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What is Operating System ?
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-> Operating System is a software which is used to interact with computer

-> Operating System is acting as mediator between users and computer hardware components

-> Operating System is mandatory to use any computer

-> OS provides environment to run other applications

(browser, notepad, paint, calc)

-> The OS came into market in 1950

-> Microsoft released it's first OS in 1981 (MS DOS)

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Windows OS
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-> Developed by Microsoft Company

-> It is having GUI (Graphical user interface)

-> It is single user based Operating System (only one person can use this at a time)

-> It is commercial (paid)

-> Less Security

-> It is recommended for personal use

- Watch Movies
- Using Internet
- Playing Games
- Attending Online classes
- Store data

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Linux OS
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-> Linux is Community Based OS

-> Linux is Free & Open Source OS

-> Linux is Multi User Based OS

-> High Security

-> Recommended to use for Applications, Servers, Databases etc..

Note: In realtime, we will use Linux OS only to setup infrastructure required to run our application

-> Linux OS is not only for Administrators, even developers and testers also will use Linux OS in realtime to monitor our application and application servers and application logs.

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History Of Linux
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-> In 1991, a student 'Linus Torvalds' developed this Linux OS

-> Linux Torvalds identified some challenges in UNIX OS and he suggested some changes for Unix OS but UNIX OS Team rejected 'Linux Torvalds 'suggestions

-> Linus Torvalds used Minux OS to develop Linux

Linus + Minux

-> First Two letters from his name and last 3 letters from Minux OS

LI + NUX => LINUX

-> Linus Torvalds released LINUX OS with source code into market so that anybody can modify LINUX OS thatys why it is called as Open Source Operating System.

-> As Linux OS is open source, so many people and companies taken that Linux OS and modified according to their requirements and released into market with different names those are called as Linux Distributions.

RHEL -- RED HAT
Ubuntu OS
Cent OS
Fedora
Open SUSE
Kali Linux
Debian
Amazon Linux

Note : 200+ Linux Distributions are available in the market.

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Environment Setup
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1) Create account in AWS (it will ask debit/credit card) - selected cards are accepted

2) Create Linux VM using AWS EC2 service (download key pair)

3) Download Mobaxterm software to connect with Linux VM

4) Connect with Linux VM using Public IP and pem file

Note: Once work is completed then stop your Linux VM in EC2 to avoid billing

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Linux Commands
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$ whoami : It will display currently logged in username

$ pwd : present working directory

$ date : To display current date

$ cal : To display calendar

-> In Linux everything will be represented as a file

```
-> We have 3 types of files in linux

1) Ordinary File / Normal File  (it will start with -)
2) Directory File  (it will start with d)
3) Link File (it will start with l)

-> The file which contains data is called as ordinary file

-> Directory file is equal to folder (it can contain files and folders)

-> The file which is having linking is called as Link File


=> touch : it is used to create empty file

                $ touch f1.txt
                $ touch f2.txt
                $ touch f3.txt f4.txt

=> To display files we will use 'ls' command

                $ ls

=> To create a file with data we will use 'cat' command

                $ cat > hello.txt
                //write data
                press CTRL + d (to save and exit)

                $ cat hello.txt   (To display file data)

                $ cat >> hello.txt (To append data in the file)
                //write data
                press CTRL + d (to save and exit)

-> To create directory we will use 'mkdir' command

                $ mkdir dirname

-> To remove the file we will use 'rm' command

                $ rm filename

-> To remove empty directory we will use 'rmdir' command

                $ rmdir dirname

=============================================================================================
    1  clear
    2  whoami
    3  pwd
    4  date
    5  cal
    6  clear
    7  touch f1.txt
    8  ls
    9  touch f2.txt
   10  ls
   11  touch f3.txt f4.txt
   12  ls
   13  cat > hello.txt
   14  ls
   15  cat hello.txt
   16  cat > hello.txt
```

```
   17  cat hello.txt
   18  cat >> hello.txt
   19  cat hello.txt
   20  clear
   21  ls
   22  touch f5.txt
   23  ls
   24  cat > f6.txt
   25  cat f6.txt
   26  cat >> f6.txt
   27  cat f6.txt
   28  clear
   29  mkdir movies
   30  ls
   31  cat f1.txt
   32  cat > f1.txt
   33  cat f1.txt
   34  rm f2.txt
   35  ls
   36  rmdir movies
   37  ls
   38  history
```

=> 'ls' is used to list out all files & directories available in the given directory

Note: we can pass several options for 'ls' commands

-> ls : It will display all files in alphabetical order (a to z)

-> ls -r : It will display all files in reverse of alphabetical order (z to a)

-> ls -l : It will display long listing of files

-> ls -t : It will display all files based on last modified date and time. Most recent file will be display at top and old files will display at bottom.

-> ls -rt : It will display all files based on reverse of last modified date and time. Old files will display at top and recent files will display bottom.

-> ls -a : It will display all files including hidden files (hidden files will start with .)

-> ls -li : It will display files with inode.

-> ls -lR : It will display all files and directories along with sub directoris content

Note: -R represents recursive

Note: We can use several options for ls command at a time. When we are using multiple options order of the options is not important

```
$ ls -ltr
$ ls -tlr
$ ls -l -t -r
$ ls -trl
```

Note: All the above commands will give same output

-> To display content of given directory we can execute like below

```
$ ls <dirname>
```

-> To delete a file we will use 'rm' command

```
$ rm <filename>
```

-> To delete empty directory we will use 'rmdir' command

```
$ rmdir dirname
```

-> To delete non-empty directory we will use 'rm' command like below

```
$ rm -r dirname
```

-> To display file content we will use 'cat' command

```
$ cat filename
```

-> To display file content with line numbers we will use '-n' option

```
$ cat -n filename
```

-> To display multiple files content at a time execute command like below

```
$ cat file1 file2 file3
```

-> Copy one file data into another file using 'cat' command

```
$ cat f1.txt > f8.txt
```

-> Copy more than one file data into another file

```
$ cat f1.txt f2.txt > f9.txt
```

Reversing File Content

-> 'tac' command is used to reverse file content

```
$ tac filename
```

-> 'rev' command is used to reverse each line content of the file

```
$ rev filename
```

head command

-> head command is used to display file data from top (default 10 lines)

```
$ head filename
$ head -n 5 data.log  (first 5 lines data)
~$ head -n 20 data.log (first 20 lines data)
```

tail command

-> tail command is used to display file data from bottom (default 10 lines)

```
$ tail filename (last 10 lines data)
$ tail -n 100 filename (last 100 lines data)

$ tail +25 filename (it will display data from 25th line to bottom)
```

Note: To see on-growing logs we can use '-f' option

```
                $ tail -f data.log   (Live log message we can see)


wc command
-----------
-> It is used to count no.of lines, no.of words and no.of characters in the file

ubuntu@ip-172-31-47-242:~$ wc f1.txt
 2  8 45 f1.txt
ubuntu@ip-172-31-47-242:~$

-----------------------------------------------------------------------------------------------
1  clear
    2  whoami
    3  pwd
    4  date
    5  cal
    6  clear
    7  touch f1.txt
    8  ls
    9  touch f2.txt
   10  ls
   11  touch f3.txt f4.txt
   12  ls
   13  cat > hello.txt
   14  ls
   15  cat hello.txt
   16  cat > hello.txt
   17  cat hello.txt
   18  cat >> hello.txt
   19  cat hello.txt
   20  clear
   21  ls
   22  touch f5.txt
   23  ls
   24  cat > f6.txt
   25  cat f6.txt
   26  cat >> f6.txt
   27  cat f6.txt
   28  clear
   29  mkdir movies
   30  ls
   31  cat f1.txt
   32  cat > f1.txt
   33  cat f1.txt
   34  rm f2.txt
   35  ls
   36  rmdir movies
   37  ls
   38  history
   39  cls
   40  clear
   41  whoami
   42  pwd
   43  date
   44  cal
   45  clear
   46  ls
   47  touch f7.txt
   48  cat > f8.txt
   49  cat f8.txt
   50  cat >> f8.txt
   51  cat f8.txt
   52  mkdir test
```

```
 53  ls
 54  rm f8.txt
 55  rmdir test
 56  clear
 57  ls
 58  ls -r
 59  ls -l
 60  ls -t
 61  ls -lt
 62  cat > one.txt
 63  clear
 64  ls -l
 65  ls -r
 66  ls -lr
 67  ls -t
 68  ls -lt
 69  clear
 70  ls -rt
 71  ls -ltr
 72  ls -trl
 73  mkdir aws
 74  mkdir devops
 75  mkdir linux
 76  clear
 77  ls -lt
 78  ls -a
 79  ls -la
 80  ls -
 81  ls -l
 82  ls -la
 83  ls -F
 84  ls -lF
 85  ls -li
 86  clear
 87  ls -l
 88  pwd
 89  cd aws
 90  pwd
 91  touch ec2.txt s3.txt rds.txt
 92  ls -l
 93  cd ..
 94  pwd
 95  clear
 96  ls -l
 97  ls -R
 98  ls -lR
 99  clear
100  ls -l
101  ls -lR
102  clear
103  ls -l
104  ls linux
105  ls aws
106  ls devops
107  ls aws
108  ls linux
109  rmdir linux
110  ls -l
111  rmdir devops
112  ls aws
113  rmdir aws
114  clear
115  rm -r aws
116  ls -l
117  clear
```

```
  118  cat f1.txt
  119  cat >> f1.txt
  120  cat f1.txt
  121  cat f2.txt
  122  cat > f2.txt
  123  cat f2.txt
  124  cat -n f1.txt
  125  cat f1.txt f2.txt
  126  clear
  127  ls -l
  128  cat f1.txt
  129  cat f1.txt > f8.txt
  130  ls -l
  131  cat f8.txt
  132  cat f1.txt
  133  cat f2.txt
  134  clear
  135  ls -l
  136  cat f1.txt f2.txt > f9.txt
  137  cat f9.txt
  138  clear
  139  cat f1.txt
  140  tac f1.txt
  141  rev f1.txt
  142  clear
  143  cat > data.lgo
  144  clear
  145  cat data.lgo
  146  clear
  147  cat > data.log
  148  cat data.log
  149  clear
  150  head data.log
  151  head -n 5 data.log
  152  clear
  153  head -n 20 data.log
  154  clear
  155  head -q data.log
  156  clear
  157  tail data.log
  158  tail -n 100 data.lgog
  159  tail -n 100 data.log
  160  tail -n 200 data.log
  161  clear
  162  tail +25 data.log
  163  clear
  164  tail -f data.log
  165  clear
  166  wc f1.txt
  167  clear
  168  history
```

-> When application running, it will generate log messages and it will store log messages at bottom of the file.

-> To see log messages of the application we will use 'tail' command

cp command

-> To copy the data from one file to another file

```
        $ cp one.txt two.txt  ( or ) $ cat one.txt > two.txt
```

```
        $ cp f1.txt f2.txt f3.txt  (invalid syntax)

-> We can't copy morethan one file data using 'cp' command. To copy multiple files data we should go
for 'cat' command

        $ cat f1.txt f2.txt > f3.txt

Rename the files or directories
-------------------------------
-> To rename files we will use 'mv' command

        $ mv f1.txt f1111.txt

        $ mv  dirname dirnewname

Note: We can use 'mv' command for renaming and moving files

Comparing files
---------------
-> To compare files we can use below commands

$ cmp f1.txt f2.txt
$ diff f1.txt f2.txt

-> cmp command will display only first difference in given 2 two files
-> diff command will display all the differences in the content

grep command
------------
-> 'grep' stands for global regular expression print.

-> 'grep' command will process the text line by line and prints any lines which matches given
pattern.

        Ex: I want to print all lines which contains 'NullPointerException'

        $ grep -i 'NullPointerException' *

Note: We can install grep using below command

        $ sudo yum install grep

//search for the lines which contains given word in the given filename
$ grep 'word' filename

//search for the lines which are having exception keyword in server.log file
$ grep -i 'exception' server.log

//search for the given text in present directory and in sub-directories also
$ grep -R 'exception'

=> We can pass several options for 'grep' command

-c : This prints only the count of files that matches give pattern

-i : ignore case-sentitivty

-n : Display the matched lines and their line numbers

-l : Displays only file names that matches the pattern

-h : Displays matched lines without file names

-R : Displays matched lines with file names
```
