Homework #4

CINS 370 Introduction to Databases
Due Friday February 28, 11:59pm
70 points

Incomplete Oracle install will result in zero credit. Start early and get help as necessary.

OBJECTIVE: This homework is an excellent hands-on assignment that many students find challenging and truly enjoyable. The objective of this lab is to perform the steps needed to set-up an Oracle working environment. Project teams are encouraged to use this Oracle environment because our class discussions will be specific to this environment.

There are several ways to proceed with this assignment. Keep in mind. This is an individual Homework assignment and not a Team assignment. This means that that all members will need to create their own environment and thereafter, one of the environment will be chosen to do the Team DB application. Here are some possible options to install Ubuntu. Pick one.

A. The best option is to install your Oracle instance on the Amazon AWS Ubuntu 18.04 cloud via aws.amazon.com. It tends to be much easier, faster, and convenient. Plus, this will give you experience for future CSCI classes. The instructor cannot enforce fees, thus, option C below is the free option. After you set an AWS account, to get a $40 credit, go to aws.amazon.com/education/awseducate/
B. If you already have an Ubuntu Linux OS running, then it can be used to install Oracle
C. On a Windows or Mac OS, you can install Ubuntu Linux via VMware or VirtualBox with relatively no impact to your host computer. I downloaded Ubuntu Desktop 18.04 from www.ubuntu.com

1. Choose option A, B, or C from above. Plenty more will be discussed during class time and of course, please stop by instructor's office OCNL 223 as needed. Instructor is on campus Monday thru Friday.

2. The student will need to create an Oracle Technology Network OTN account in order to download software. Go to http://www.oracle.com

3. From www.oracle.com, Transfer a copy of the free Oracle Database 11gR2 Express Edition for Linux x64 to your Amazon AWS **Ubuntu** Linux instance. Due to Oracle's authentication, I had to first download the zip file to my laptop and then I used WinSCP to transfer the file to my Ubuntu Linux instance.

   Goto https://www.oracle.com/database/technologies/xe-downloads.html
   scroll down and click on "Prior Release Archive"
   click on "Oracle Database 11gR2 Express Edition for Linux x64"

If you are new to Unix, in this document, the $ symbol represents the regular user Linux interface command prompt. And the # symbol represents the Administrator user Linux interface command prompt.

4. On your Ubuntu server, ensure it has the latest software updates because your Oracle installation may complain during the install step. You can do this with the following commands:
   $ sudo apt-get update
   $ sudo apt-get upgrade

5. You may have noticed the file you transferred earlier from Oracle is zipped. You will need to unzip it. You may need to download the unzip package. You may also need the bc utility which may or may not already be installed. It just depends on what Ubuntu version you are using. Execute the following.
   $ sudo apt-get install unzip
   $ sudo apt-get install bc

6. Let's install more software. Execute the following command to install the following set of commands:
   $ sudo apt-get install alien libaio1 unixodbc vim rlwrap

7. Navigate to the directory where you transferred the Oracle file and depending on how the file was transferred, it may need to get unzipped as:
   $ unzip oracle-xe-11.2.0-1.0.x86_64.rpm.zip

8. Notice the tha unzip step created a Disk1 subdirectory. Next, you want to convert the red-hat (rpm) package to an Ubuntu package using the following command. Note that after hitting the 'enter' key it may seem that nothing is occurring. Give it about 10 minutes and your command prompt should return with successful completion.
   $ cd Disk1
   $ sudo alien --scripts -d oracle-xe-11.2.0-1.0.x86_64.rpm

9. Initiate the vim editor to create the chkconfig file as:
   $ sudo vim /sbin/chkconfig

(enter the following)
```
#!/bin/bash
# Oracle 11gR2 XE installer chkconfig hack for Ubuntu
file=/etc/init.d/oracle-xe
if [[ ! `tail -n1 $file | grep INIT` ]]; then
echo >> $file
echo '### BEGIN INIT INFO' >> $file
echo '# Provides: OracleXE' >> $file
echo '# Required-Start: $remote_fs $syslog' >> $file
echo '# Required-Stop: $remote_fs $syslog' >> $file
echo '# Default-Start: 2 3 4 5' >> $file
echo '# Default-Stop: 0 1 6' >> $file
echo '# Short-Description: Oracle 11g Express Edition' >> $file
echo '### END INIT INFO' >> $file
fi
update-rc.d oracle-xe defaults 80 01
```

10. Once you have saved the file, set the following appropriate permission settings
    $ sudo chmod 755 /sbin/chkconfig

11. You will also need to adjust some kernel parameters. Create the following server initialization script so that every time your server reboots, the kernel settings are set. Use the sudo vim command below to create the script and then enter the contents which follow. Note, in this case, that the pound # symbol represents a comment within a script and not the command prompt(lol).
    $ sudo vim /etc/sysctl.d/60-oracle.conf

```
# Oracle 11g XE kernel parameters
fs.file-max=6815744
net.ipv4.ip_local_port_range=9000 65000
kernel.sem=250 32000 100 128
kernel.shmmax=536870912
```

12. Let's test the above script. Manually load the adjusted kernel parameters by executing 60-oracle.conf
    $ sudo service procps start

13. Analyze your current swap space by following command and look at the /dev/shm
   $ df

Installing a 2 GB swap without partitioning. Some software that you install e.g. oracle database XE requires you to have greater than one GB swap space. We'll do the following steps to add more swap space.

14. To gain root privilege or you can append sudo to each of the following commands
   $ sudo -s

15. Make a compatible link for awk
   # ln -s /usr/bin/awk /bin/awk

16. Make sure the following directory exists. If not, then create it.
   # mkdir /var/lock/subsys

17. Create an empty file
   # touch /var/lock/subsys/listener

The following steps are needed to avoid getting the ORA-00845 MEMORY_TARGET error. Make sure the directory /dev/shm exists and is empty. Ignore this message "device or resource busy":
   # rm -rf /dev/shm
   # mkdir /dev/shm

18. In order to automate the mounting of the temporary virtual memory, create a file named S01shm_load in /etc/rc2.d by executing the following
   # vim /etc/rc2.d/S01shm_load

(enter the following)
#!/bin/sh
case "$1" in
start) mkdir /var/lock/subsys 2>/dev/null
      touch /var/lock/subsys/listener
      rm /dev/shm 2>/dev/null
      mkdir /dev/shm 2>/dev/null
      mount -t tmpfs shmfs -o size=2048m /dev/shm ;;
*) echo error
   exit 1 ;;
esac

19. Save the file and provide the following permission settings.
   # chmod 755 /etc/rc2.d/S01shm_load

   Finally, we can install Oracle. If you get any errors, you may need to skip to step #26

20. Reboot

21. We can now install Oracle 11gR2 XE. **Navigate** to the directory where the deb file was created and execute the following
$ sudo dpkg --install oracle-xe_11.2.0-2_amd64.deb

22. Now we can fully configure the Oracle installation.
$ sudo /etc/init.d/oracle-xe configure

Enter the following configuration information by choosing default values. Also, make sure to write down the password you will be prompted to create. This password is the master DBA password. If you forget this password, you will need to re-install the DBMS which will cause you to lose any DB data:

A valid HTTP port for the Oracle Application Express (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
Confirm password for SYS and SYSTEM administrative user accounts
Whether you want the database to start automatically when the computer starts (next reboot). (y)

23. Before you start using Oracle 11gR2 XE you have to set-up the environmental variables by adding the following lines to your .bashrc file. On my server, the complete full file name is /home/ubuntu/.bashrc

export ORACLE_HOME=/u01/app/oracle/product/11.2.0/xe
export ORACLE_SID=XE
#Export NLS_LANG=`$ORACLE_HOME/bin/nls_lang.sh`
export ORACLE_BASE=/u01/app/oracle
export LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH
export PATH=$ORACLE_HOME/bin:$PATH

24. Log out and log back in so that your .bashrc file executes

25. Add the user currently logged in, to the dba group with the following command:
$ sudo usermod -a -G dba ubuntu

26. This step is ONLY needed if you need to re-install. Don't do these steps during the initial install. For example, if you lose your master DBA password or if you skipped one of the above steps, then it is likely you will need to clean up some Oracle files and re-install.

$ sudo -s
# /etc/init.d/oracle-xe stop
# ps -ef | grep oracle | grep -v grep | awk '{print $2}' | xargs kill
# dpkg --purge oracle-xe
# rm -r /u01
# rm /etc/default/oracle-xe
# update-rc.d -f oracle-xe remove
# exit

If reinstalling, go back to step #20, reinstall and configure the Oracle software

27. The following command logs you in as the DBA. Normally, you just want to log in as a regular user. Hence, the steps below will log you in as the DBA and then you'll create a regular user account.

$ sqlplus sys as sysdba

QL*Plus: Release 11.2.0.2.0 Production on Wed May 9 12:12:16 2012

Copyright (c) 1982, 2011, Oracle. All rights reserved.

Enter password:

Connected to:
Oracle Database 11g Express Edition Release 11.2.0.2.0 - 64bit Production

SQL> create user user101 identified by pass101;

User created.

SQL> grant connect,resource to user101;

Grant succeeded.

SQL> exit

28. Log back in but this time as the newly created user101 user.

$ rlwrap sqlplus

SQL*Plus: Release 11.2.0.2.0 Production on Wed May 9 12:28:48 2012

Copyright (c) 1982, 2011, Oracle. All rights reserved.

Enter user-name: user101
Enter password:

Connected to:
Oracle Database 11g Express Edition Release 11.2.0.2.0 - 64bit Production

SQL> select 2+2 from dual;

2+2

4

SQL> exit

29. Done.

DELIVERABLES

Submission Steps

1. Submit ONLY a screen shot of the SQLPLUS query mentioned in Step 28 above (2+2). This will confirm that the Oracle engine is running ok.

2. Provide 3-4 sentences on the lab experience, obstacles, etc. Did you work on this assignment with your team? The more details you can provide, the better it is to measure your effort.

3. Submit only 1 Word/PDF formatted file on Blackboard. Grading will be done on content, correctness, neatness, grammar, timeliness, etc. Please refer to our course syllabus for more submission details.

4. Please email instructor for any question(s). Keep in mind that if you send your email within 2-3 days before the due date, you may not get a reply on time. This is an incentive to start and complete your work early.