**Documentation for Shell commands**

**Internal commands:**

1. pwd
2. cd
3. echo
4. **cd internal command**

**Usage:**

* cd
  + change to home directory
* cd [DIRECTORY]
  + change to DIRECTORY

**Examples:**

vibhor shell 12> pwd

/home/vibhor/OS/shell

vibhor shell 13> cd ..

vibhor shell 14> pwd

/home/vibhor/OS

vibhor shell 19> cd shell

vibhor shell 20> pwd

/home/vibhor/OS/shell

vibhor shell 21> cd

vibhor shell 22> pwd

/home/vibhor

**Error Handling:**

vibhor shell 24> cd .. .

cd: too many arguments

vibhor shell 28> pwd

/home/vibhor/OS/shell

vibhor shell 29> cd cat.c

cd: cat.c: Not a directory

vibhor shell 31> cd dummy

cd: dummy: No such file or directory

1. **pwd internal command**

**Usage:**

* pwd
  + prints current working directory
* pwd [-P|--physical]
  + prints physical path after resolving symbolic links

**Examples:**

vibhor shell 12> pwd

/home/vibhor/OS/shell

vibhor shell 2> pwd --help

Usage: pwd [-P|--physical|--help]

vibhor shell 3> pwd -P

/home/vibhor/OS/shell

**Error Handling:**

* Any argument specified with ‘pwd’ is ignored as with the Unix shell built-in command

vibhor shell 13> pwd abc # any other option is ignored

/home/vibhor/OS/shell

* Directory /home/vibhor/OS/shell/abc is removed while we are in that directory

vibhor shell 13> cd abc

vibhor shell 13> pwd

pwd: No such file or directory

1. **echo internal command**

**Usage:**

* echo <one or more string>
  + dumps given strings after expanding environment variables
* echo -n <one or more string>
  + dumps given strings after expanding environment variables without ending newline

**Examples:**

vibhor shell 5> echo --help

Usage: echo [-n] [STRING]...

vibhor shell 6> echo "Hello Shell"

Hello Shell

vibhor shell 7> echo $PWD

/home/vibhor/OS/shell

vibhor shell 8> echo $HOME

/home/vibhor

vibhor shell 11> echo -n "\*\*\* No Newline \*\*\*"

\*\*\* No Newline \*\*\*vibhor shell 12>

vibhor shell 18> echo '$HOME'

$HOME

vibhor shell 19> echo "$HOME"

/home/vibhor

vibhor shell 20> echo $HOME

/home/vibhor

vibhor shell 20> echo

<only newline is printed>

**Error Handling:**

vibhor shell 14> echo -x

echo: invalid option -- 'x'

Usage: echo [-n] [STRING]...

vibhor shell 17> echo $dummy

<nothing is printed for env. variable which is not set>

**External commands:**

1. cat
2. ls
3. mkdir
4. rm
5. date

All of these commands execute through fork()/execl() by default, and if the command is followed by &t, then thread version is invoked, for e.g., cat&t will invoke thread version of cat command

1. **cat external command**

**Usage:**

* cat <one or more files>
  + displays contents of specified files
* cat [-n|--number] <one or more files>
  + displays contents of specified files with each line being assigned a number
* cat [-E|--show-ends] <one or more files>
  + displays files contents with each line ending with $
* cat&t version of all above commands are supported which invokes thread version

**Examples:**

vibhor shell 1> cat

Hello Shell

Hello Shell

Hello World

Hello World

vibhor shell 3> cat -n

Hello Shell

1 Hello Shell

Hello World

2 Hello World

vibhor shell 4> cat abcd

\*\*\*\*Start

Hello Myshell

\*\*\*\*End

vibhor shell 5> cat --help

Usage: cat [-E|--show-ends] [-n|--number] [FILE]...

vibhor shell 6> cat -E abcd

\*\*\*\*Start$

Hello Myshell$

\*\*\*\*End$

vibhor shell 7> cat -n abcd

1 \*\*\*\*Start

2 Hello Myshell

3 \*\*\*\*End

vibhor shell 7> cat&t -n abcd

1 \*\*\*\*Start

2 Hello Myshell

3 \*\*\*\*End

**Error Handling:**

vibhor shell 2> cat abc.c

cat: abc.c: No such file or directory

vibhor shell 3> cat a3

cat: 'a3': Is a directory

vibhor shell 8> cat -x

mycat: invalid option -- 'x'

Usage: cat [-E|--show-ends] [-n|--number] [FILE]...

1. **ls external command**

**Usage:**

* ls [FILE|DIRECTORY]…
  + list given files and contents of given directories
* ls [-a|-all] [FILE|DIRECTORY]…
  + same as above and hidden files starting with . are also listed
* ls [-A|-almost all] [FILE|DIRECTORY]…
  + same as above except that . and .. directories are not listed
* ls&t version of all above commands are supported which invokes thread version

**Examples:**

vibhor shell 1> ls

a3 abcd cat.c cd.c

date.c Documentation.docx echo.c ls.c

Makefile mkdir.c mycat mycd

mydate myecho myls mymkdir

mypwd myrm myshell option.c

option.h option.o pwd.c rm.c

shell.c shell.o ~$cumentation.docx ~WRL3069.tmp

vibhor shell 4> ls a3

a3:

a2

vibhor shell 5> ls -a

. .. a3 abcd

cat.c cd.c date.c Documentation.docx

echo.c ls.c Makefile mkdir.c

mycat mycd mydate myecho

myls mymkdir mypwd myrm

myshell option.c option.h option.o

pwd.c rm.c shell.c shell.o

~$cumentation.docx ~WRL3069.tmp

vibhor shell 6> ls -A

a3 abcd cat.c cd.c

date.c Documentation.docx echo.c ls.c

Makefile mkdir.c mycat mycd

mydate myecho myls mymkdir

mypwd myrm myshell option.c

option.h option.o pwd.c rm.c

shell.c shell.o ~$cumentation.docx ~WRL3069.tmp

**Error Handling:**

vibhor shell 7> ls abc

ls: cannot access 'abc': No such file or directory

vibhor shell 8> ls -xyz

myls: invalid option -- 'xyz'

Usage: ls [-a|--all] [-A|--almost-all] [FILE]...

1. **mkdir external command**

**Usage:**

* mkdir DIRECTORY...
  + creates specified directories
* mkdir [-p|--parents] DIRECTORY...
  + creates specified directories including any sub-directories if not already there
* mkdir [-v|--verbose] DIRECTORY...
  + creates directories and also list which all directories are created
* mkdir&t version of all above commands are supported which invokes thread version

**Examples:**

vibhor shell 12> mkdir abc2 abc3

vibhor shell 13> ls

a3 **abc2** **abc3** abcd

cat.c cd.c date.c Documentation.docx

echo.c ls.c Makefile mkdir.c

mycat mycd mydate myecho

myls mymkdir mypwd myrm

myshell option.c option.h option.o

pwd.c rm.c shell.c shell.o

~$cumentation.docx ~WRL3069.tmp

vibhor shell 14> mkdir -v abc4

mkdir: created directory 'abc4'

vibhor shell 17> mkdir -p abc5/abc6 -v

mkdir: created directory 'abc5'

mkdir: created directory 'abc5/abc6'

**Error Handling:**

vibhor shell 19> mkdir ls.c

mkdir: cannot create directory 'ls.c': File exists

Usage: mkdir [-p|--parents] [-v|--verbose] DIRECTORY...

vibhor shell 21> mkdir abc2

mkdir: cannot create directory 'abc2': File exists

Usage: mkdir [-p|--parents] [-v|--verbose] DIRECTORY...

vibhor shell 23> mkdir abc2/abc3/abc4

mkdir: cannot create directory 'abc2/abc3/abc4': No such file or directory

Usage: mkdir [-p|--parents] [-v|--verbose] DIRECTORY...

vibhor shell 3> mkdir

mkdir: missing operand

Usage: mkdir [-p|--parents] [-v|--verbose] DIRECTORY...

vibhor shell 4> mkdir -invalid abc

mymkdir: invalid option -- 'invalid'

Usage: mkdir [-p|--parents] [-v|--verbose] DIRECTORY...

1. **rm external command**

**Usage:**

* rm FILE...
  + removes specified files
* rm [-f|--force] FILE...
  + removes specified files and remains silent if non-existing files are specified
* rm [-v|--verbose] FILE...
  + removes specified files and also list which all files are removed
* rm&t version of all above commands are supported which invokes thread version

**Examples:**

vibhor shell 27> rm shell.o

vibhor shell 28> rm -v abcd

removed 'abcd'

vibhor shell 30> rm xyz

rm: cannot remove 'xyz': No such file or directory

vibhor shell 32> rm -f xyz

**Error Handling:**

vibhor shell 32> rm xyz

rm: cannot remove 'xyz': No such file or directory

vibhor shell 34> rm a3

rm: cannot remove 'a3': Is a directory

vibhor shell 2> rm

rm: missing operand

Usage: rm [-f|--force] [-v|--verbose] FILE...

1. **date external command**

**Usage:**

* date
  + prints date in localtime
* date [-u|--utc|--universal]
  + prints date in UTC
* date [-I|--iso-8601]
  + prints date in YYYY-MM-DD format
* date&t version of all above commands are supported which invokes thread version

**Examples:**

vibhor shell 38> date

Mon Oct 31 00:04:30 2022

vibhor shell 39> date -u

Sun Oct 30 18:34:32 2022

vibhor shell 40> date -I

2022-10-31

**Error Handling:**

vibhor shell 42> date -x

mydate: invalid option -- 'x'

Usage: date [-u|--utc|--universal] [-I|--iso-8601]

vibhor shell 44> date adad

Usage: date [-u|--utc|--universal] [-I|--iso-8601]