

Documentation for Shell commands

Internal commands:

1. pwd
2. cd
3. echo

1. 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

2. 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

3. 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]...

2. 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

mys: invalid option -- 'xyz'

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

3. 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
mysls	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

mkdir: invalid option -- 'invalid'

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

4. 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...

5. date external command

Usage:

- date
 - prints date in localtime
- date [-u|--utc|--universal]
 - prints date in UTC
- date [-l|--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 -l

2022-10-31

Error Handling:

vibhor shell 42> date -x

mydate: invalid option -- 'x'

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

vibhor shell 44> date adad

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