**Unix fundamentals and Command**

**Foundation Phase**

**Technical Learning Services**

**Unix Assignment: Day 1**

Objective: At the end of the assignment, participants will be able to:

* Execute Basic Unix commands
* Understand Hardlink and Softlink concepts
* Directory structure

Section 1: **Basic Unix commands**

1. What are different ways of connecting to Linux/Unix server from windows client machine?
2. Display system name (Unix) using Unix command.(Hint - **uname** command)
3. Display kernel version using **uname** command.
4. List all the files and sub directories of the /bin directory.
5. Display all files and sub directories of /boot directory?
6. What is **vmlinuz** in /boot directory?
7. List all the files including hidden files in your current directory.
8. Display name of system generated log files on the console.
9. List all the files starting with letter ‘r’ in your current directory.
10. List all the files having three characters in their names, from your current directory.
11. List all the files with extension .doc in your current directory.
12. List all the files having the first letter of their name within the range ‘l’ to‘s’, from your current directory.
13. Create a file text1 and read its input from keyboard.
14. Copy the contents of file text1 to another file text2.
15. Append the contents of file text2 to file text1.
16. Count the number of files in the current directory.
17. Display the output of command ls –l to a file and on the output screen.
18. Find the number of users currently logged on to the system.
19. Delete all the files with their names starting with “tmp”.
20. List only the directories in your current directory
21. To lists all the files in the /etc sub-directory that begin with the letter w.
22. To lists all four character filenames in the /etc sub-directory
23. To list all files beginning with "temp" and ending in any digit between 1 to 9
24. To lists all files beginning with the letter a or A
25. Using one single command, display the output of “who” and “pwd” commands.
26. List all the files in the /etc dicd
27. catrectory that have .config extensions.
28. Enter the command ‘who am i’ without the embedded spaces in between and see the output.

28. Display the user name taken on a dynamic basis to display the following message

**Hi, User! Welcome to Techmahindra Learning World!**

1. Show the paths for the commands: pwd, mkdir,find,fsck
2. Show the Calendar that shows the year in which the next Olympics are held.

Section 2: **Hardlink and Softlink Concepts**

1. Create a file fruit with some text in it using cat command.
2. Create hard link to fruit file and verify inode number of both files. Whether it’s same or different.
3. Append newly created file with some text in it and observe that it is reflected in original file. State the reason for the same.
4. Count the link of fruit file.
5. Now remove original file fruit and comment your observation on newly created file.
6. Creacdte soft link for file /etc/**passwd** in your working directory.

Verify inode number of soft link and original passwd file under /etc dir.

1. Can we create soft link for directory? if yes verify with suitable example.

Create file inside new created directory and observe file under original directory.

Section 3: **Directory structure**

1. Display your current working directory.
2. Create following directory structure under your Home directory

(Note: Your home directory is where you login to.)

SYSTEM (SUB DIRECTORY)

HARDWARE (SUB-SUB DIRECTORY) SOFTWARE

INPUT OUTPUT (SUB-SUB-SUB) APPL SYS

MOUSE PRINTER ( FILES ) JAVA OS

SCANNER VDU (FILES ) DOTNET LINKERS

* + - 1. 3. List detailed information about all the files and directories of Hardware directory while your current directory is still the home directory.

1. 4. Change your current directory to SYS and list the names of all files and subdirectories in the directory sub tree starting that starts from your home directory.
2. 5. Rename the file SCANNER to SCAN.
3. 6. Read some text form Keyboard and append it to the file SCAN.

7. Remove the directory sub tree starting from SYSTEM in one go.

**Unix Assignment: Day 2**

Objective: At the end of the assignment, participants will be able to understand and implement:

* Using basic **Unix** commands and filters as building blocks
* Shell overview

Section 1**: Unix Filter command**

1. Create two files Data1.doc and Data2.doc with almost identical data (with some minor differences). Compare the two files to display the bytes offset and the line numbers where they differ
2. Display the command output that compares the two files DIR1 and DIR2 and proposes the changes to make them identical
3. Check the permissions for User, Group and Others on the file DIR1.doc
4. Revoke the Write Permission for the Group using absolute method and grant the same using Symbolic method.
5. Find the UMASK set for the system and deduce what effective permissions would exist for a newly created File?
6. Find the word count of DATA1.doc file
7. Redirect the output of the long list of all files with only .config extension inside /etc directory to **Plans** subdirectory with the file name: File1.doc that you earlier created
8. After the 7th Assignment question find the line count File1.doc
9. Display the top 12 lines and the bottom 5 lines of File1.doc
10. Create a File Customers with the following content

1000 Rajesh Mumbai [Rajesh111@gmail.com](mailto:Rajesh111@gmail.com)

1056 Irfan Delhi [Ifr2134@rediffmail.com](mailto:Ifr2134@rediffmail.com)

1780 Chritina Chennai [Chritina709@gmail.com](mailto:Chritina709@gmail.com)

a) Use cut command to get only Name and Address fields from the above file

b) Display only second and third characters from the above file

11. Sort only the numeric columns in the Customers file

12. Sort the third field of the Customer file

13. Ensure that the Sentence “the social man” is displayed all in capital letters

14. Replace all spaces in the below sentence with ‘~’ character:

**Cheque Amount is 34890 INR**

15. Assign variable x a value of 100. Export it and then disassociate the value 100 from x

16. Give the command that will list all the Environment variables in the Unix machine

17. What is the purpose of .**bash\_profile** file?

18. Count the total number of words and lines in file text1.

19. Display the system date in following format:

1. Today is Friday, 17 May 96
2. Create a file called india.txt and enter below line

**I love my**

Create another file bharat.txt and enter below line

**India**

Generate a file which should have messages from above two files.

**I love my India**

Create a file emp.dat having colon (: ) separated fields

Empid: Name: Sal

1001:John:50000

1002:Mary:60000

1003:Robert:70000

10010:Sam:40000

100100:Julie:50000

10020:Sally:10010

Create another file called dept.dat

Dept

Sales

Marketing

Marketing

HR

HR

Sales

Generate a file which should have information from above two files.

Empid: Name: Sal: Dept

1001:John:50000:Sales

1002:Mary:60000:Marketing

1003:Robert:70000:Marketing

10010:Sam:40000:HR

100100:Julie:50000:HR

10020:Sally:10010:Sales

1. Display only username (login name) and their IP addresses on console.
2. Display only files name and their size on the console.
3. Display file name and its size having largest size in your current working directory.
4. Create the file employee.txt having colon (: ) separated fields.   
   The fields of the record are: enumber, ename, eposition, esal, edoj, edept.   
   And now answer the following:
   1. List all the employees along with a row number
   2. Sort the file as per the names
   3. List top three salaried employees
   4. Remove duplicate records from the file
   5. List dept. no along with no. of employees working in each dept.
   6. Sort the file in descending order of salary.

**Unix Assignment: Day 3**

Objective: At the end of the assignment, participants will be able to

* Use vi Editor
* Regular expressions and grep

Section 1**:** **vi editor**

1. Using vi editor:
   1. Create a file “Data1.txt
   2. Save the file and exit from the vi editor.
   3. Open the vi editor without specifying a file name
   4. Write some text and and save it to a file “MyData2.txt”
   5. Repeat point ( c ) but after writing some text don’t save and just exit “vi”
2. Create the following file content (Name the File as evolution.doc) using vi Editor:

According to Evolution theory, the paleontologists and Anthropologists do not accept the Critical Point Theory. According to Critical Point Theory, there has been a quantum leap in the human thinking levels that created a huge gap between the humans and its nearest relative the ape.

Even after millians of years we do not actually see any evolutionary progress in the apes.

What is the cause of this?

Why is it that while humans have progressed in leaps and bounds, a dog cannot even build a rough and rudimentary shelter for itself? In short one wonders what has kept, say, an earthworm from evolving. These questions may seem senseless but one cannot refrain from asking them nevertheless. But we wander away from the point. And that is the wonder of this rather confusing article.

{From the above Para answer the following questions}:

1. Highlight globally the occurrence of the word “evolution”
2. Create an abbreviation for the word “Paleontologist” and use vi editor in inserting a new line at the end of the last para consisting of the word “Paleontologist” automatically expanded using the abbreviation you created
3. Position the cursor at the beginning of the line containing the word “Anthropologists” and open a new line above it
4. Position the cursor at the end of the line consisting of the first occurrence of ‘?”
5. Position the cursor at the beginning of the beginning with ‘Why’ and delete the first two lines
6. Quit from the vi editor without saving the changes you made
7. Replace the occurrence of the word ‘evolution’ with ‘growth’
8. Without quitting the vi editor, find what today’s date is
9. Open the above file in vi editor with the cursor positioned on the 10th Line of the file
10. Replace the letter ‘a’ with ‘o’ in the word ‘millians’ in the file
11. Yank the first 5 lines from the file and paste them after the last paragraph
12. Set line numbers to the above file
13. Set an auto-indent to the above file

**The ‘grep’ Command Related Assignments:**

**[Note: All the grep command related questions are based on the above file used in vi Editor]**

1. In the evolution.doc file search for the lines containing the word ‘human’ in it
2. Match all the lines containing “Evolution” and “Even” in them
3. Match all lines containing the word ‘is’. [Note: the lines containing ‘this’ or ‘Anthropologists’ should not form the pattern of search]
4. Match the line(s) ending with ‘is’
5. Count the number of lines containing the word ‘evolution’
6. Print the lines that do not contain the word ‘evolution’
7. Match lines that contain words ‘wonder’ or ‘wander’
8. Create a file using vi editor and enter the following text in it:

**Unix Unix Unix Unix Unix**

**Unix is multi user operating system, Unix is multi tasking o\perating system**

**Everything on Unix is a file.**

**Unix File structure is hierarchical like an upside down tree.**

**Regular files cannot contain another file, or directory**

**Directory File Contains directory(s) and/or file(s) within it**

**Device files are used to represent physical devices.**

**Symbolic link is an indirect pointer to a file**

* + 1. Save the file without exiting vi.
    2. Display the line number from within vi
    3. Move first three lines of the file to the end of the file.
    4. Copy 5th line and paste above the first line.
    5. Search the word ***Unix*** in forward direction
    6. Search the word ***Unix*** in backward direction
    7. Replace all the occurrences of the word ***Unix*** with ***Linux***

Section 2 **: grep family - grep, egrep, fgrep**

* + - 1. Create the file **emp.dat** having colon (: ) separated fields

Empid: Name: Sal: Dept

1001:John:50000:Sales

1002:Mary:60000:Marketing

1003:Robert:70000:Marketing

10010:Sam:40000:HR

100100:Julie:50000:HR

10020:Sally:10010:Sales

1. Display details about employee whose empid is 1001.
2. Display details about employee whose empid is 10010.
3. Display employee’s details of Sales dept.
4. Display only name and salary of employees whose Dept is HR.
5. Display only name of top salaried employee.
6. Sort the emp.dat file in descending order of salary.
7. Count the number of employees in the Marketing dept.
8. Display information about Employees who are not from HR dept.
9. Count the number of employees who are not from HR dept.
   * + 1. Create the file **CDR.dat** having pipe ( | ) separated fields

Source number| Destination number|call duration|date

8834567890|9922153160|10|10-10-2015

8833567891|9922154161|13|11-10-2015

8835567892|9922155162|15|11-10-2015

8834567893|9922156163|16|12-10-2015

8834567894|9922157160|10|12-10-2015

1. Sort the CDR.dat file in the ascending order of call duration.
2. Display only source number and call duration on the console.
   * + 1. Consider the Arizona roaster as an input data file for this exercise.

Using grep , sort, wc , head, tail, pipe do the following activities :-

1. display the number of players on the roster
2. displays the roster in order by jersey number
3. displays the roster in alphabetical order by surname
4. displays the heaviest five players
5. displays all players who attended Wisconsin

The Roaster is given below (separating by comma) :-

JersyNo,Name,surname ,linebackers,Weight , Date , Experience, Country

20 , Anderson, Damien ,RB 5'10" , 212 , 07/17/1979 , 3 ,Northwestern

30 , Ayanbadejo, Oba ,FB 6'02" , 235 , 03/05/1975 , 5 ,San Diego

92 , Berry,Bert ,DE6'03" , 250, 08/15/1975 , 7 ,NotreDame

81 , Boldin,Anquan ,WR6'01" ,215 , 10/03/1980 ,2 , FloridaState

91 , Bryant,Wendell ,DT6'04" ,303, 09/12/1980 , 3 , Wisconsin

35 , Carter,Dyshod ,DB5'10" ,197 , 06/18/1978 ,2 , Kansas State

52 , Fisher,Levar ,OLB6'01" ,235 , 07/02/1979 ,3, NorthCarolina

11 , Fitzgerald,Larry ,WR6'04" ,229, 08/31/1983 ,10 ,Pittsburgh

63 ,Garcia,Frank ,G6'02" , 302, 01/28/1972,10, Wisconsin

1. Grace,Steven ,C6'03" ,295, 02/13/1979 , 3,Arizona

85,Hamilton,Lawrence ,WR6'03" ,205 ,08/31/1980 ,2,StephenF.Austin

* + - 1. Assignments based on ‘gzip’ Command:

1. Find out the size of the file Evolution you created above
2. Compress it so that occupies lesser space in the disk
3. Uncompress it again

**Optional Assignments Question**

Create the following Directory Structure:

Under your current Directory Create a Subdirectory: Streams

Under Streams create two subdirectories: Mainframe and BI

Under Mainframe: ZOS and CICS Subdirectories

Under BI : ETL and REPORTS Subdirectories

Under ZOS create two Subdirectories: **ZOS1** and **ZOS2** and under CICS create **Plans** Subdirectories

Under ETL create : Informatica and IBM subdirectories

Under REPORTS create COGNOS subdirectory

1. Make COGNOS as your current working directory
2. Give a short-cut command that will directly take you to your Home Directory
3. Make COGNOS again as your current directory
4. Give a command that will take you to ZOS1 subdirectory
5. Create two files under each of the ZOS1 and ZOS2 Subdirectories
6. Copy these to Plans Subdirectory.
7. Create a File named: Process under ETL Subdirectory and enter text in it.
8. Append some additional content to it.
9. Copy the content of Process to PLANS subdirectory
10. Rename the Process file in PLANS to PROCS.DOC
11. Create 5 Empty files in ZOS1 subdirectory.
12. Check how many links does ZOS1 subdirectory has. What will you do to create the link count?
13. Type a wrong syntax of a command and redirect its output to a file: error.txt
14. On a single command line create 3 directories such DIR2 exists under DIR1 and DIR2 under DIR1
15. Remove ZOS1 directory along with its content

**Version History:**

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| --- | --- | --- | --- |
| **Version No** | **Author** | **Date Created** | **Reviewed by** |
| 1.0 | Amol Joshi | 27/08/2015 | Amol Joshi |
| 2.0 | Suhas Shirbavikar | 20/06/2016 | Amol Joshi |