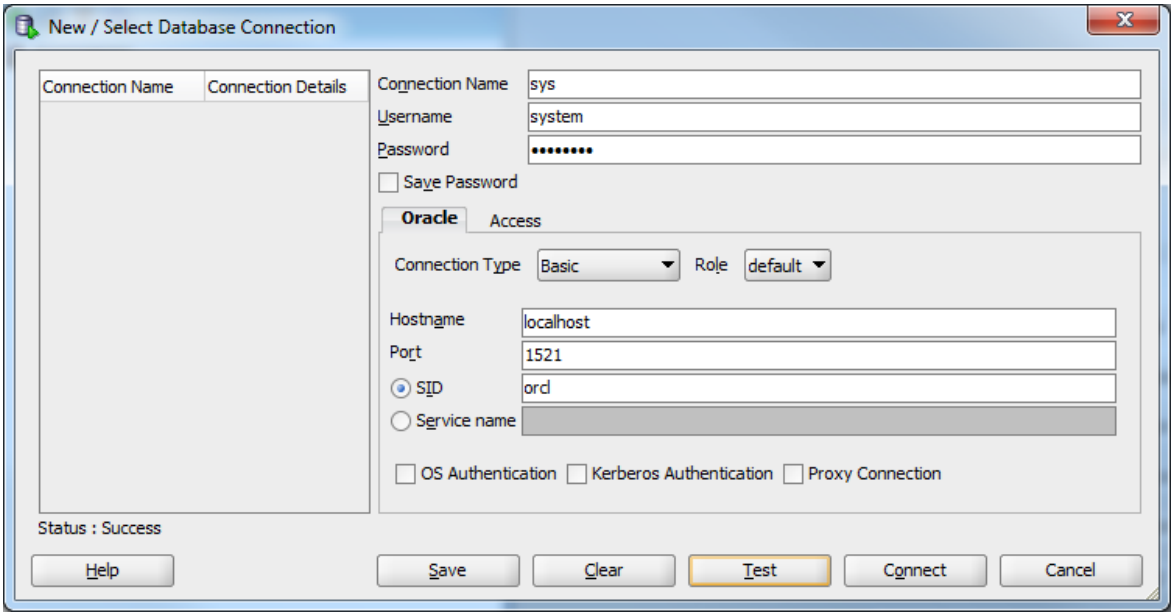


You will need to modify the following four fields – Connection Name, Username, Password, and SID. The Connection Name is just an identifier that you are giving your connection, so that you may identify it in the future. You can type anything you want that is memorable. We will use the name “system” because this connection is for the system user. The username is “system”. The password is whatever you chose your password to be during the Oracle installation process.

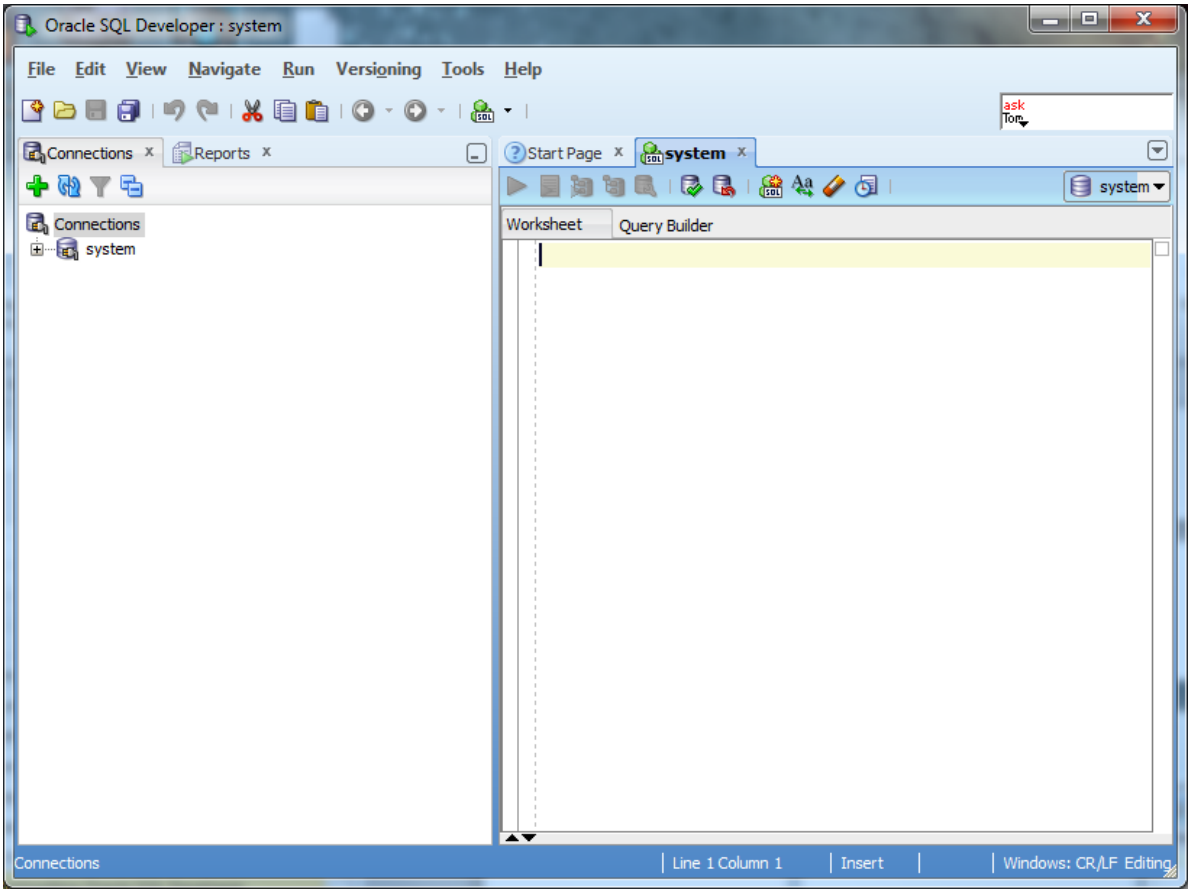
The SID will be whatever you chose your Global Database Name to be during the installation process. Type that here, and do not try to guess. Recall that we recommended that you choose “ORCL”. If you installed Oracle Express Edition, it did not ask you for your SID, and automatically established your SID to be “XE”.



Click the Test button to ensure that you are able to connect. If you are able to connect, it will state “Status: Success” in the lower left-hand part of the dialog. If there is an issue, it will display the issue in the place of the success status. You will need to fix any issues issue before proceeding to connect.



Simply click the Connect button to establish the connection. When you do so, Oracle SQL Developer will open up a blank SQL worksheet.



In this SQL worksheet, you can type commands, execute them, and see the results.

Congratulations! You have now successfully launched Oracle SQL Developer and established a connection to your database.

Creating a Database User to Complete Your Assignments

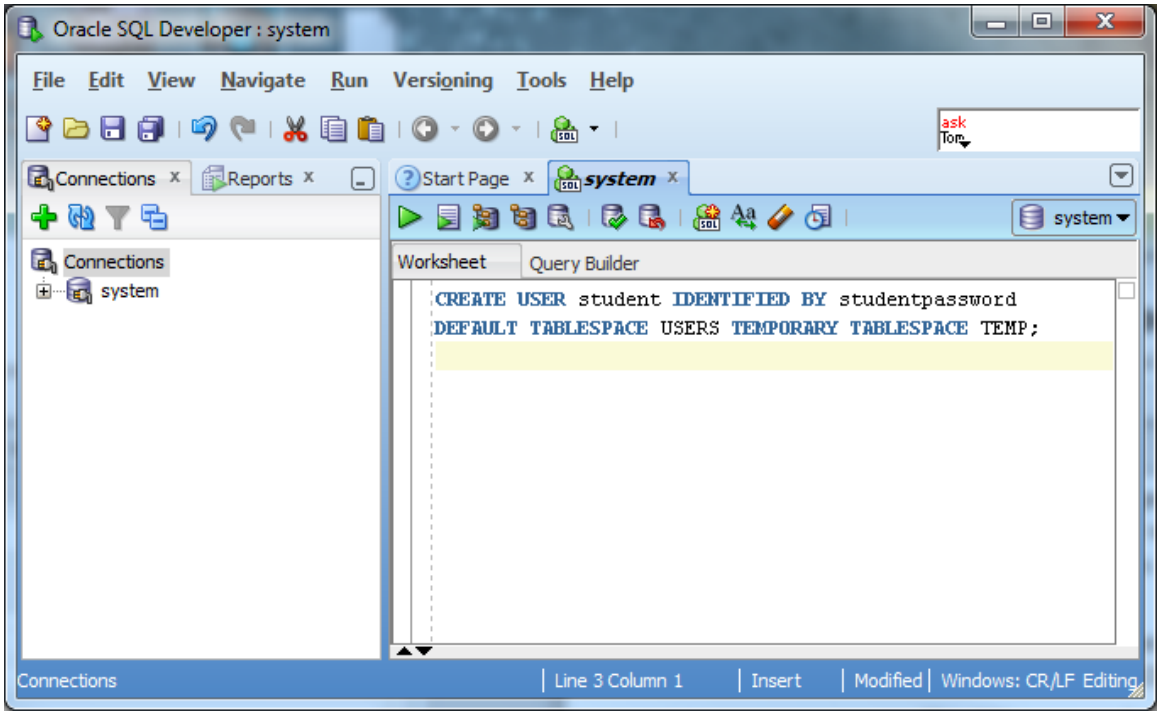
Step 1: Creating Your Own User

Create the User

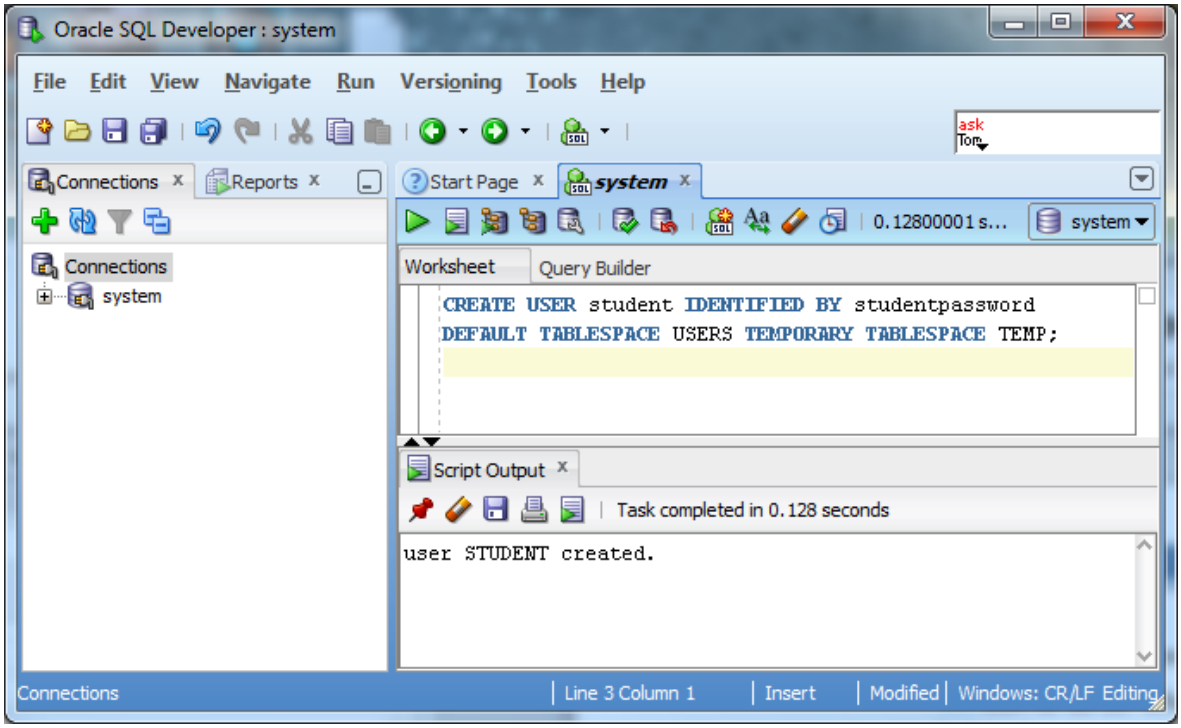
The SYSTEM account that we are now logged in under is the initial DBA account, and it has so many privileges that it is risky for routine use. We will next create an ordinary user of the sort that we will use for this class. I will call this user "student", but you can substitute any name. Choose a password that you can remember. Just type in the following:

```
CREATE USER student IDENTIFIED BY studentpassword
DEFAULT TABLESPACE USERS TEMPORARY TABLESPACE TEMP;
```

This SQL command creates user "student" with password "studentpassword" and sets up two important defaults for student's account. Note the semicolon at the end. Upper case is conventional for SQL keywords in the Oracle community. When you have typed this command, it will look like this:



We now need to execute this command for it to take effect in the database. Click the icon to do so. When executed, the results of the command – the fact that the user is created – should display in a pane below the command.

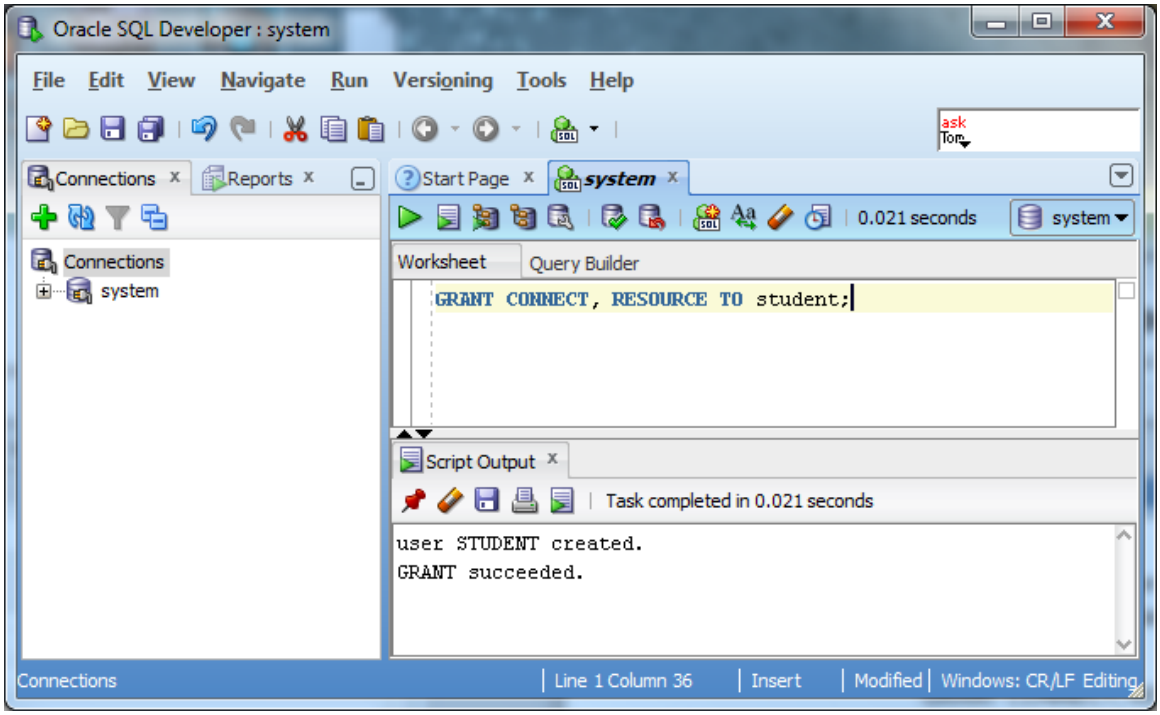


Give the User Basic Privileges

Next we will give user “student” the privilege to connect to the database and the privilege to create database resources. Type and execute

```
GRANT CONNECT, RESOURCE TO student;
ALTER USER student QUOTA UNLIMITED ON USERS;
```

Again, notice the semicolon at the end. Your screen should now look about like this:

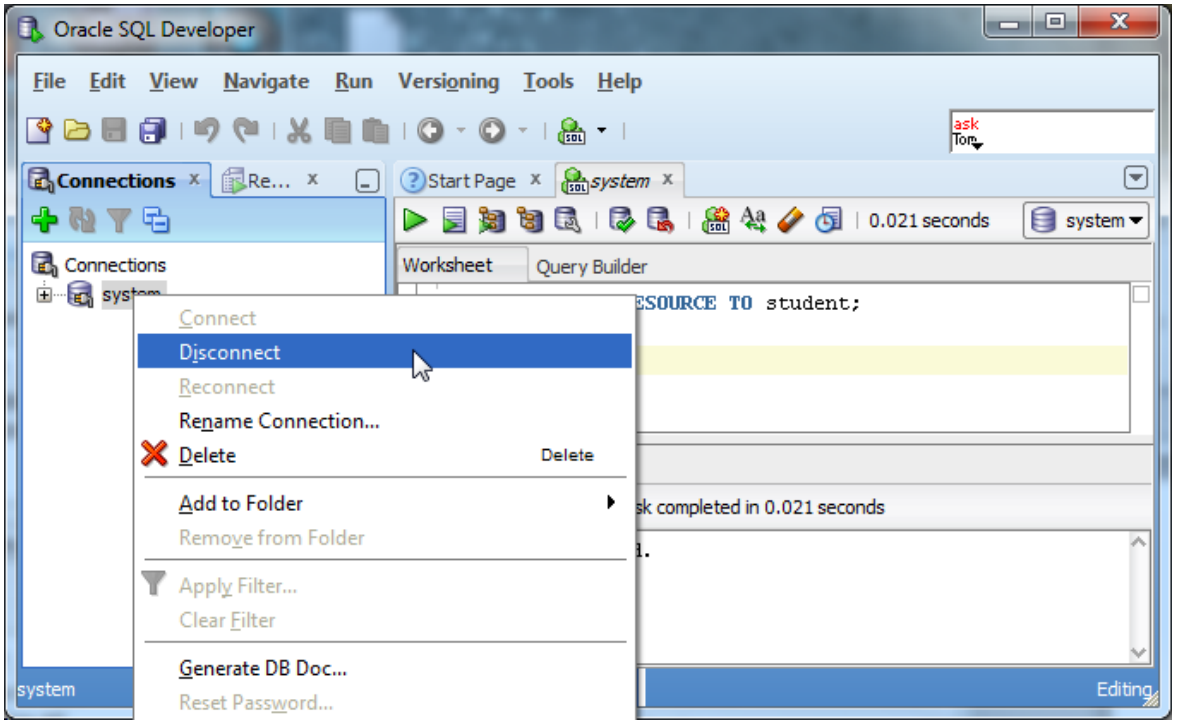


The new user is now created!

Step 2: Connecting with Your New User

Disconnect the System User

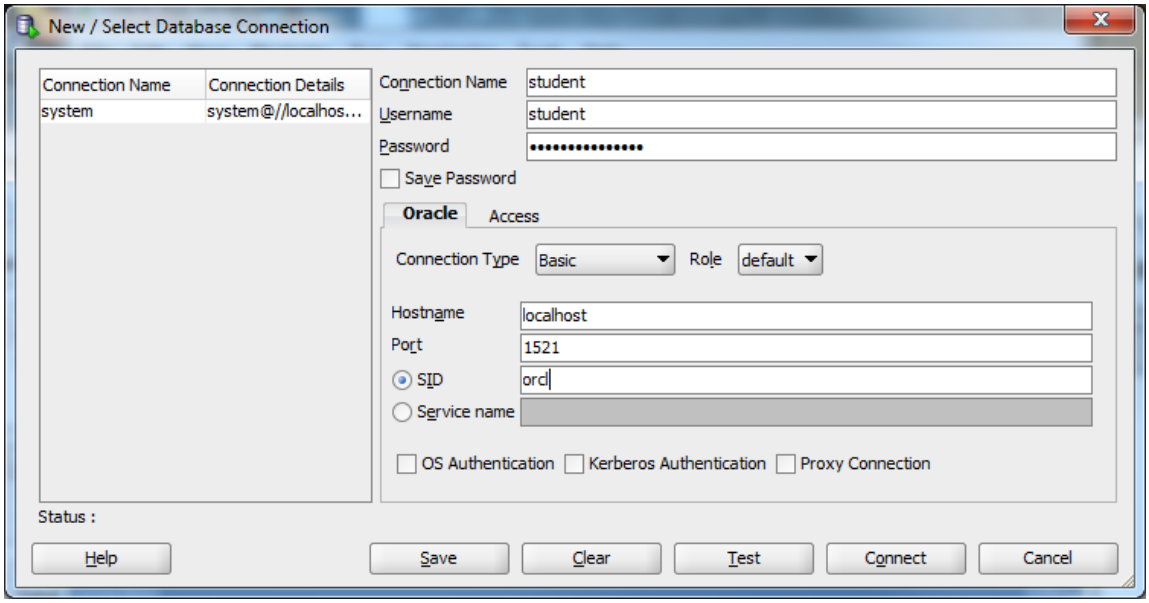
We can use this new user to complete our assignments without concerning ourselves with accidentally damaging the database. So that we are sure not to use the "system" any longer, let us close the connection to "system" by right clicking on the "system" connection, and choosing "Disconnect" from the context menu.



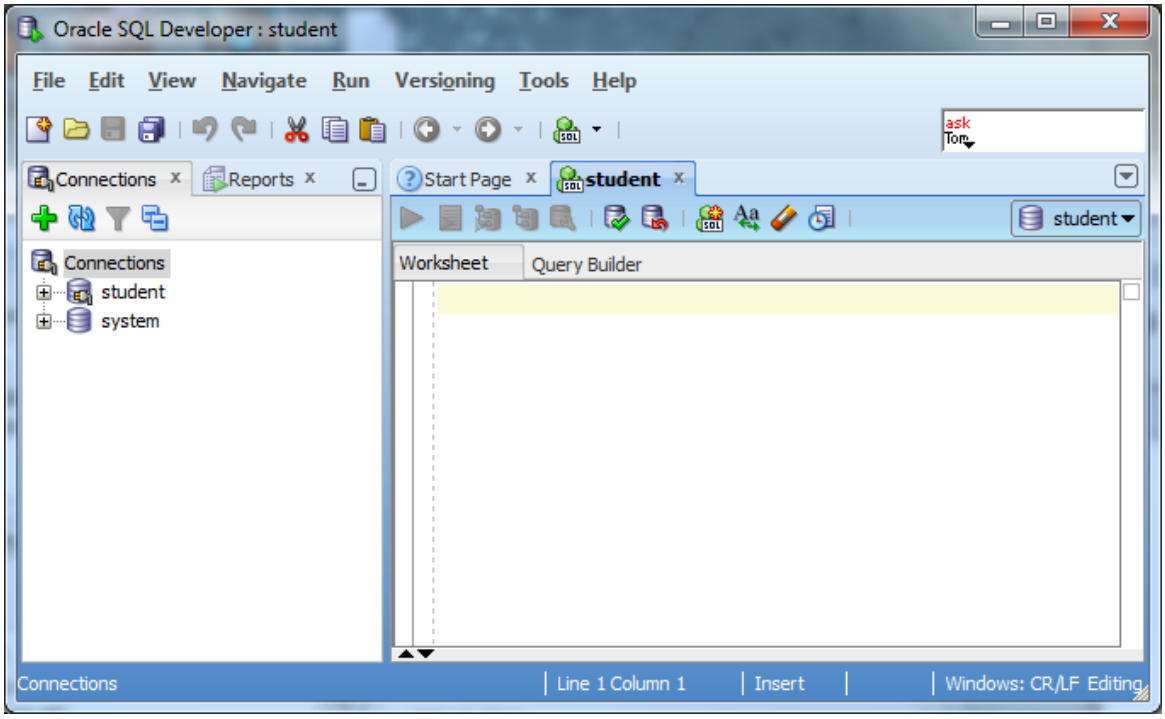
This will terminate the system connection, but will not close the SQL command window. You can close the existing SQL command window by clicking the x icon.

Connect as Your New User

Next we will setup a new connection to your new user by following similar steps to setting up a connection to the system user. Right click the "Connections" category, choose "New Connection…" from the context menu, and fill in the appropriate information for that connection.



Remember to put in the new username and password instead of the system username and pasword. After inputting the information, click the Connect to connect. A SQL worksheet for the new user will open up.



You are now connected to Oracle as an ordinary user, and you can do your exercises, experiment, or do whatever you want with Oracle. If you want to create another user, just connect as “system”, and do what we did to create user “student”. Have fun!

Congratulations! You are ready to work in Oracle!

Troubleshooting Common Installation and Usage Issues

I forgot my password.

If you forget your password, do not panic, because you can log in a different way and change your password. Your access to the computer onto which you installed Oracle means that you are able to login to Oracle as the SYS user without a password. Your privileges are akin to a master DBA in a production environment. See Appendix D for how to login as the SYS user without a password to reset your SYSTEM and user passwords.

Because you typically install and use your own database locally in this course, security is not usually an issue for your student database. For class databases it is recommended to use an easily memorized password, such as “password”.

The prerequisite checks tell me that I do not have a static IP address.

Many desktops and laptops dynamically obtain their IP address through DHCP, and if so, you may need to install the Microsoft Loopback Adapter with a static IP address. Reference Appendix B for more information on installing and configuring the Microsoft Loopback Adapter.

The installer fails with a report that it cannot find a file.

If the installer progress through a part of the installation, then reports that it cannot find a file, the most likely cause is that the directory from which you are installing only has the contents from the first download zip file. You may have unzipped the second zip file into another directory. For your Oracle installation to succeed, the contents of the extraction of both zip files must end up in the same directory. Oracle has provided you with two files for a better download experience; nevertheless, the installer expects there to be a single directory structure containing all of the contents from both zip files. Your first option is to unzip each zip file into the same directory. The second option is to unzip each zip file into different directories, but then manually copy the contents of the second directory into the first.

The prerequisite checks tell me that my PATH exceeds the recommended length.

If the prerequisite checks report a warning similar to the following:

> Environment variable: "PATH" - This test checks whether the length of the environment variable "PATH" does not exceed the recommended length.
>
> Expected Value
>
> : XXXX
>
> Actual Value
>
> : YYYY

Then Oracle’s attempt to add its installed directory on the path will not succeed, because the value of the PATH variable is already too long. The “Expected Value” in the error message indicates the maximum allowable length, and the “Actual Value” indicates what the length will be when Oracle’s entry is added. See Appendix E for details on how to reduce the length of your PATH environment variable to rectify this issue.

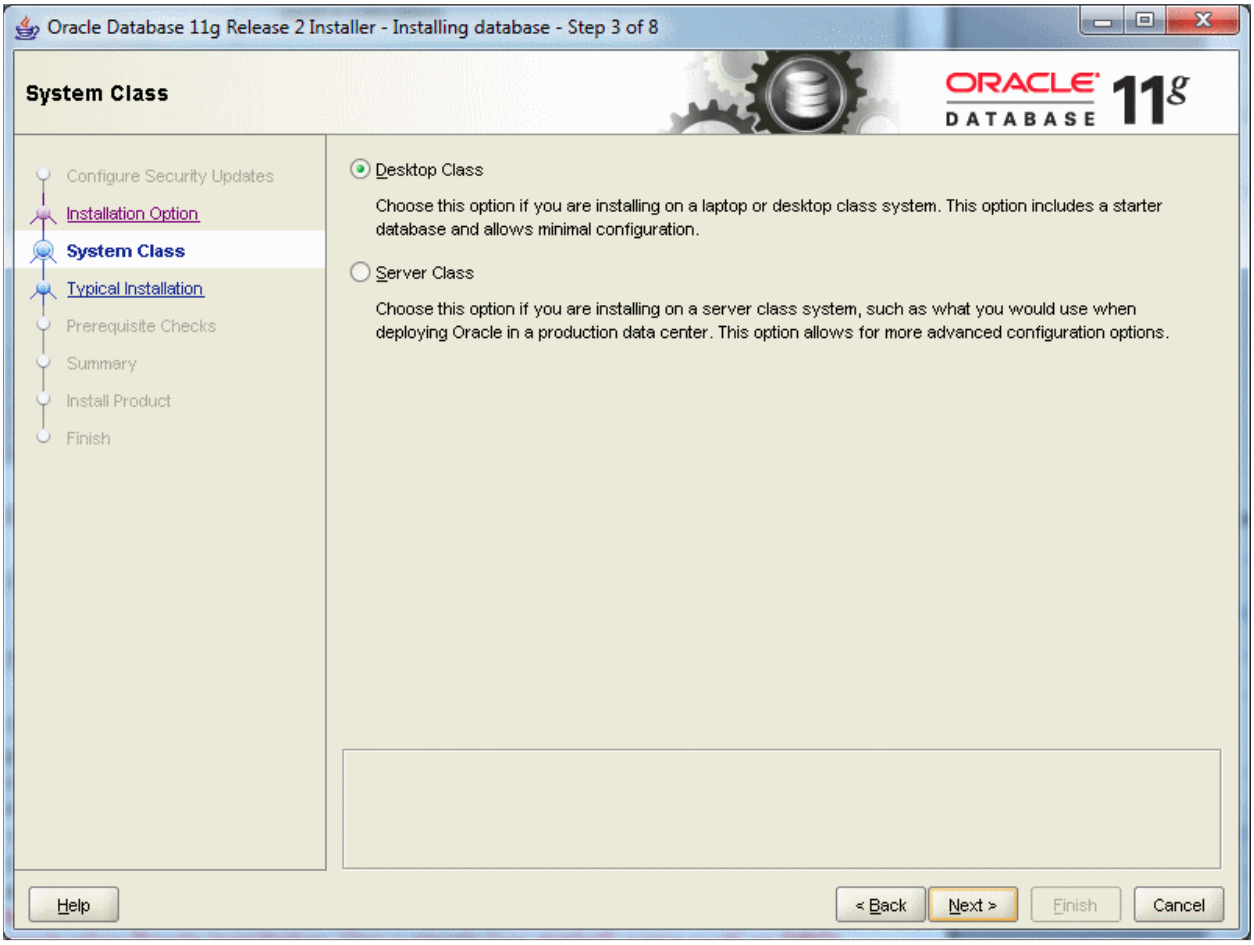
The Oracle Listener Refuses your Connection

If you attempt to establish a connection to your database, and database client reports the following error, “Listener refused the connection with the following error: ORA-12505”, please refer to Appendix G, “Correcting Oracle Listener Issues”.

The Oracle install window disappears after selecting the “Desktop Class” option.

If the install window disappears after selecting “Desktop Class” early on in the installation, effectively aborting the install process, after clicking

during the screen that looks like the screen below:



Then you may need to explicitly tell the installer the location of the latest Java installation. The following steps indicate how to do so:

1. Install the latest version of Java. You can find the latest version of Java on the Oracle web site. Select the one appropriate for your operating system.
2. Remember the path of the Java installation during the Java install. For example, Java version 1.7.0_11 would install itself to a path similar to the following: C:\Program Files\Java\jdk1.7.0_11

3. After extracting the Oracle database zip files as described in this guide, open the command prompt by clicking Start->All Programs->Accessories->Command Prompt.
4. Change the directory where you extracted the database install. The “cd” command allows you to do this. For example:

```
C:\>cd database
```

5. Verify that you are in the correct folder by running the “dir” command. You will know you are in the correct directory if you see “setup.exe” in the list of files. For example:

```
C:\database>dir
 Volume in drive C is TI105957W0F
 Volume Serial Number is 0017-9E59

 Directory of C:\database

01/21/2013  01:27 PM    <DIR>          .
01/21/2013  01:27 PM    <DIR>          ..
01/21/2013  01:26 PM    <DIR>          doc
01/21/2013  01:27 PM    <DIR>          install
01/21/2013  01:27 PM    <DIR>          response
03/12/2010  12:11 AM           341,304 setup.exe
01/21/2013  01:27 PM    <DIR>          stage
03/16/2010  12:42 PM             5,733 welcome.html
               2 File(s)        347,037 bytes
               6 Dir(s)  79,781,351,424 bytes free
```

6. Start the database installer by typing the following command:
   setup -jreLoc <path to Java install>
   For example, if our path was as described in step #2, we would type:
   setup –jreLoc “c:\Program Files\java\jdk1.7.0_11”

```
C:\database>setup -jreLoc c:\PROGRA~1\java\jdk1.7.0_11
```

7. The installer is now running with the correct version of Java, and the installer window should no longer disappear when selecting “Desktop Class” during the install process.

Appendix A: Configuring Oracle Startup Options

Your computer may become sluggish after installing Oracle. This can be normal when Oracle is running on a machine with limited resources. When Oracle first starts up it loads the database and performs other initialization. If you have adequate memory to support Oracle and the other programs that you are running on your computer the sluggishness will go away when Oracle has finished these startup operations. The sluggishness also goes away when Oracle is stopped. You will need to have the Oracle instance running only a fraction of the time, so you can stop Oracle when you aren't using it.

You can easily start and stop Oracle by starting and stopping the corresponding service. For an instance named *SID*, this service is called *OracleServiceSID*. Just right click on the service such as *OracleServiceSID* in the Services control panel and select *Stop* or *Start*. When the service is stopped it also stops the corresponding *oracle.exe* process, and when the service is started it also starts the process.

To get to the Services control panel in Windows, first open the Control Panel. If you are on Windows XP, it's easier if you click the *Switch to Classic View* look. Then on XP you can launch the services control panel by going to *Start* then *Settings* then *Control Panel* then *Administrative Tools* then *Services*. In some cases, you may see a *Services* control right there in the control panel. If so, click on it and the services will come up. If you don't see *Services*, then you need to click on the *Administrative Tools* icon first. Then you will see *Services* and can click on that.

Once the services control opens, you will see a list of services. Highlight the one that says OracleServiceSID, where SID is the name that you gave your Oracle service when you installed Oracle. The service name will be something like "OracleServiceORCL". Then click *Action/Stop*. After a while the Oracle service shuts down the Oracle instance. Of course, once you stop it, Oracle is no longer running, so you'll have to repeat these steps and click "start" to start it again. Or, just rebooting your computer should make the service start again.

Your computer will boot more slowly when Oracle is running, because the Oracle services are starting at boot time, and starting an Oracle instance can take a while, particularly on a notebook computer.

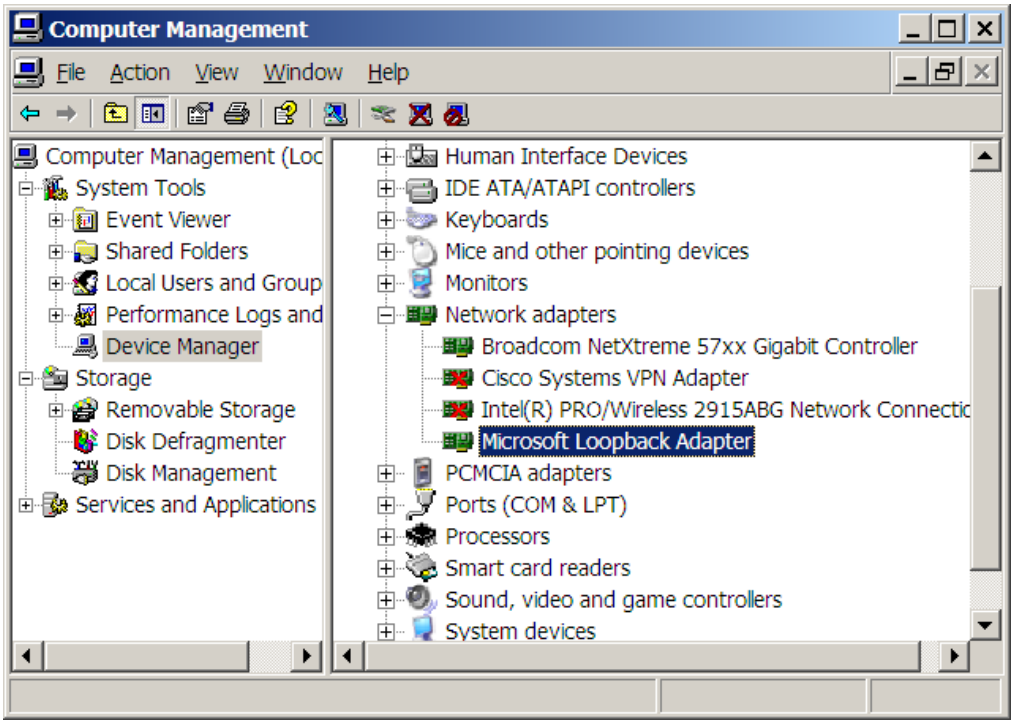
You can configure Oracle so that it doesn't start up when you boot your machine. Just open up the *OracleServiceSID...* service, as described above. But, instead of just clicking *stop*, you need to change the startup mode. Windows services have one of three startup modes -- *automatic*, *manual*, and *disabled*. By default, the Oracle service is in *automatic* mode. This means whenever you boot your computer, the service will start up automatically. You need to change it to *manual* to keep it from starting at boot time.

To do so, right click on the *OracleServiceSID...* service then click the *Properties* option. From there, you should see the *startup mode*, and be able to switch it from *automatic* to *manual*. Do the same to the *Oracle…TNSListener* service. Then next time you boot, those services won't start. Of course, if you set these services to *manual* startup mode, then when you need to use Oracle, you'll need to go into the services again and start them manually.

On recent Windows releases you can also reduce the time to boot while leaving Oracle running by hibernating your computer rather than shutting it down and rebooting it. Restarting after hibernation will take a little longer with Oracle running, but not nearly as long as rebooting with Oracle in *automatic* startup mode.

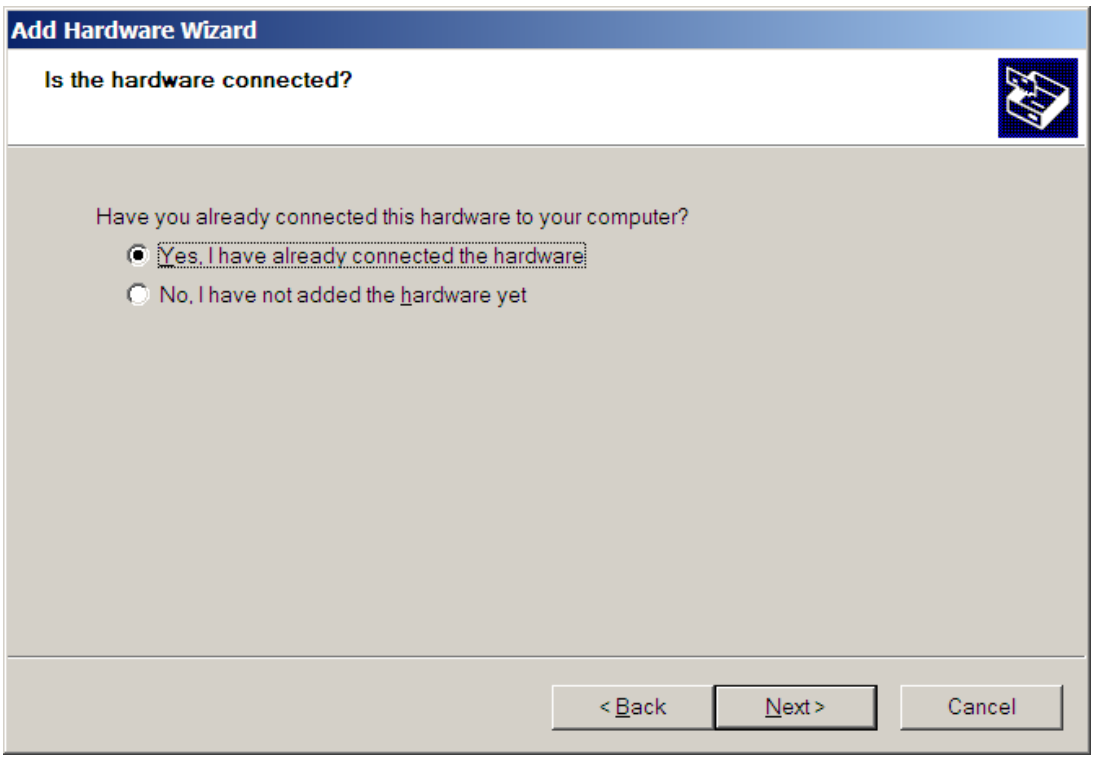
Appendix B: Installing and Enabling the Microsoft Loopback Adapter

First, check if the Microsoft Loopback adapter is installed. On XP, from the Start menu, choose the Control Panel, then Administrative Tools, then Computer Management then Device Manager. A dialog box similar to the following should appear.

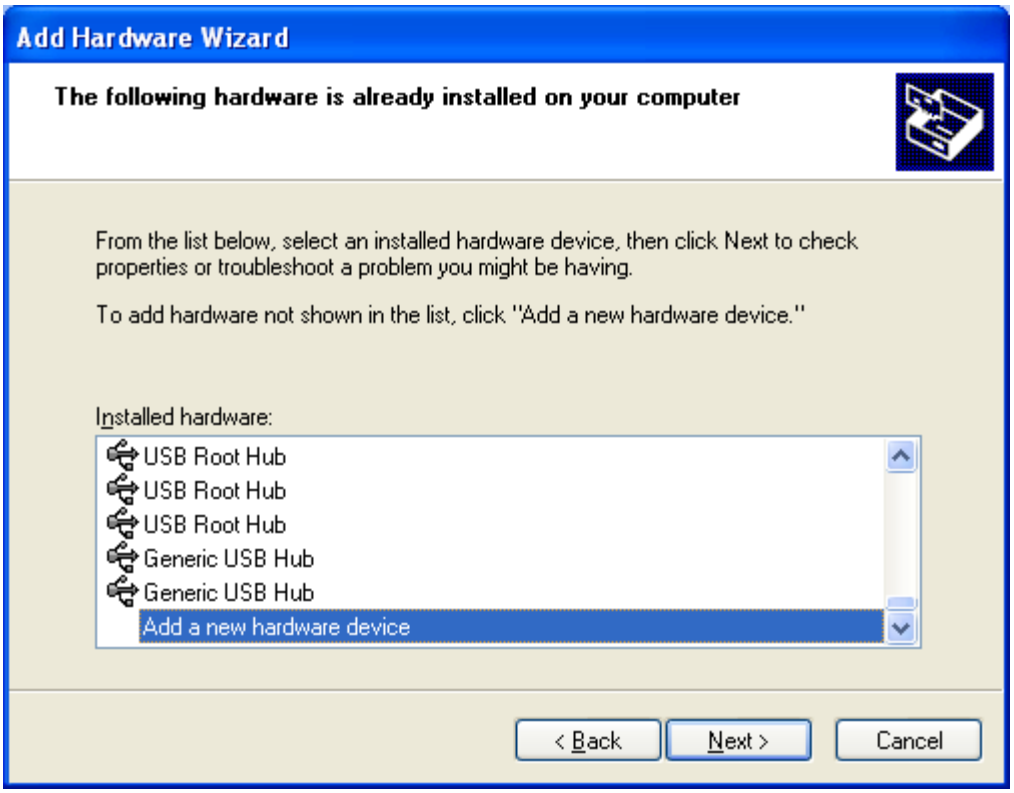


If the Loopback adapter is installed, it will appear there. If it is not installed then you need to install it. If it is installed, right click on *Microsoft Loopback Adapter*, and check that it is enabled. The right-click menu should include *disable*. If it includes *enable*, then you need to click on *enable* to enable the adapter. You can also do this through the *Properties* popup.

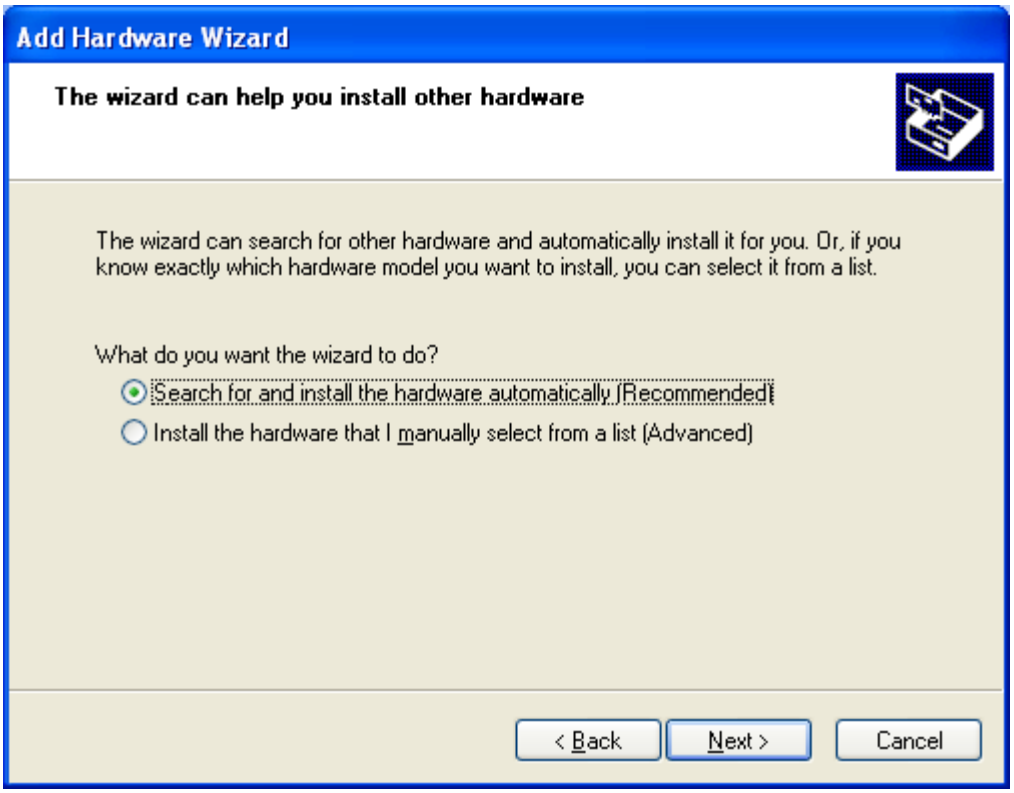
If the Loopback adapter does not appear in the dialog, install it by selecting *Add Hardware* in the Control Panel. The following dialog will appear:



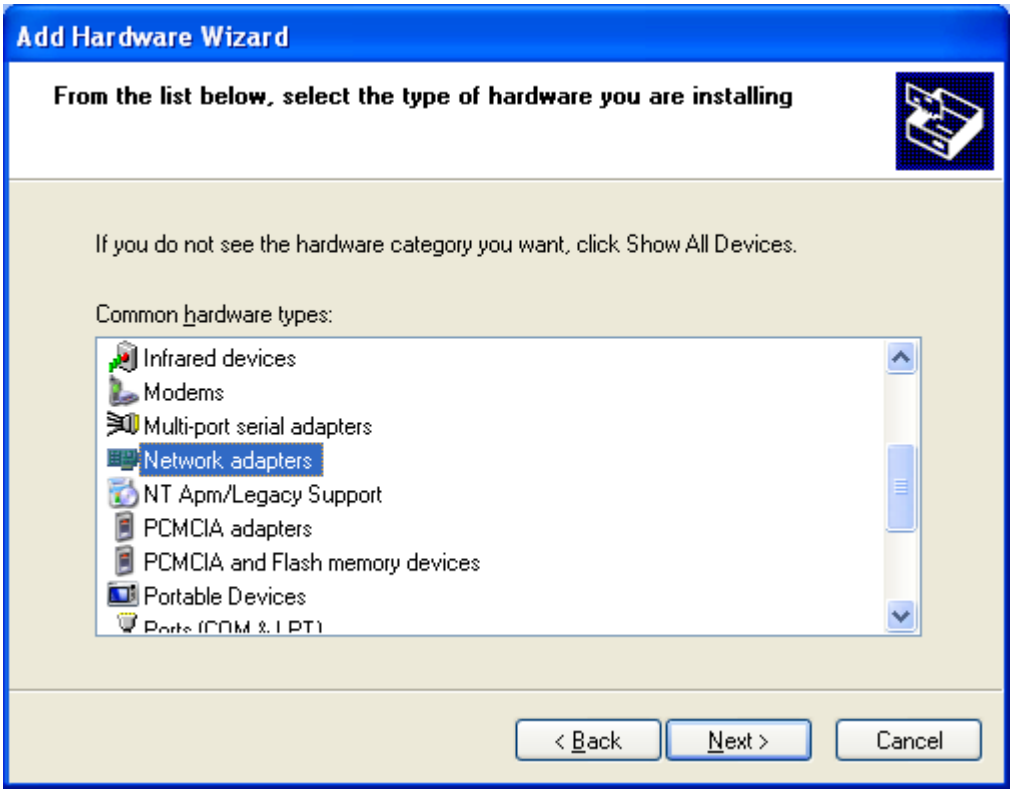
Select the *Yes* radio button and then *Next*. You will see a list of hardware already installed on your computer. Scroll down to the bottom of the list and select *Add a new hardware device*, and then click Next.

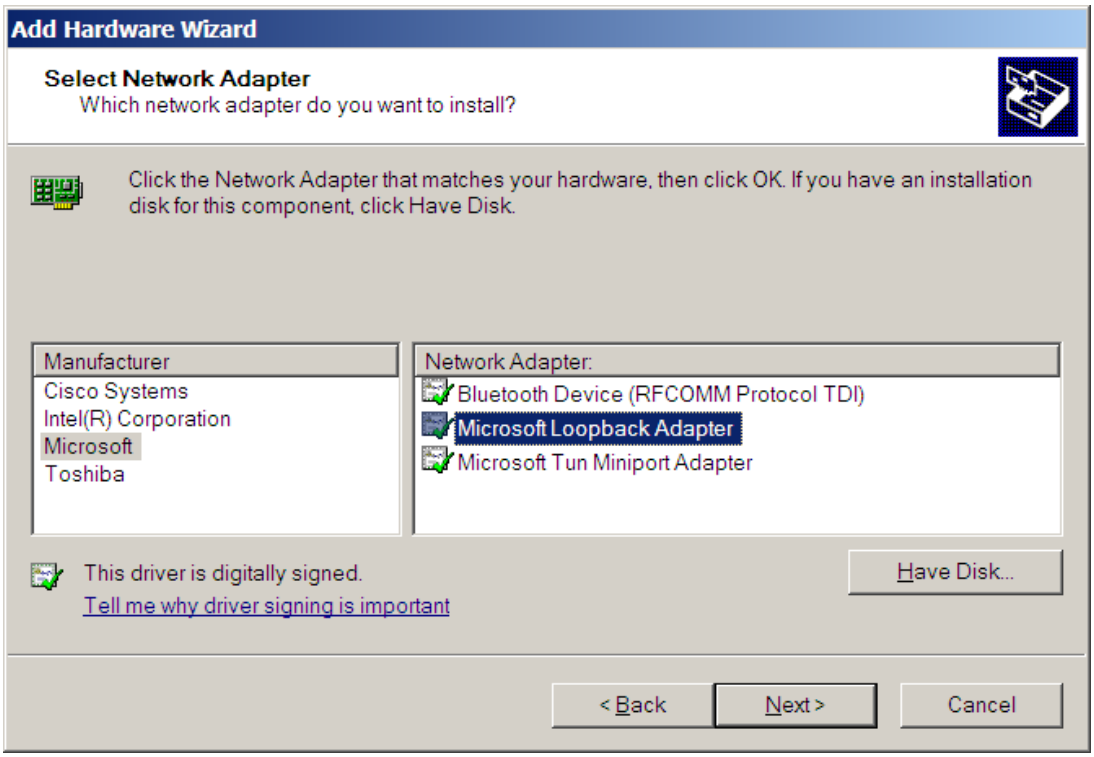


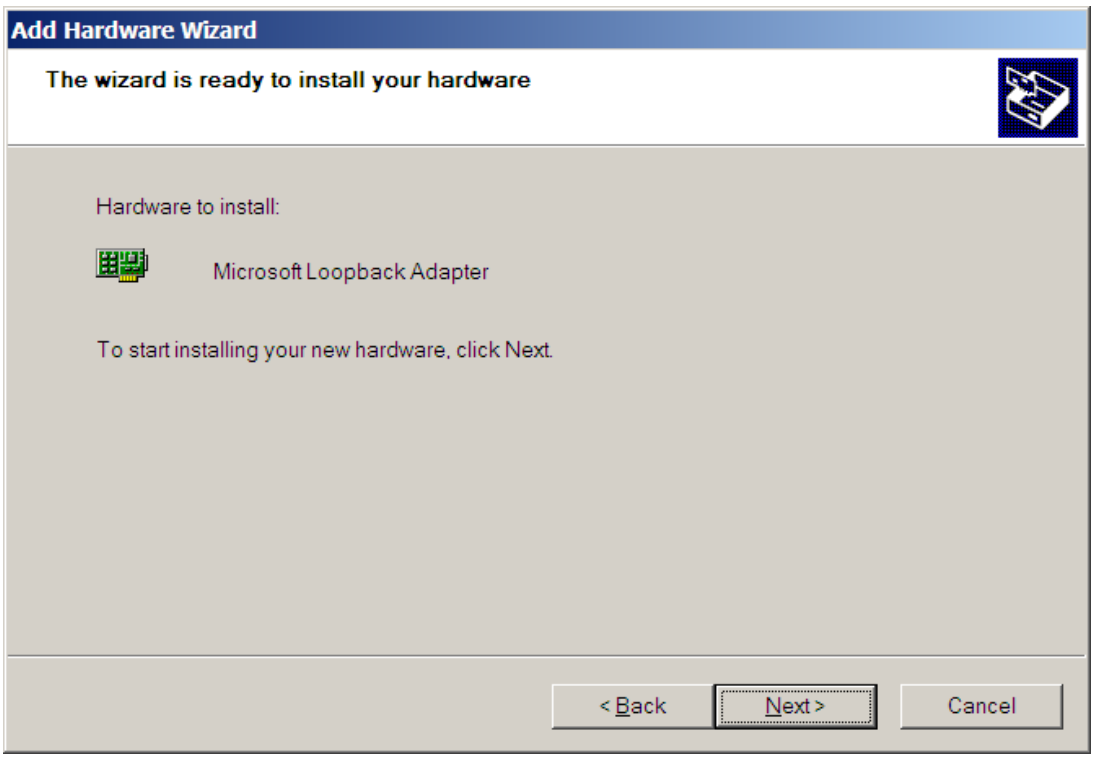
You will see a list of hardware already installed on your computer. Scroll down to the bottom of the list and select *Add a new hardware device*, and then click Next. You will see the following screen. Select *Search for and install…* and click *Next*.

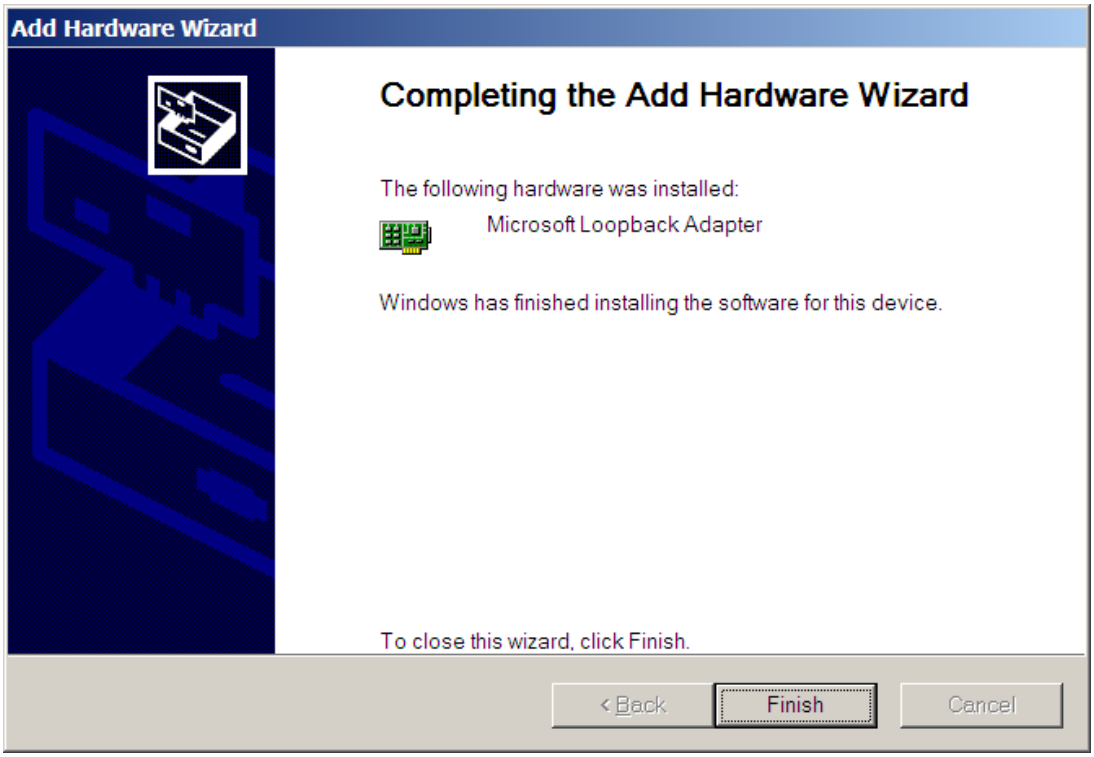


Select *Network adapters* then *Next*




Add Hardware Wizard
Select Network Adapter
Which network adapter do you want to install?
Click the Network Adapter that matches your hardware, then click OK. If you have an installation disk for this component, click Have Disk.
Manufacturer
Cisco Systems
Intel(R) Corporation
Microsoft
Toshiba
Network Adapter:
Bluetooth Device (RFCOMM Protocol TDI)
Microsoft Loopback Adapter
Microsoft Tun Miniport Adapter
This driver is digitally signed.
Tell me why driver signing is important
Have Disk...
< Back
Next >
Cancel


Add Hardware Wizard
The wizard is ready to install your hardware
Hardware to install:
Microsoft Loopback Adapter
To start installing your new hardware, click Next.
< Back
Next >
Cancel



Check Control Panel->Network Connections. If the Loopback Adapter still does not say 'Connected' then do the following steps.

To manually install the Microsoft Loopback adapter in Windows XP, follow these steps:

1. Click **Start**, and then click **Control Panel**.
2. If you are in Classic view, click **Switch to Category View** under **Control Panel** in the left pane.
3. Double-click **Printers and Other Hardware**, and then click **Next**.
4. Under **See Also** in the left pane, click **Add Hardware**, and then click **Next**.
5. Click **Yes, I have already connected the hardware**, and then click **Next**.
6. At the bottom of the list, click **Add a new hardware device**, and then click **Next**.
7. Click **Install the hardware that I manually select from a list**, and then click **Next**.
8. Click **Network adapters**, and then click **Next**.
9. In the **Manufacturer** box, click **Microsoft**.
10. In the **Network Adapter** box, click **Microsoft Loopback Adapter**, and then click **Next**.
11. Click **Finish**.

You next need to make sure that the Microsoft Loopback Adapter is properly configured.

1. Right-click My Network Places on the desktop and select Properties. This displays the Network and Dial-up Connections control panel.
2. Right-click the connection that was just created. This is usually "Local Area Connection 2". Select *Properties*.
3. On the General tab, select Internet Protocol (TCP/IP), and click *Properties*.
4. In the Properties dialog box, click Use the following IP address and do the following:
   a) IP Address: Enter a non-routable IP address for the loopback adapter.
   Oracle recommends the following non-routable address:
   192.168.x.x (where x is any value between 0 and 255)
   b) Subnet mask: Enter 255.255.255.0.
   c) Record the values you entered.
   d) Leave all other fields empty.
   e) Click OK.
5. Close the Network Connections window.

Note: On Linux systems, the loopback adapter is not required.

Appendix C: Installing Oracle 11g Express Edition

This appendix guides you though the installation of Oracle 11g Express on Windows and Linux.

Introduction

The Express Edition (XE) is a limited scalability version of Oracle designed to compete with comparable reduced scalability DBMS from Microsoft and other vendors. It has the following limitations:

- Only one CPU may be used (on multiple CPU systems, the equivalent of one CPU is used)
- No more than 11GB of user data may be stored
- Only one instance of XE may be run at one time
- XE will use at most 1GB of RAM during execution

Despite these intended scalability limitations, XE is ideal for classroom work because it requires fewer system resources, yet is functionally complete enough that it may be used for the exercises in CS579, CS669, and CS779. CS674 requires the Enterprise Manager, which is in the Enterprise Edition.

Requirements

This package has minimum requirements for operating system versions:

- Microsoft Windows XP Professional
- Microsoft Windows Server 2003 - all editions
- Microsoft Windows Server 2003 R2 - all editions
- Microsoft Windows Server 2008 - Standard, Enterprise, Datacenter, Web, and Foundation editions. The Server Core option is not supported.
- Microsoft Windows 7 - Professional, Enterprise, and Ultimate editions

Both Windows and Linux installations require approximately 1.5GB of disk space. At least 512MB of memory is recommended.

Installation (Windows)

The following is taken from the Oracle 11g Express Edition Installation Guide.

To perform a graphical user interface installation:

1. Log on to Windows with Administrative privileges.

   You must be part of the Administrators group on Windows to install Oracle Database XE. If you are logged in as a domain user, ensure that you are connected to the network.

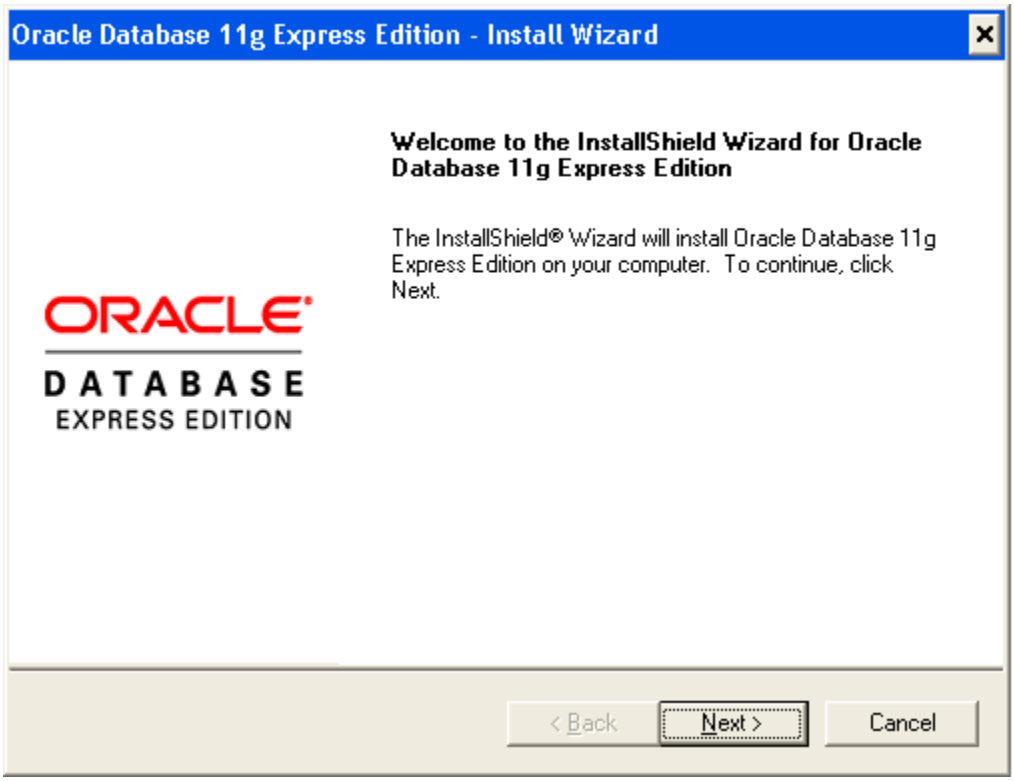
2. If the ORACLE_HOME environment variable has been set, then use System in the Control Panel to delete it.
3. Go to the following Web site:

   http://www.oracle.com/technetwork/database/express-edition/downloads/index.html

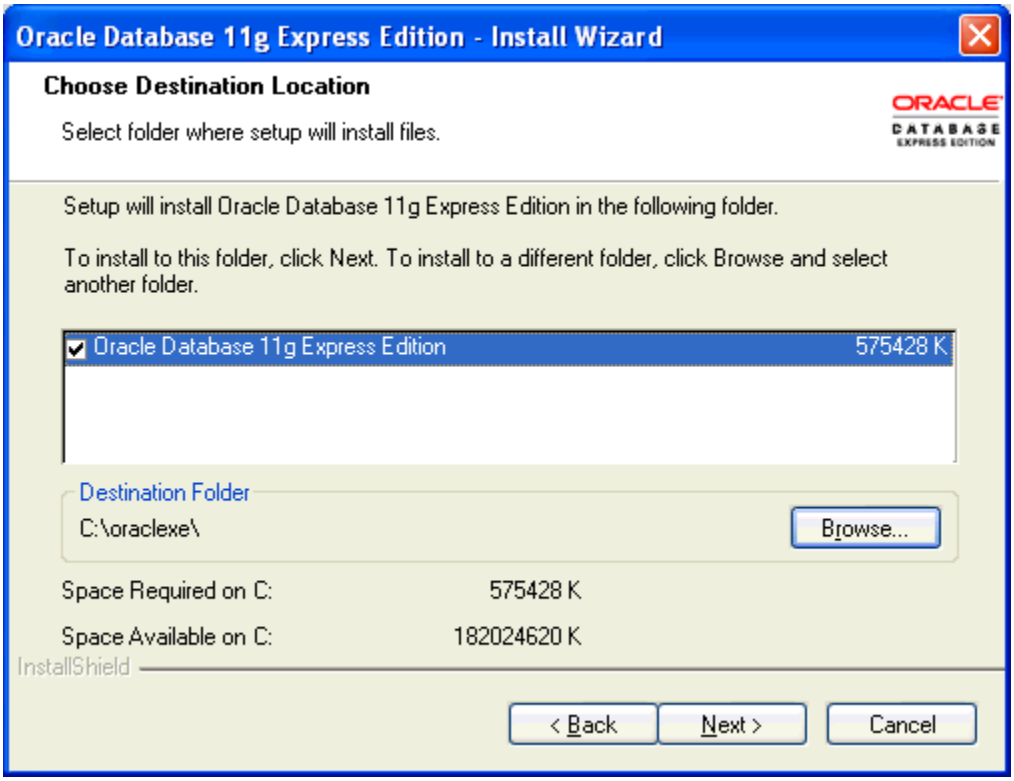
4. Click Free Download and follow the instructions to select and download the Microsoft Windows version of Oracle Database XE.
5. After downloading the Oracle Database XE installation executable, setup.exe, double-click it.

   "Oracle Database XE Character and Language Configurations" describes these character sets in detail.

6. In the Oracle Database 11g Express Edition - Install Wizard welcome window, click Next.



7. In the License Agreement window, select I accept the terms in the license agreement and then click Next.
8. In the Choose Destination Location window, either accept the default or click Browse to select a different installation directory. (Do not select a directory that has spaces in its name.) Then click Next.



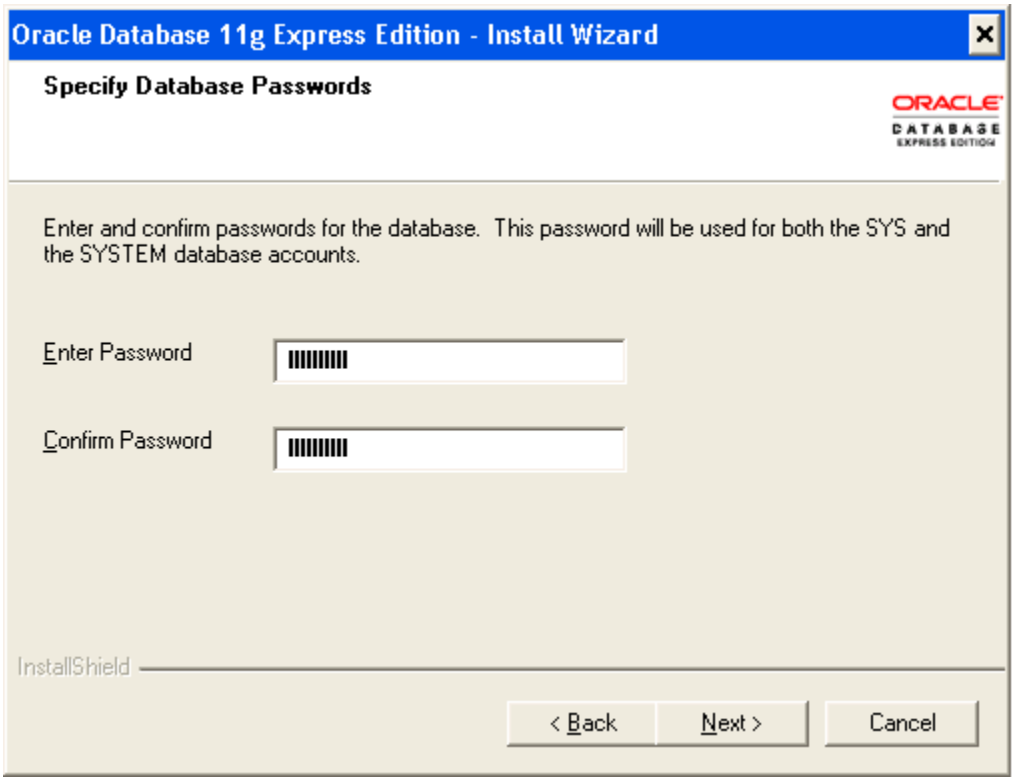
9. If you are prompted for a port number, then specify one.

   The following port numbers are the default values:

   - 1521: Oracle database listener
   - 2030: Oracle Services for Microsoft Transaction Server
   - 8080: HTTP port for the Oracle Database XE graphical user interface

   If these port numbers are not currently used, then the installation uses them automatically without prompting you. If they are in use, then you will be prompted to enter an available port number.

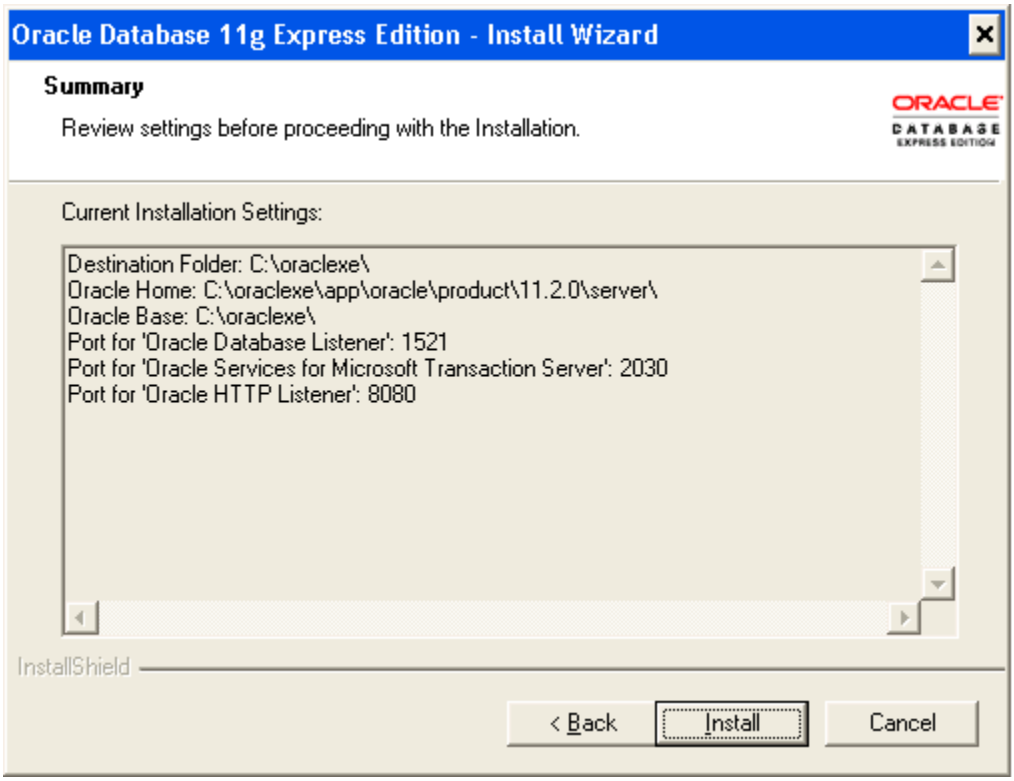
10. In the Specify Database Passwords window, enter and confirm the password to use for the SYS and SYSTEM database accounts. Then click Next.



Note:

The password for the INTERNAL and ADMIN Oracle Application Express user accounts will be the same as the SYS and SYSTEM administrative user accounts.

11. In the Summary window, review the installation settings, and if you are satisfied, click Install. Otherwise, click Back and modify the settings as necessary.



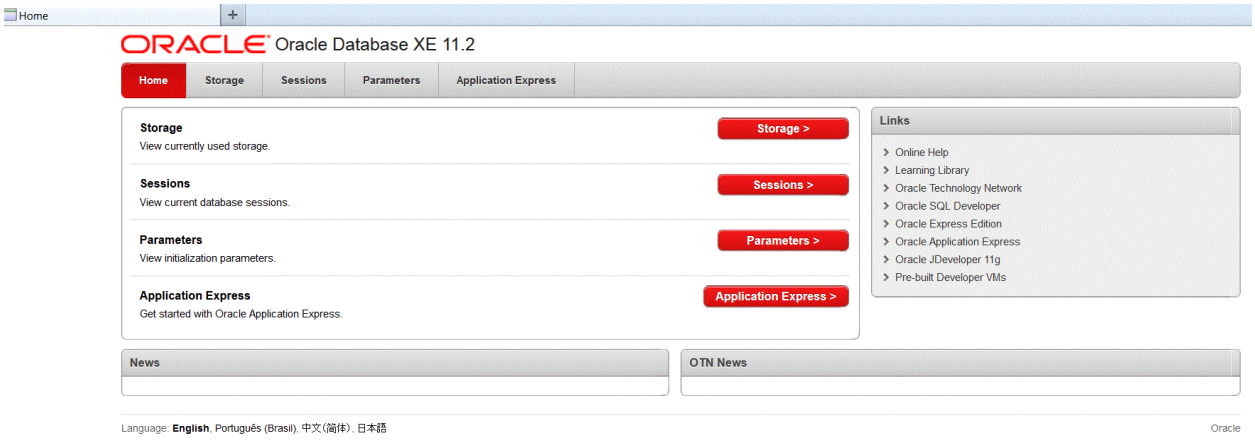
12. In the InstallShield Wizard Complete window, click Finish.

Note:

Logs for the server component installation are in the OracleDatabaseXEServerInstall.log file, located in the system root directory, which is typically c:\WINDOWS. You can find the database creation logs in the install_directory\app\oracle\product\11.2.0\server\config\log directory. (install_directory is typically c:\oraclexe.)

13. You'll see an icon like this

on your desktop. When you click it, the database home page will open in your browser, as below.



Starting the Database (Windows)

The following is taken from the Oracle 11g Express Edition Installation Guide.

After you have installed Oracle Database XE, the database is up and running and you can begin using it right away.

1. If the database is currently stopped, start it as follows: from the Start menu, select Programs (or All Programs), then Oracle Database 11g Express Edition, and then click Start Database.
2. From the Start menu, select Programs (or All Programs), then Oracle Database 11g Express Edition, and then click Run SQL Command Line. Connect to the database using the user name SYSTEM, and supply the password that you created during installation.

Immediately after you install Oracle Database XE using the graphical user interface installation method, if you selected the Launch the Oracle Database 11g Express Edition homepage checkbox when the installation completed, the Database Home Page appears. To get started using Oracle Database XE, click Getting Started to learn how to log on and create a simple application.

If you did not select the Launch the Oracle Database 11g Express Edition homepage checkbox, or if you want to access Oracle Database XE from another computer, then follow these steps:

1. To access the Database Home Page, from the Start menu, select Programs (or All Programs), then Oracle Database 11g Express Edition, and then Go to Database Home Page.

   If Oracle Database XE Server is installed on another computer, then you can access it from the following URL:

   http://host:port/apex/

In this URL:

- “host” is the host name or IP address of the computer where Oracle Database XE Server is installed. If Oracle Database XE Server is on your local computer, then you can enter localhost as the host name.

  Note that the URL in the browser by default points to the localhost IP address 127.0.0.1. If you want another user to access your Oracle Database XE installation, then provide the host name or IP address of your computer.

- “port” is the TCP port that the Oracle Database XE HTTP listener is listening on. You set this port number during installation. Normally it is set to 8080.

For example, if Oracle Database XE Server was installed on a computer with the host name shobeen with the default port number 8080, you would access the Database Home Page at this URL:

http://shobeen:8080/apex/

2. Log in to the database using the user name SYSTEM, and supply the password that you created during installation.

The web interface provides a Help link that displays commonly used commands.

Installation (Linux)

To install Oracle Database XE Server:

1. Log on to your computer with root permissions.
2. Go to the following Web site:

   http://www.oracle.com/technology/products/database/xe
3. Click Free Download and follow the instructions to select and download the Linux version of Oracle Database XE Server.
4. Run one the following Oracle Database XE executables to either install or upgrade Oracle Database XE server:
   - For Linux operating systems that use Debian:
     - Universal character set: oracle-xe-universal_10.2.0.1-1.0_i386.deb
     - Western European character set: oracle-xe_10.2.0.1-1.0_i386.deb
   - For all other supported Linux operating systems:
     - Universal character set: oracle-xe-univ-10.2.0.1-1.0.i386.rpm
     - Western European character set: oracle-xe-10.2.0.1-1.0.i386.rpm

   For example, if you downloaded the oracle-xe-universal_10.2.0.1-1.0_i386.deb executable into a directory called downloads, you would enter the following command:

   $ dpkg -i downloads/oracle-xe-universal_10.2.0.1-1.0_i386.deb

   If you downloaded the oracle-xe-univ-10.2.0.1-1.0.i386.rpm executable, you would enter this command:

   $ rpm -ivh downloads/oracle-xe-univ-10.2.0.1-1.0.i386.rpm

   The installation displays a status of its progress.
5. When prompted, run the following command:

   $ /etc/init.d/oracle-xe configure
6. Enter the following configuration information:
   - A valid HTTP port for the Oracle Database XE graphical user interface (the default is 8080)
   - A valid port for the Oracle database listener (the default is 1521)
   - A password for the SYS and SYSTEM administrative user accounts
   - Whether you want the database to start automatically when the computer starts

     If you enter Yes, then the database starts immediately

If you need to change the configuration settings, then you can do so by running the following command:

$ /etc/init.d/oracle-xe configure

To start the database manually, run this command:

$ /etc/init.d/oracle-xe start

To stop the database manually, use the following command:

$ /etc/init.d/oracle-xe sto

Starting the Database (Linux)

After you have installed Oracle Database XE, the database is up and running and you can begin using it right away, as follows:

1. If the database is currently stopped, start it as follows: click the Main menu (on Gnome) or the Applications menu (on KDE), then Oracle Database 11g Express Edition, and then click Start Database.
2. Go to the Main menu (on Gnome) or the Applications menu (on KDE), then Oracle Database 11g Express Edition, and then click Run SQL Command Line. Connect to the database using the user name SYSTEM, and supply the password that you created during configuration.
3. To begin learning about Oracle Database XE, use the OracleDatabase XE Documentation.

   To access the Oracle Database XE Documentation, from the Main menu (on Gnome) or the Applications menu (on KDE), select Oracle Database 11g Express Edition, then Get Help, and then click Read Documentation.

Note:

To use Oracle Database XE, your user id must be a member of Linux group dba.

Appendix D: How to reset your SYSTEM password on Windows

This appendix provides instructions for resetting your Oracle SYSTEM password without reinstalling Oracle. This method uses the operating system authentication, which must be enabled for this to work. We will login to Oracle using the SYSDBA account for which operating system authentication is turned on by default for operating system users in the “dba” user group. Users with the administrator privilege on MSWindows are usually in the dba user group. This solution depends upon having SQLPlus or another comparable Oracle client installed on the machine.

If you are running on a Microsoft Windows platform and you are logged onto the machine as a user in the "dba" operating system user group, which Oracle creates, you don't need to specify a password to connect as sysdba. Just go to the DOS (Command line) prompt and run "sqlplus / as sysdba". SQLPlus should be launched in the command line interface, connected to Oracle as SYSDBA. You can then change the SYSTEM password with the command:

```
ALTER USER SYSTEM IDENTIFIED BY <new password>;
```

Where <new password> is replaced by the new password that you wish to give to the SYSTEM user. For a class installation choose something memorable, and write it down or store it on your computer. Production passwords should be carefully chosen to be resistant to attacks and the passwords should be carefully protected.

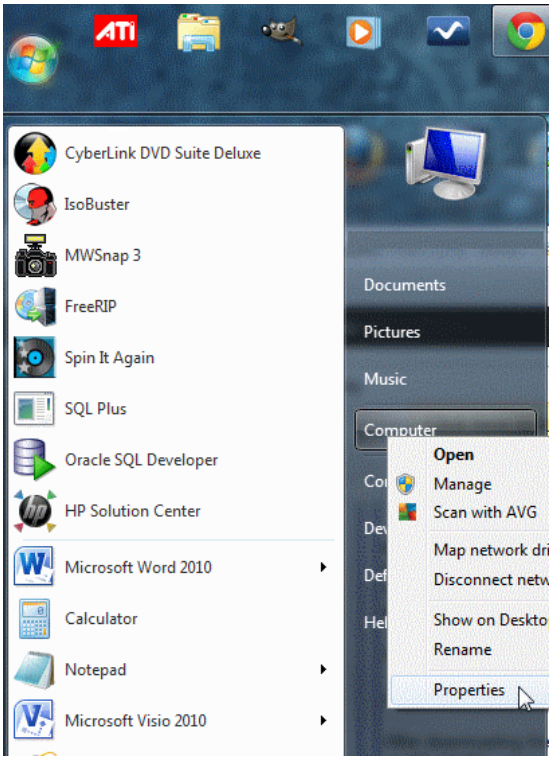
After you have changed the SYSTEM password to something that you know, you can connect as SYSTEM, and do anything that you wish, including changing any passwords. There are similar ways of connecting to Oracle if you know the root password on UNIX family platforms.

Appendix E: How to reduce the length of your PATH on Windows

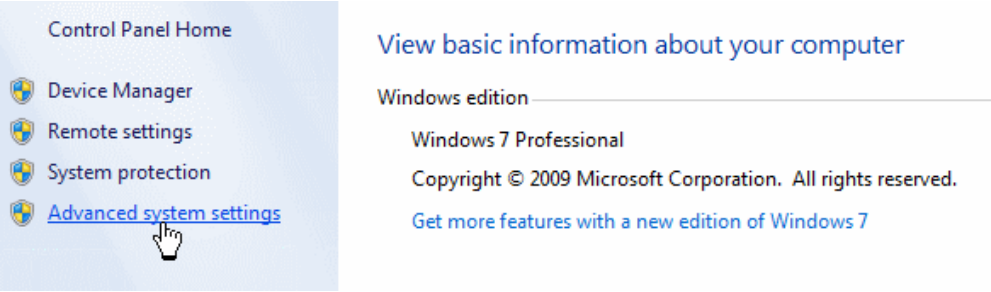
Operating systems including Windows have a maximum length for the value of an environment variable. Environment variables are name/value pairs that control important operating system functions. For some versions of Windows, the maximum is 1024 characters. The PATH environment variable tells Windows where to look for executable files. To function properly, Oracle needs to add its directory to this list. If Oracle's entry into the PATH variable would cause it to exceed the maximum allowable length, Oracle's entry will be ignored.

The resolution to this problem is for you to remove one or more entries from the PATH. However, *do not arbitrarily remove characters or directories from this environment variable as this can cause your operating system to malfunction.* Rather, you need to view the contents of the variable, determine what can be removed, and carefully remove one or more directories from the list. One common reason for the variable's value to be too long is that you have uninstalled software from your system, but its entry in the PATH variable was not removed. If this is the case, simply remove the unneeded directory from the PATH. Another common reason is that you have installed many versions of Oracle or SQL Server. In this case, simply uninstall an unneeded version and ensure that its entry has been removed from the PATH.

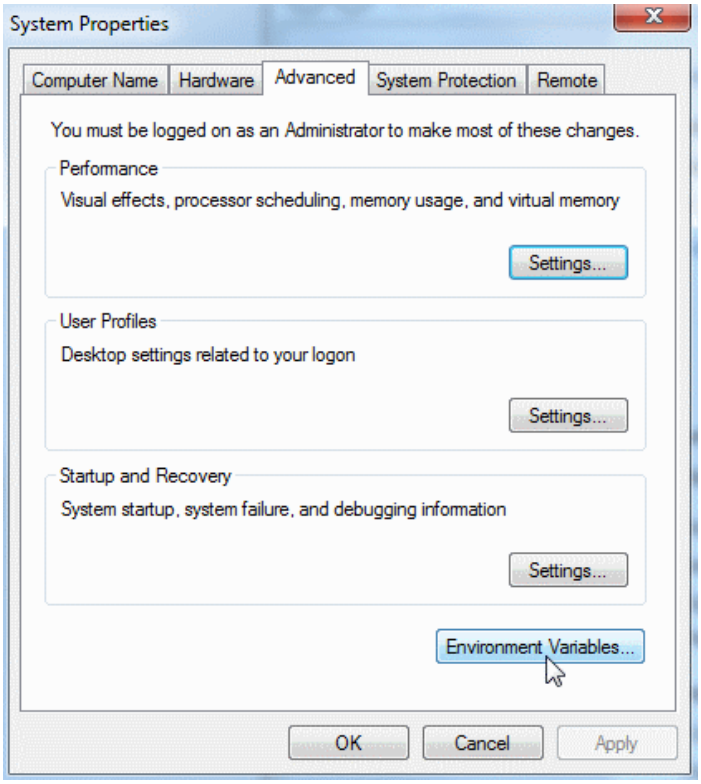
To view and edit environment variables in Windows 7, first click the Windows icon, right click on "Computer", and then click "Properties":



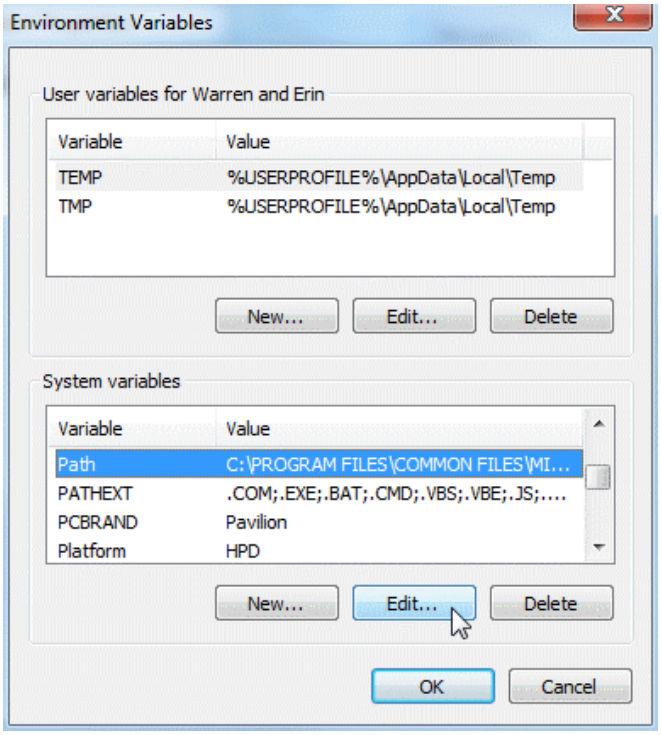
Next, click on the “Advanced system settings” hyperlink:



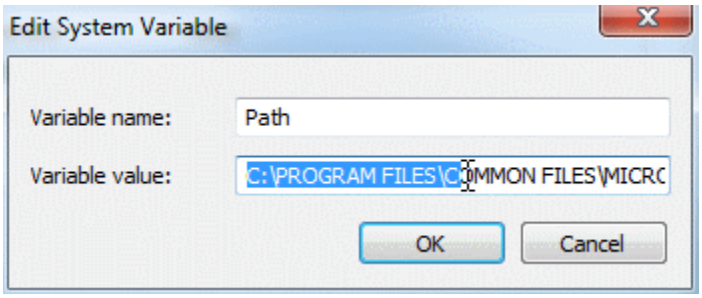
On the resulting dialog, click on the “Environment Variables…” button:



On the Environment Variables dialog, select “Path” under “System variables”, then click the “Edit…” button:



You can now edit the value in the resulting dialog.



As previously mentioned, do not arbitrarily delete text here. Rather, carefully determine the directory or directories to delete. Notice that the value is a list of directories separated by a semicolon (;).

To save your edits, click the OK button on the open dialogs.

Appendix F: How to Install Oracle on a Mac

Oracle can be installed and used on a Mac, but this requires some setup work. Many consider Mac computers to be the most user friendly computers available, and there are many devoted Mac users today. Although Mac computers may be user friendly, the Mac platform is not supported by the major, modern DBMS vendors, including Oracle and SQL Server. If you find yourself in the situation where your home computer is a Mac, and you do not have a readily available Windows machine available for DBMS installation, there are two ways to run Windows on your Mac – dual booting and using a virtual machine.

Dual Booting

The first solution, dual booting, is available to you if you have a modern Mac that runs on an Intel-based processor. All new Macs run on Intel-based processors, but older ones do not. Dual booting is a fairly simple concept. Normally when you power on your computer, your operating system starts booting immediately, and this happens seamlessly so that it appears your operating system is just a natural part of the computer. In actuality, when your computer is first powered on, it first loads a boot loader program, and that boot loader tells the operating system to start. If there is only one operating system, you may not even notice the work of the boot loader, because it always starts the same operating system. However, there is no reason why one cannot install two operating systems on their computer. In such a case, each time your computer is powered on, the boot loader asks you which operating system you would like to start, and also usually defaults to the first one if you do not select an option, after a timeout period.

All new Macs come with what Apple terms “Boot Camp”, which is a built-in utility that supports dual booting Mac OS X and Windows. To install Oracle in Windows on your Mac, you will need to:

1. Review the prerequisites needed to run Boot Camp and to install Windows as a second operating system on your Mac computer. The prerequisites are listed at http://support.apple.com/kb/HT1461. Ensure that your computer meets the requirements before continuing.

2. Obtain a licensed copy of Windows. If you do not have a licensed copy of Windows, you will need to download one from the MSDNAA site. BU students are entitled to free, licensed copies of the latest versions of Windows through the MSDNAA site, and details on how to access this site are available in your course’s syllabus.

3. Burn the copy of Windows onto a CD, or copy the ISO image onto a USB stick. Boot Camp supports installing Windows from either a CD or a USB stick.

4. Follow the steps recommended by Apple to install Windows using Boot Camp. Instructions are included with the utility, and you can also start here as well: http://support.apple.com/kb/HT1461

5. After Windows is installed, reboot your computer then boot into Windows. Proceed with the Oracle install instructions, starting from the beginning of this install guide. When you need to run Oracle, boot into Windows. When you need to use your Mac applications, boot into OS X.

Using a Virtual Machine

A virtual machine mostly behaves as any other application, but has some differences. The virtual machine has an application window that can be minimized and closed, the same as any other application. What makes a virtual machine different from an ordinary application is that an entire operating system is installed and executes inside of the virtual machine. The operating system running inside of the virtual machine, termed a "guest" operating system, runs as if it were to be on its own physical machine. This means we can install and use applications native to the guest operating system. Thus, once we are running a virtual machine, we are effectively running two operating systems at the same time – our machine's operating system (termed the "host" operating system), and the guest operating system – and are using applications native to both operating systems at the same time.

In our case, we are interested in running Windows as a guest operating system on our Mac. There are many virtual machines available for Macs; however, perhaps the two most popular are VirtualBox and Parallels. VirtualBox, available at http://virtualbox.org, is free to download and use. Parallels, available at http://parallels.com, costs money, but offers more features. Students have successfully used both to run both Windows and Oracle on a Mac in our BU program.

Follow the steps below to install and use Oracle on your Mac:

1. Download and install your virtual machine of choice.

2. If you do not have a licensed copy of Windows, you will need to download one from the MSDNAA site. BU students are entitled to free, licensed copies of the latest versions of Windows through the MSDNAA site, and details on how to access this site are available in your course's syllabus.

3. Install Windows inside of the virtual machine.

4. Proceed with the Oracle install instructions, starting from the beginning of this install guide, installing Oracle into the guest operating system.

Dual Booting Versus Using a Virtual Machine

An obvious question is, which of these two options should you use? The answer depends upon your computer hardware, and your personal preferences. The following table summarizes the advantages and disadvantages of both options:

	Advantages	Disadvantages
Dual Booting	Because both operating systems run natively on the computer's hardware, there is no performance overhead. Because both operating systems directly access the computer's hardware, there are not hardware compatibility issues. The setup is conceptually simpler. Simply boot the operating system you need upon startup.	You can only run one operating system and its applications at a time. To start the second operating system, you must reboot. There is no clipboard sharing between applications in both operating systems. If text is to be shared across applications, it must be saved in a file then loaded by applications in the other operating system.
Virtual Machine	The guest operating system and its applications run at the same time as the host operating system and its applications. There is clipboard sharing between applications in both operating systems. Text can be copied from an application in one operating system, and pasted into an application in the second operating system.	Because the guest operating system is running under the control of virtual machine software, the guest operating system and its applications will execute noticeably slower than if they were running natively on the computer. Because both operating systems run concurrently, the performance of the host operating system may degrade.

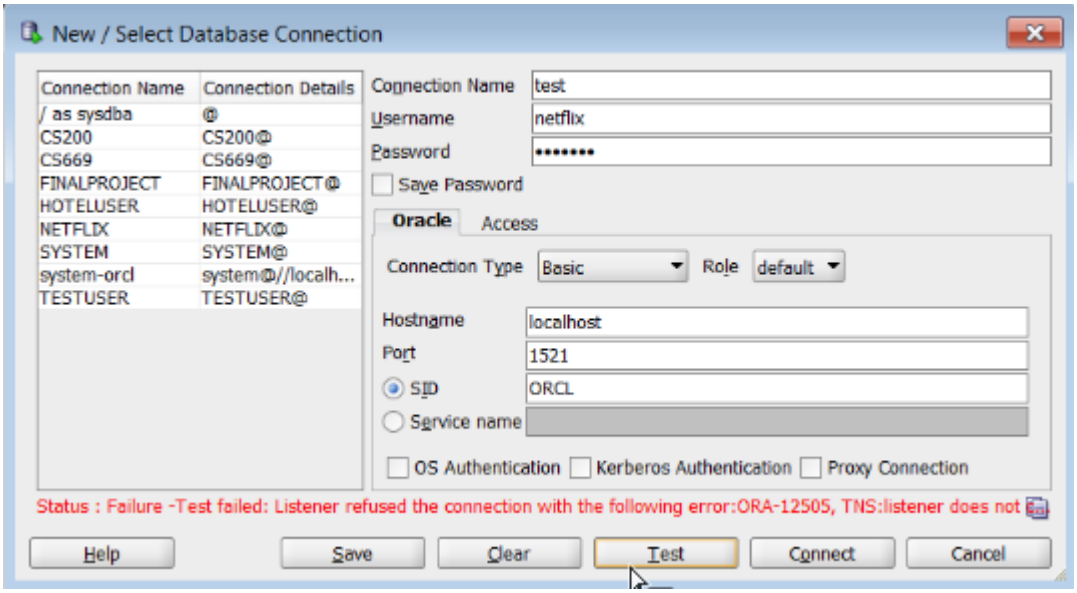
If your hardware is powerful enough to support running two operating systems simultaneously, and still perform reasonably well, you may want to use a virtual machine, so that you can run both your Mac applications and your Windows applications at the same time. If you are concerned about obtaining the best performance for both operating systems, you may want to dual boot.

A third advanced option, supported by the Parallels virtual machine, is to run the *same* Windows installation under a dual boot configuration *and* a virtual machine configuration. This is an advanced setup, and will require two Windows license registrations, as running the same installation both ways is the equivalent of running Windows on two different physical machines.

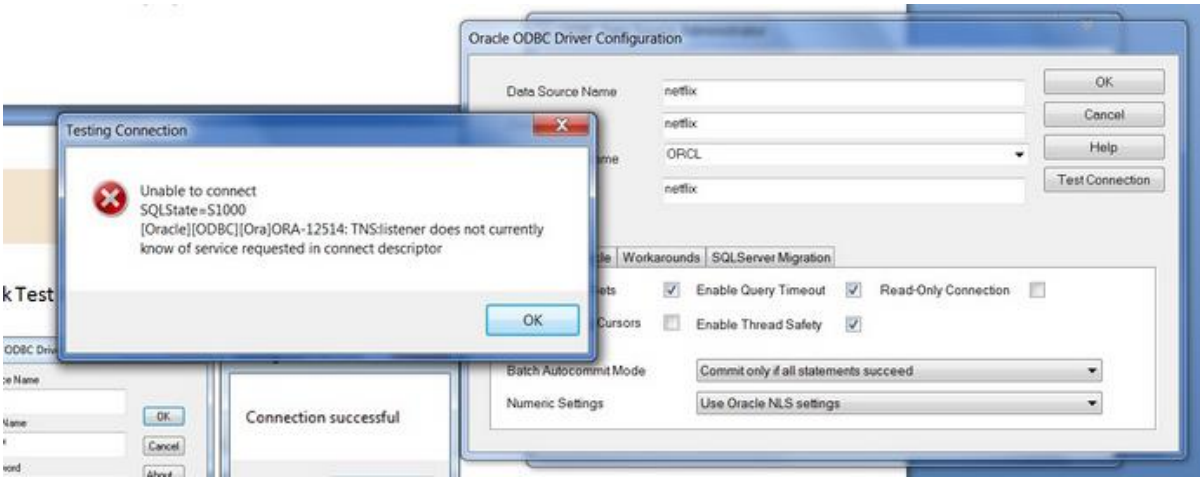
Appendix G: Correcting Oracle Listener Issues

If you attempt to establish a connection to your database, and the database client reports the following error, “Listener refused the connection with the following error: ORA-12505”, this section may help you resolve the issue.

The error looks similar to the following in Oracle SQL Developer:



You may also see this issue while attempting an ODBC connection, as follows:



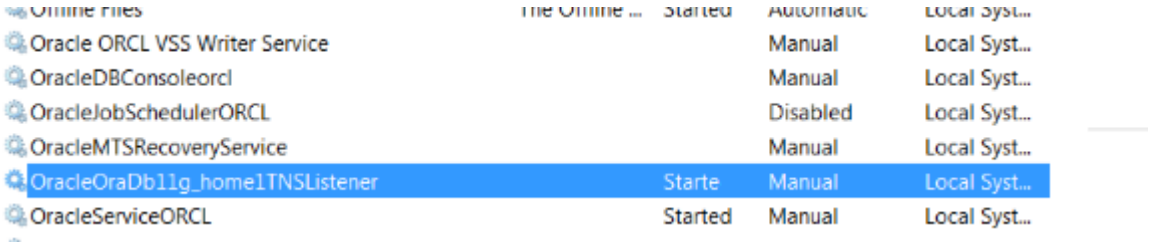
There are two common causes for this error. The first cause is that one or more required Oracle services are not running. This cause is relatively simple to resolve, and should be resolved before attempting to resolve the second cause. The second cause is that the listener may be

incorrectly configured. Correcting the second cause is a little more involved and requires updating configuration files.

Cause 1: Oracle Services not started

You will first want to verify that all required Oracle services are running.

1. Go to Start->Control Panel->Administrative Tools-> Services
2. Scroll down to the services that begin with the word "Oracle". Your screen should look something like this:



Make sure that the following services have a status of "Started":
OracleOraDB11g_home1TNSListener
OracleServiceXXXX, where XXXX is the Oracle SID you chose during the Oracle installation.

If either or both of these services are not running, right click on them and select "Start" from the context menu. Starting the services may be all that you need to do in order to resolve the error.

Cause 2: Incorrect Listener Configuration

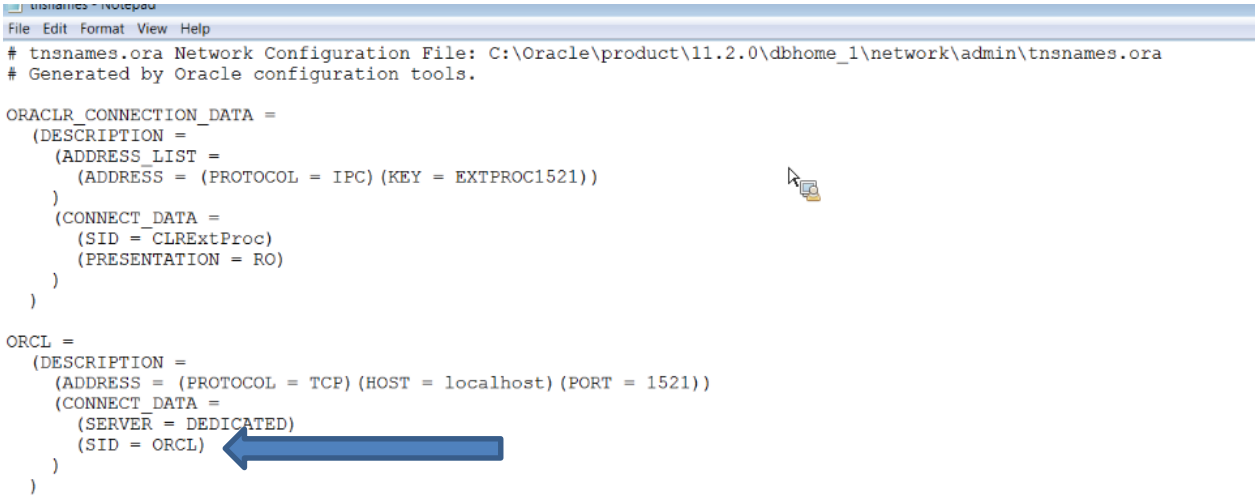
If you have verified that your required Oracle services are started, and you continue to see the "ORA-12505" error, your listener may be incorrectly configured. The following steps may help you resolve the issue.

1. Update the tnsnames.org configuration file.
    a. Using Windows Explorer, go to this directory:
    C:\Oracle\product\11.2.0\dbhome_1\NETWORK\ADMIN
    Note that your directory may vary slightly, depending upon the version of Oracle you are installing, and upon the installation configuration.
    b. Open the tnsnames.ora file with a text editor, such as notepad or notepad++. When you first open the file, it will look similar to the following:

```
# tnsnames.ora Network Configuration File: C:\Oracle\product\11.2.0\dbhome_1\network\admin\tnsnames.ora
# Generated by Oracle configuration tools.

LISTENER_ORCL =
  (ADDRESS = (PROTOCOL = TCP)(HOST = localhost)(PORT = 1521))


ORACLR_CONNECTION_DATA =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1521))
    )
    (CONNECT_DATA =
      (SID = CLRExtProc)
      (PRESENTATION = RO)
    )
  )

ORCL =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = localhost)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = orcl)
    )
  )
```

First, completely delete the two lines associated with the LISTENER_XXXX construct. Next, change the word “SERVICE_NAME” to “SID”, and type in your SID after the equal sign.

After the changes are applied, your file should look similar to the following:



c. Now save the file with the changes. If Windows security will not let you save it as is, then save a copy to the desktop with the same name, then drag the file to the folder to replace the original. Windows will confirm this action with security dialog, which you should approve.

2. Update the listener.ora configuration file.
   a. Using Windows Explorer, go to this directory: **C:\Oracle\product\11.2.0\dbhome_1\NETWORK\ADMIN**

Note that your directory may vary slightly, depending upon the version of Oracle you are installing, and upon the installation configuration.

b. Open the listener.ora file with a text editor, such as notepad or notepad++. When you open the file, it will look similar to the following:

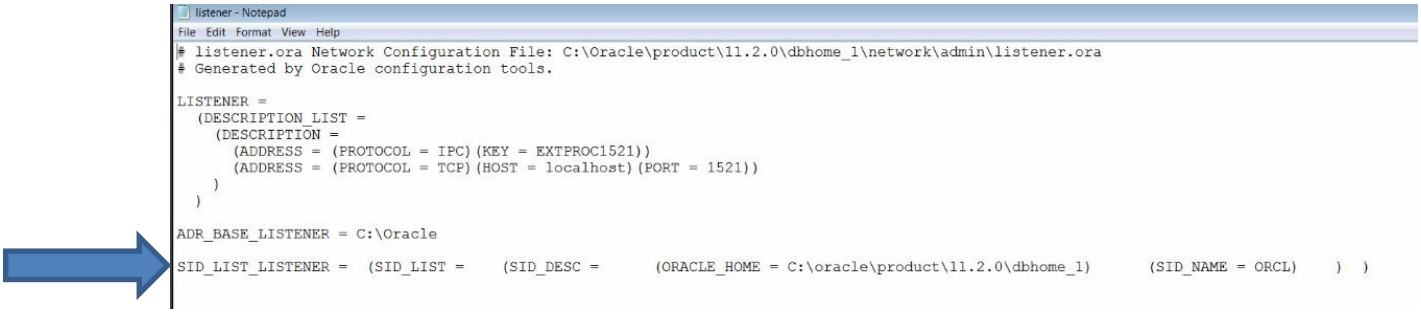
```
# listener.ora Network Configuration File: C:\Oracle\product\11.2.0\dbhome_1\network\admin\listener.ora
# Generated by Oracle configuration tools.

LISTENER =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1521))
      (ADDRESS = (PROTOCOL = TCP)(HOST = localhost)(PORT = 1521))
    )
  )

ADR_BASE_LISTENER = C:\Oracle
```

c. The file has a missing line that you will add to the end of the file. At the end of the file, add the following line:

```
SID_LIST_LISTENER = (SID_LIST = (SID_DESC = (ORACLE_HOME =
C:\oracle\product\11.2.0\db\dbhome_1)(SID_NAME = LUMP)))
```

Note that if your Oracle installation path differs from the above ORACLE_HOME path, you will need to enter the correct path for your installation.

d. After updating the listener.ora file, it will look similar to the following:

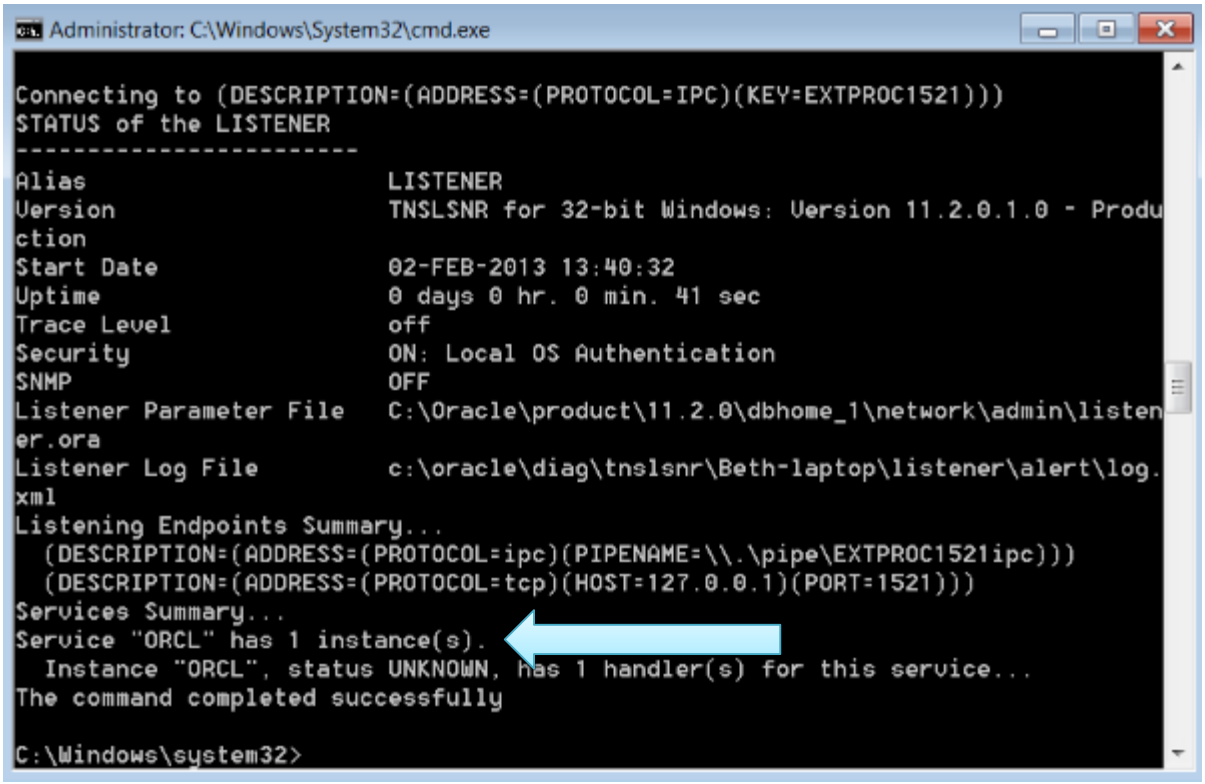


e. Now save the file with the changes. If Windows security will not let you save it as is, then save a copy to the desktop with the same name, then drag the file to the folder to replace the original. Windows will confirm this action with security dialog, which you should approve.

3. Restart the listener service.
   a. Go to Start->Control Panel->Administrative Tools->Services
   b. Scroll down to Oracle services.
   c. Right click on **OracleOraDB11g_home1TNSListener** and select “Restart” from the context menu.
4. Ensure that the listener is listening properly by running the **lsnrctl** command on the command line.
   a. Go to Start->All Programs->Accessories->Command Prompt

Note to Windows 7 users. Make sure to run Command Prompt "As Administrator". To do so, right click on the Command Prompt icon and choose "Run as Administrator".

b. On the command line, type the command **lsnrctl status LISTENER.** If your listener is listening correctly, you should see a screen similar to the following:



Note the line that states that there is 1 instance running.

c. If you see the line that there is 1 instance running, then you should now be able to successfully connect to Oracle using your database client.