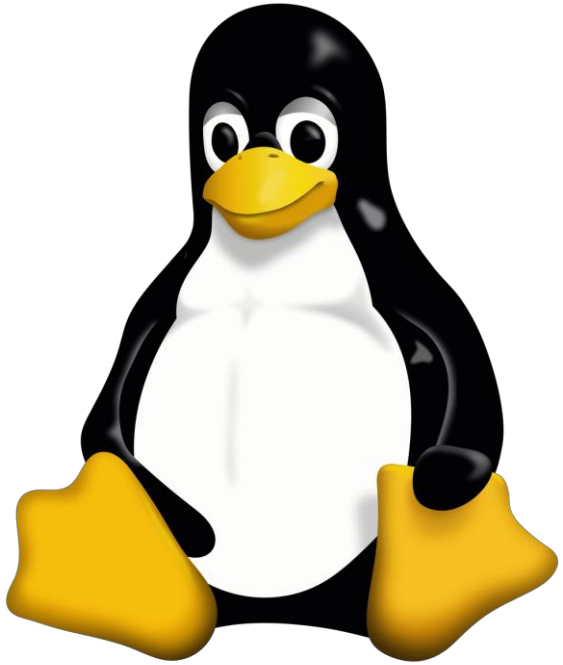


Operating System – Linux Programming

Sunbeam Infotech

File system commands

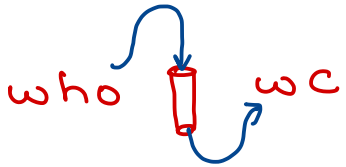
- ls dirpath
  - ls -l dirpath
- mkdir dirpath and rmdir dirpath
- cat filepath
  - cat > filepath
- cp filepath dirpath
  - cp -r srcdirpath destdirpath
- mv filepath dirpath
  - mv oldfile newfile
  - hidden files
- rm filepath
  - rm -r dirpath
- Shell wildcards
  - *
  - ?

Shell advanced topics

- Redirection
  - Input redirection (<)
    - command < in_file
  - Output redirection (>)
    - command > out_file
    - command >> out_file → append output in file
  - Error redirection (2>)
    - command 2> err_file

sort < in.txt > out.txt 2> err.txt

- Pipe
  - command1 | command2 →



- Command execution
  - $? → exit code of previous command/program → 0: success; non-zero: failure.
  - command1 && command2 → if first cmd is success, then run second cmd.
  - command1 || command2 → if first cmd is failed, then run second cmd.
  - command & → async cmd execution. → shell doesn't wait for cmd to complete.

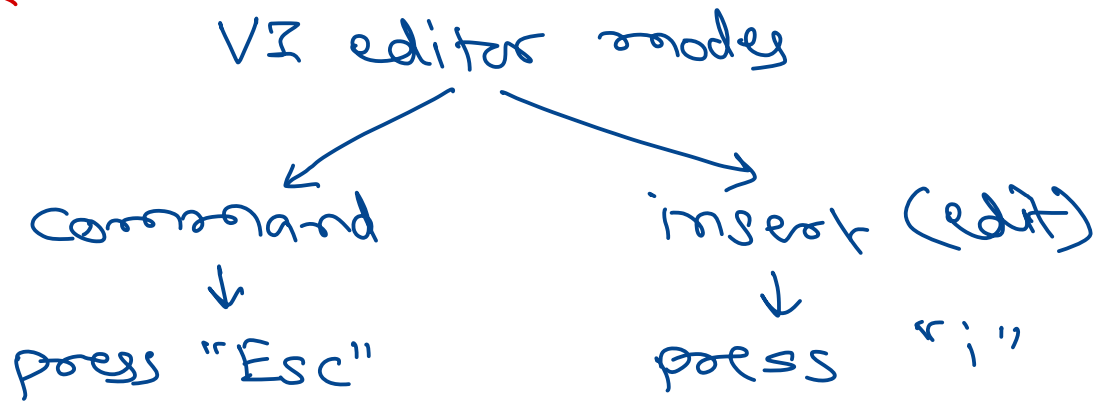
By default, shell waits for cmd to be completed.

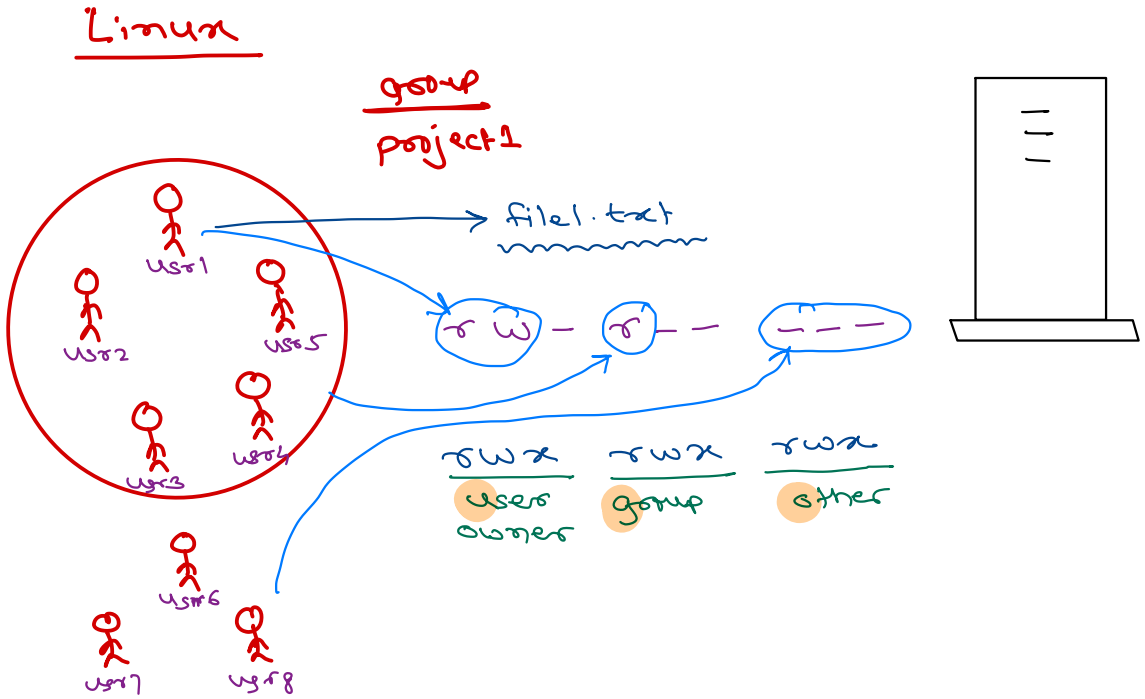
Regular expression

- Regex commands
  - grep → GNU Regular Expression Parser
  - egrep → Extended GNU Regular Expression Parser → grep -E
  - fgrep → Fixed GNU Regular Expression Parser → grep -F
- Regex wildcard characters
  - $ → ends with
  - ^ → starts with
  - . → any single char
  - [scanset] → any single char in given scan set.
    [^scanset] → any single char not in scan set.
  - * → 0 or more occurrency of prev char/group
  - + → 1 or more occurrency of prev char/group
  - ? → 0 or 1 occurrency of prev char/group
  - {n}, {m,n}, {m,}, {,n} → num of occurrency of prev char/group (>=m, <=n)
  - (w1|w2|w3) → find a word from w1, w2 or w3.
  - \ → remove special meaning of wild card char.
- Building regex → "^[0-9]{10}$" → 10 digit mobile

VI editor → World's best editor → vim → VI improved.

- Developed by Bill Joy. → UCB → BSD UNIX
- Operations
  - create/open file → vim filepath
  - write/save → :w
  - quit → :q
  - write and quit → :wq
  - quit without saving → :q!
- .vimrc file
- Copy/Cut
  - line
  - c lines
  - m to n lines
  - word
  - c words
- Paste
- Find word




Linux
group
project1
user1
user2
user5
user3
user4
user6
user7
user8
file1.txt
rwx
rwx
rwx
user
owner
group
other

BASH shell script

- Shell script is collection of shell commands along with programming constructs.
- Shebang line
  - #!/bin/bash
- echo “Hello World”
  - -n
  - -e
- Shell variables
  - var=value
  - echo “$var”
- expr command
- Command substitution
  - var=`command`
  - var=$(command)
- User input
  - read var

interpreter

pros
- simplified syntax
- quick development

cons
- fixed syntax (not free-form).
- tough debugging
- slower execution

applications
1. installers
2. administration

BASH shell script

- if-else
  - if [condition]
    then
    …
    fi
  - if [condition]
    then
    …
    elif [condition]
    then
    …
    else
    …
    fi

- test command
  - -eq, -ne, -gt, -lt, -ge, -le
  - -a, -o, !
  - -f, -d, -w, -r, -x

- loops
  - while [condition]
  - do
  - …
  - done

  - until [condition]
  - do
  - …
  - done

BASH shell scripts

- case
  - case expr in
    c1)
        …
        ;;
    c2)
        …
        ;;
    c3)
        …
        ;;
    *)
        …
    esac

- for loop
  - C like for loop
    - for ((initialization; condition; modification))
      do
          …
      done
  - for-each loop
    - for var in collection
      do
          …
      done

BASH shell script

- Positional parameters
  - terminal> ./script.sh arg1 arg2 arg3
  - Special variables
    - $0
    - $1, $2, …, $9
    - $#
    - $*
    - shift command
- BASH functions

```
function my_func() {
        …
}

result=$(my_func arg1 arg2 …)
```

BASH shell script

- Arrays
  - arr=(val1 val2 val3 …)
  - ${arr[0]}, ${arr[1]}, …
  - ${arr[*]} – collection of values
  - ${#arr[*]} – count of values
- Strings
  - str='string value'
  - ${#str} – string length
  - ${str:start_index} – substring
  - ${str:start_index:count} – substring
  - if [[$str =~ regex]]; then echo "true"; fi
  - ${str/find/replace}
- Directory operations
  - pushd dirpath
  - popd
  - dirs -v

Thank you!

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