Assignment 1 Documentation

1)Internal Commands:

i)cd command:

The “cd” command is used to change the Directories. The cd command takes an argument; the argument should be the name of the folder/directories you want to use. The cd command also takes flags as an argument with the directory at position argument 2.

Format: cd [flag] [folder] or cd [folder]

Assumption: The flag should be at argument 1st only, not at argument 2nd.

Flags:

-P: Handle the operand dot-dot physically; symbolic link components shall be resolved before dot-dot components are processed.

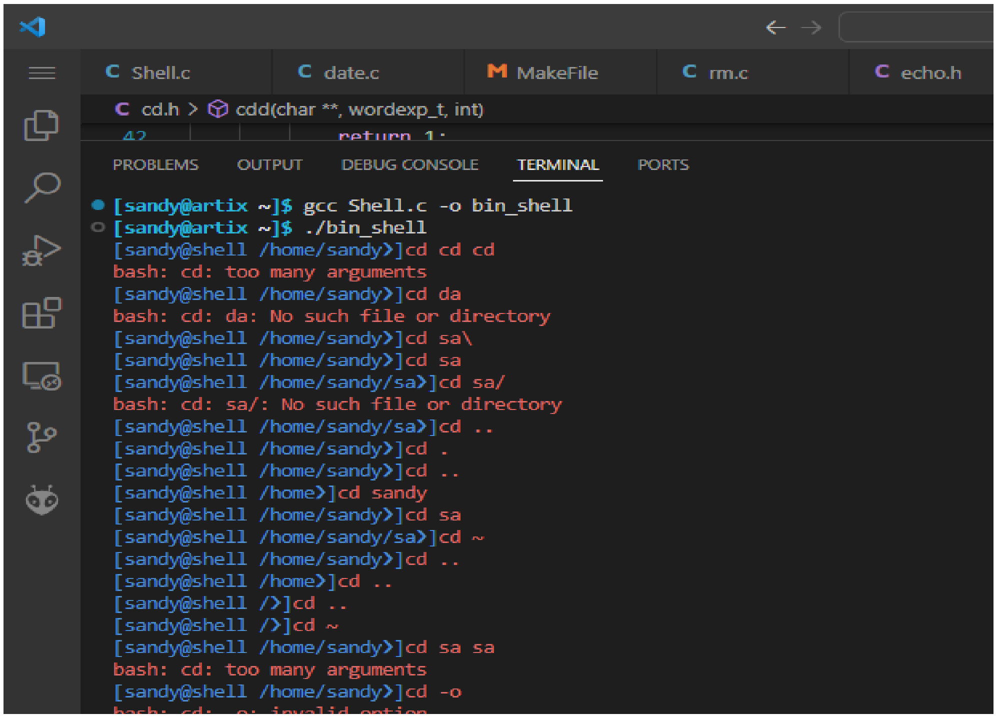
-L: Handle the operand dot-dot logically; symbolic link components shall not be resolved before dot-dot components are processed

Error:

“bash: cd: too many arguments”

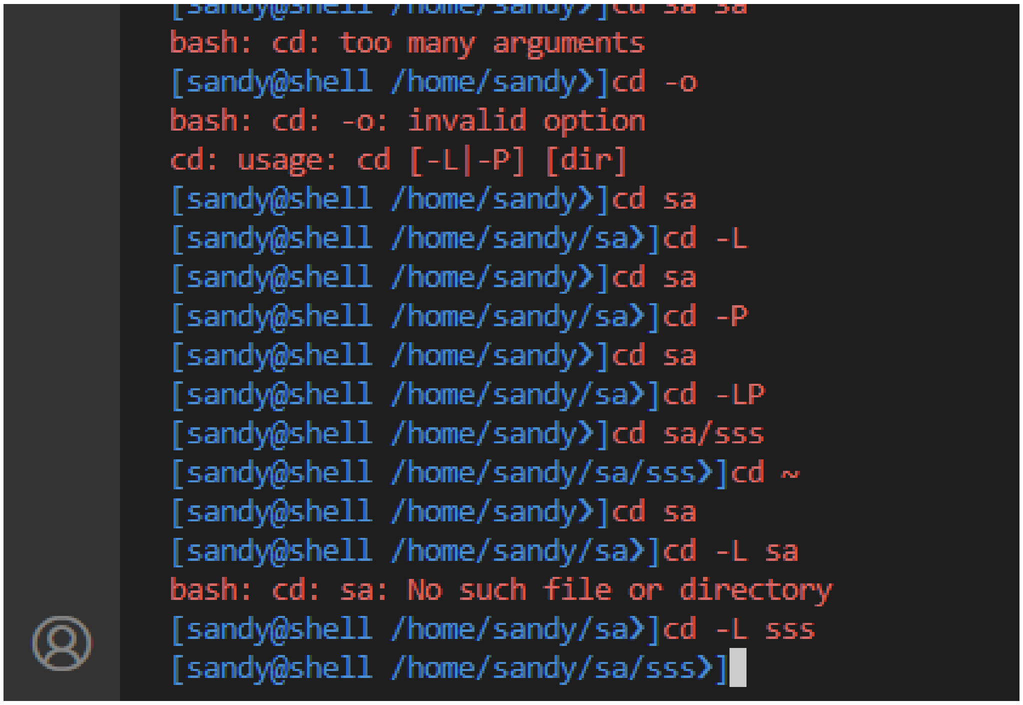
“bash: cd: %s: No such file or directory”

“bash: cd: -%c: invalid option
cd: usage: cd [-L|-P] [dir]”



```
42        return 1;
```

```
[sandy@artix ~]$ gcc Shell.c -o bin_shell
[sandy@artix ~]$ ./bin_shell
[sandy@shell /home/sandy>]cd cd cd
bash: cd: too many arguments
[sandy@shell /home/sandy>]cd da
bash: cd: da: No such file or directory
[sandy@shell /home/sandy>]cd sa\
[sandy@shell /home/sandy>]cd sa
[sandy@shell /home/sandy/sa>]cd sa/
bash: cd: sa/: No such file or directory
[sandy@shell /home/sandy/sa>]cd ..
[sandy@shell /home/sandy>]cd .
[sandy@shell /home/sandy>]cd ..
[sandy@shell /home>]cd sandy
[sandy@shell /home/sandy>]cd sa
[sandy@shell /home/sandy/sa>]cd ~
[sandy@shell /home/sandy>]cd ..
[sandy@shell /home>]cd ..
[sandy@shell />]cd ..
[sandy@shell />]cd ~
[sandy@shell /home/sandy>]cd sa sa
bash: cd: too many arguments
[sandy@shell /home/sandy>]cd -o
bash: cd: -o: invalid option
```



```
[sandy@shell /home/sandy>]cd sa sa
bash: cd: too many arguments
[sandy@shell /home/sandy>]cd -o
bash: cd: -o: invalid option
cd: usage: cd [-L|-P] [dir]
[sandy@shell /home/sandy>]cd sa
[sandy@shell /home/sandy/sa>]cd -L
[sandy@shell /home/sandy>]cd sa
[sandy@shell /home/sandy/sa>]cd -P
[sandy@shell /home/sandy>]cd sa
[sandy@shell /home/sandy/sa>]cd -LP
[sandy@shell /home/sandy>]cd sa/sss
[sandy@shell /home/sandy/sa/sss>]cd ~
[sandy@shell /home/sandy>]cd sa
[sandy@shell /home/sandy/sa>]cd -L sa
bash: cd: sa: No such file or directory
[sandy@shell /home/sandy/sa>]cd -L sss
[sandy@shell /home/sandy/sa/sss>]
```

ii)echo command:

The” echo” command in Linux displays lines of text/string passed as an argument. It can display the string given with or without quotation marks(“). However, quotation marks are not displayed when the string message is printed.

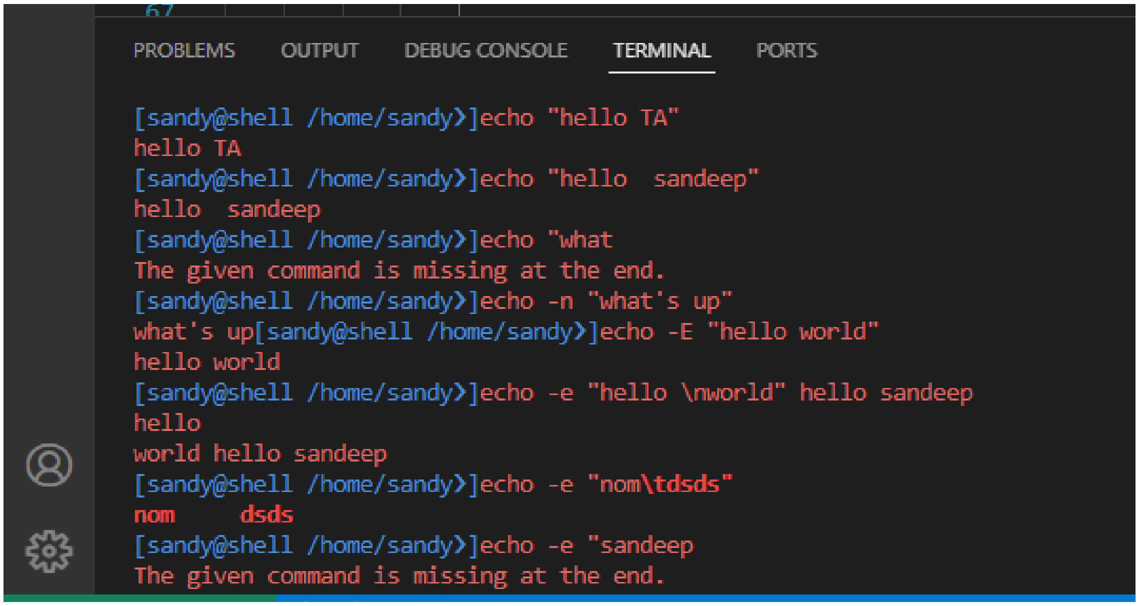
- The user can enter as many arguments in the string message of the echo Command.
- If flags are incorrectly used, then the flag is evaluated as a String.
- If the user enters only one quotation and forgets to close the quotation, then an error message is displayed **“ The given command is missing “ at the end.”**

Flags:

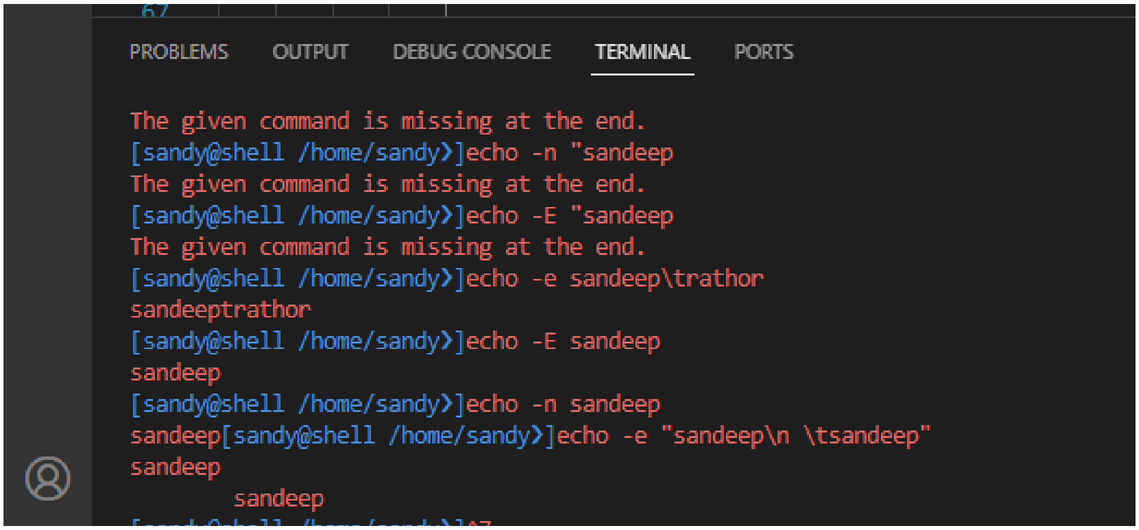
-n: If the command is “echo -n”, the Linux command prompt is continued in the following line.
If the command has the correct syntax “echo -n “message, " the string is printed, and the Linux command prompt will pop up simultaneously.

-E: It is the default flag of the echo command.

-e: It implements the escape sequences, such as \n,\t etc., in the string message.
The basic demonstration of all these commands is shown in the below figure.



```
[sandy@shell /home/sandy>]echo "hello TA"
hello TA
[sandy@shell /home/sandy>]echo "hello  sandeep"
hello  sandeep
[sandy@shell /home/sandy>]echo "what
The given command is missing at the end.
[sandy@shell /home/sandy>]echo -n "what's up"
what's up[sandy@shell /home/sandy>]echo -E "hello world"
hello world
[sandy@shell /home/sandy>]echo -e "hello \nworld" hello sandeep
hello
world hello sandeep
[sandy@shell /home/sandy>]echo -e "nom\tdsds"
nom      dsds
[sandy@shell /home/sandy>]echo -e "sandeep
The given command is missing at the end.
```



```
The given command is missing at the end.
[sandy@shell /home/sandy>]echo -n "sandeep
The given command is missing at the end.
[sandy@shell /home/sandy>]echo -E "sandeep
The given command is missing at the end.
[sandy@shell /home/sandy>]echo -e sandeep\trathor
sandeeptrathor
[sandy@shell /home/sandy>]echo -E sandeep
sandeep
[sandy@shell /home/sandy>]echo -n sandeep
sandeep[sandy@shell /home/sandy>]echo -e "sandeep\n \tsandeep"
sandeep
         sandeep
[sandy@shell /home/sandy>]^Z
```

iii)pwd command:

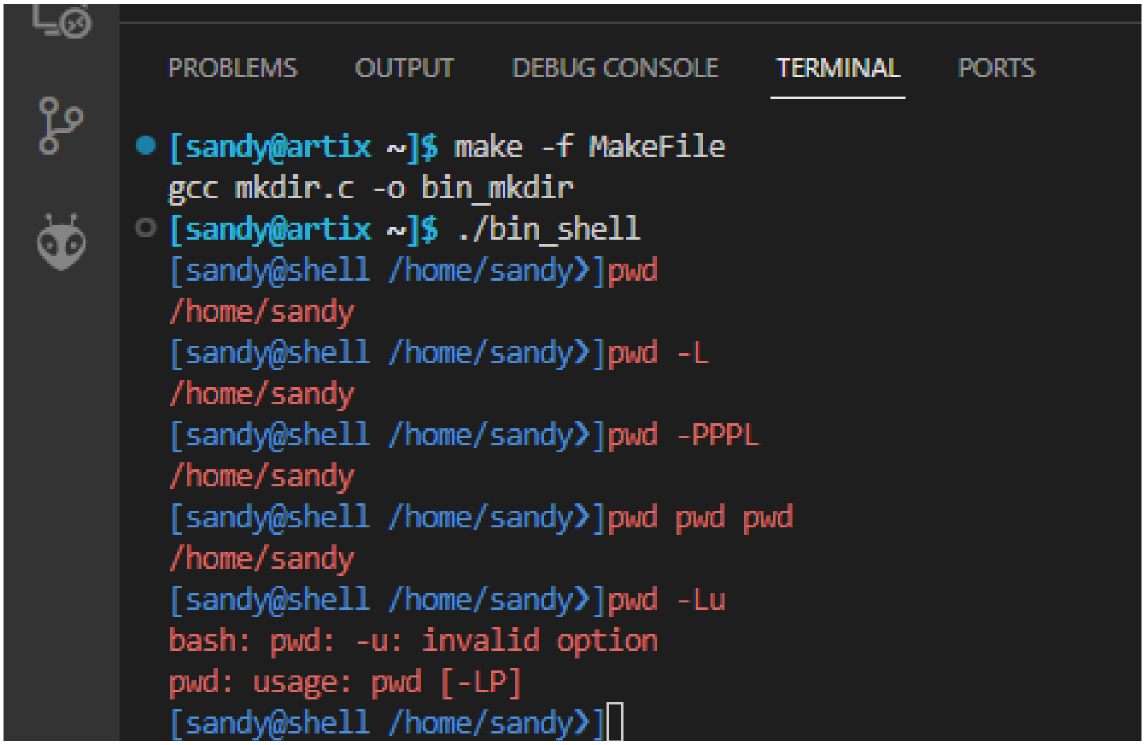
Print name of current/working directory

Flags:

- **-P:** avoid all symlinks
- **-L:** use PWD from the environment, even if it contains symlinks

Error:

"bash: pwd: -%c: invalid option\n"
"pwd: usage: pwd [-LP]\n"



```
[sandy@artix ~]$ make -f MakeFile
gcc mkdir.c -o bin_mkdir
[sandy@artix ~]$ ./bin_shell
[sandy@shell /home/sandy>]pwd
/home/sandy
[sandy@shell /home/sandy>]pwd -L
/home/sandy
[sandy@shell /home/sandy>]pwd -PPPL
/home/sandy
[sandy@shell /home/sandy>]pwd pwd pwd
/home/sandy
[sandy@shell /home/sandy>]pwd -Lu
bash: pwd: -u: invalid option
pwd: usage: pwd [-LP]
[sandy@shell /home/sandy>]
```

2)External Commands:

i)ls command:

Prints the directory contents.

Assumption: The user can enter only two arguments.

The user can enter the flags on any of the two arguments, and also two flags at the same argument are also valid.

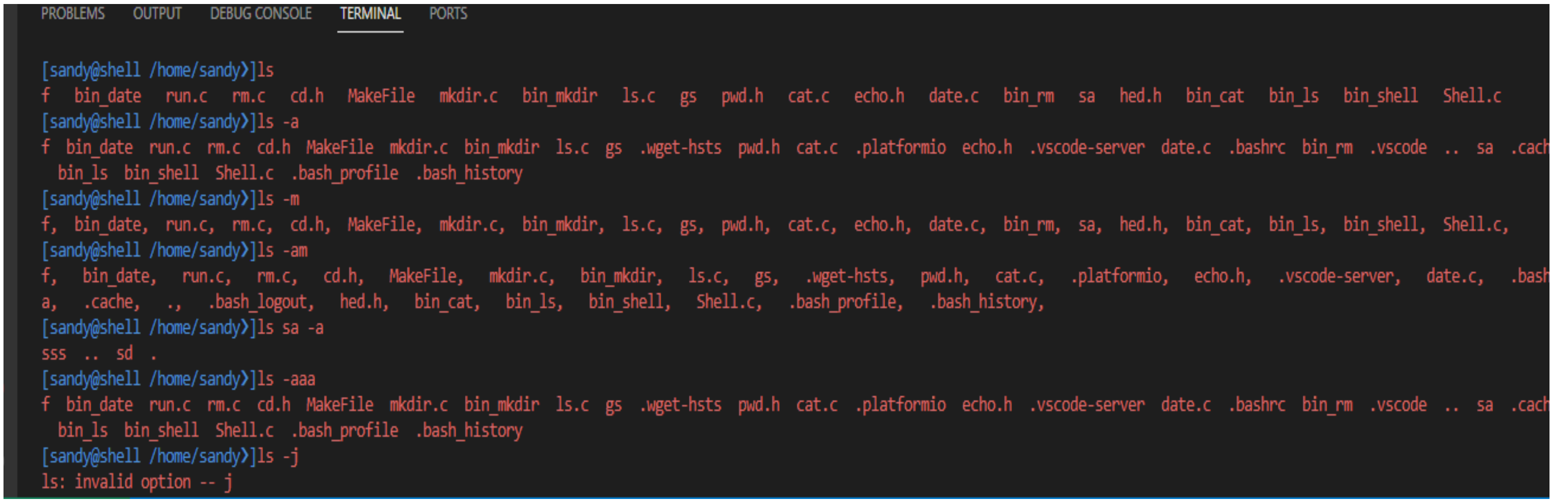
Flags:

-m: prints the entries with the comma separated.

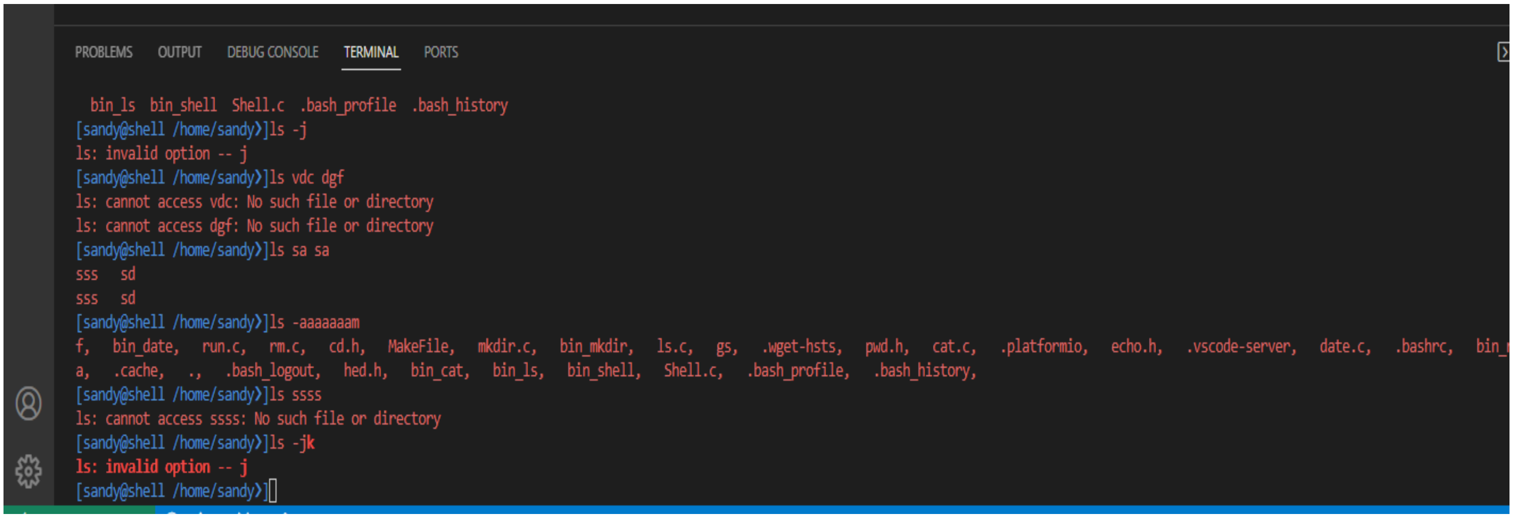
-n: prints the entries which also started with **'.'** .

Error:

```
"ls: cannot access %s: No such file or directory”
"ls: invalid option -- %c”
```



```
[sandy@shell /home/sandy>]ls
f   bin_date   run.c   rm.c   cd.h   MakeFile   mkdir.c   bin_mkdir   ls.c   gs   pwd.h   cat.c   echo.h   date.c   bin_rm   sa   hed.h   bin_cat   bin_ls   bin_shell   Shell.c
[sandy@shell /home/sandy>]ls -a
f  bin_date  run.c  rm.c  cd.h  MakeFile  mkdir.c  bin_mkdir  ls.c  gs  .wget-hsts  pwd.h  cat.c  .platformio  echo.h  .vscode-server  date.c  .bashrc  bin_rm  .vscode  ..  sa  .cach
  bin_ls  bin_shell  Shell.c  .bash_profile  .bash_history
[sandy@shell /home/sandy>]ls -m
f,  bin_date,  run.c,  rm.c,  cd.h,  MakeFile,  mkdir.c,  bin_mkdir,  ls.c,  gs,  pwd.h,  cat.c,  echo.h,  date.c,  bin_rm,  sa,  hed.h,  bin_cat,  bin_ls,  bin_shell,  Shell.c,
[sandy@shell /home/sandy>]ls -am
f,   bin_date,   run.c,   rm.c,   cd.h,   MakeFile,   mkdir.c,   bin_mkdir,   ls.c,   gs,   .wget-hsts,   pwd.h,   cat.c,   .platformio,   echo.h,   .vscode-server,   date.c,   .bash
a,   .cache,   .,   .bash_logout,   hed.h,   bin_cat,   bin_ls,   bin_shell,   Shell.c,   .bash_profile,   .bash_history,
[sandy@shell /home/sandy>]ls sa -a
sss  ..  sd  .
[sandy@shell /home/sandy>]ls -aaa
f  bin_date  run.c  rm.c  cd.h  MakeFile  mkdir.c  bin_mkdir  ls.c  gs  .wget-hsts  pwd.h  cat.c  .platformio  echo.h  .vscode-server  date.c  .bashrc  bin_rm  .vscode  ..  sa  .cach
  bin_ls  bin_shell  Shell.c  .bash_profile  .bash_history
[sandy@shell /home/sandy>]ls -j
ls: invalid option -- j
```



```
 bin_ls  bin_shell  Shell.c  .bash_profile  .bash_history
[sandy@shell /home/sandy⟩]ls -j
ls: invalid option -- j
[sandy@shell /home/sandy⟩]ls vdc dgf
ls: cannot access vdc: No such file or directory
ls: cannot access dgf: No such file or directory
[sandy@shell /home/sandy⟩]ls sa sa
sss   sd
sss   sd
[sandy@shell /home/sandy⟩]ls -aaaaaaam
f,   bin_date,   run.c,   rm.c,   cd.h,   MakeFile,   mkdir.c,   bin_mkdir,   ls.c,   gs,   .wget-hsts,   pwd.h,   cat.c,   .platformio,   echo.h,   .vscode-server,   date.c,   .bashrc,   bin_
a,   .cache,   .,   .bash_logout,   hed.h,   bin_cat,   bin_ls,   bin_shell,   Shell.c,   .bash_profile,   .bash_history,
[sandy@shell /home/sandy⟩]ls ssss
ls: cannot access ssss: No such file or directory
[sandy@shell /home/sandy⟩]ls -jk
ls: invalid option -- j
[sandy@shell /home/sandy⟩]
```

ii)cat command:

It reads the date from the file and gives its content as output. it helps us to concatenate files.

Assumption: The user can give two arguments at the same time.

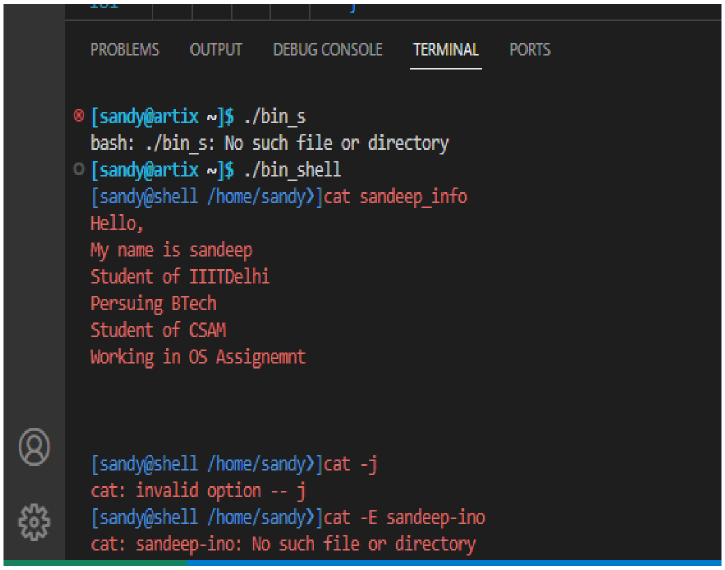
The user can give two flags at the position of argument 1 and at argument 2. when the user enters the cat with the flag, this case is also Handel.

Flags:

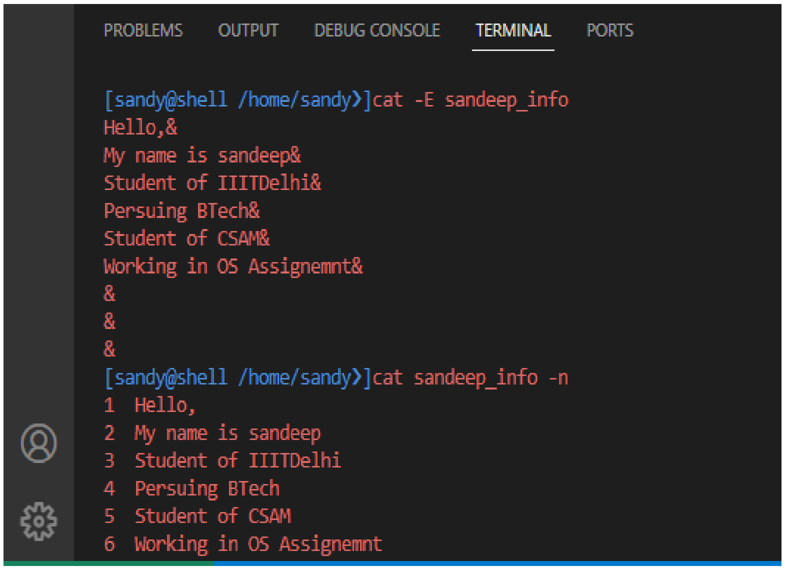
-E: display % at the end of the line.
-n: display the number to all the output lines

Error:

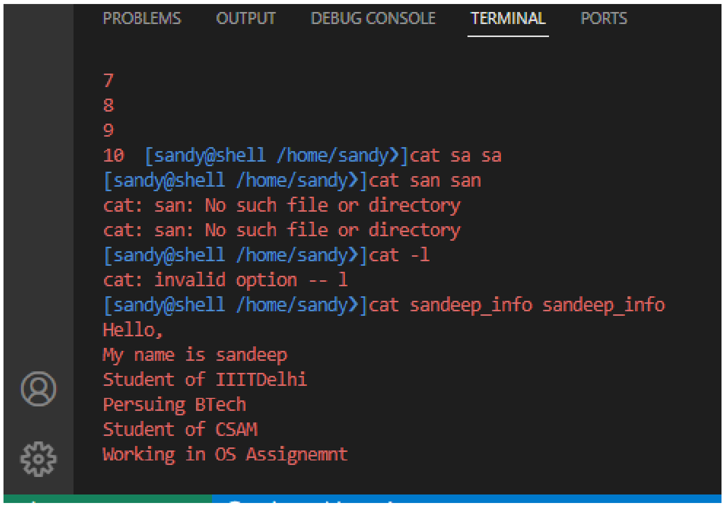
```
"cat: %s: No such file or directory"
"cat: invalid option -- %c\n"
```



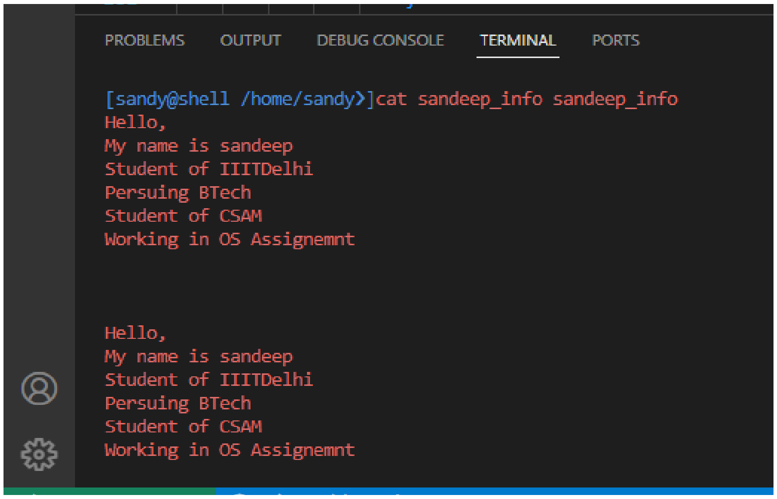
```
[sandy@artix ~]$ ./bin_s
bash: ./bin_s: No such file or directory
[sandy@artix ~]$ ./bin_shell
[sandy@shell /home/sandy>]cat sandeep_info
Hello,
My name is sandeep
Student of IIITDelhi
Persuing BTech
Student of CSAM
Working in OS Assignemnt



[sandy@shell /home/sandy>]cat -j
cat: invalid option -- j
[sandy@shell /home/sandy>]cat -E sandeep-ino
cat: sandeep-ino: No such file or directory
```



```
[sandy@shell /home/sandy>]cat -E sandeep_info
Hello,&
My name is sandeep&
Student of IIITDelhi&
Persuing BTech&
Student of CSAM&
Working in OS Assignemnt&
&
&
&
[sandy@shell /home/sandy>]cat sandeep_info -n
1  Hello,
2  My name is sandeep
3  Student of IIITDelhi
4  Persuing BTech
5  Student of CSAM
6  Working in OS Assignemnt
```



```
7
8
9
10  [sandy@shell /home/sandy>]cat sa sa
[sandy@shell /home/sandy>]cat san san
cat: san: No such file or directory
cat: san: No such file or directory
[sandy@shell /home/sandy>]cat -l
cat: invalid option -- l
[sandy@shell /home/sandy>]cat sandeep_info sandeep_info
Hello,
My name is sandeep
Student of IIITDelhi
Persuing BTech
Student of CSAM
Working in OS Assignemnt
```



```
[sandy@shell /home/sandy>]cat sandeep_info sandeep_info
Hello,
My name is sandeep
Student of IIITDelhi
Persuing BTech
Student of CSAM
Working in OS Assignemnt



Hello,
My name is sandeep
Student of IIITDelhi
Persuing BTech
Student of CSAM
Working in OS Assignemnt
```

iii) date command:

Prints the current date and time, last modified date time of any existing file.

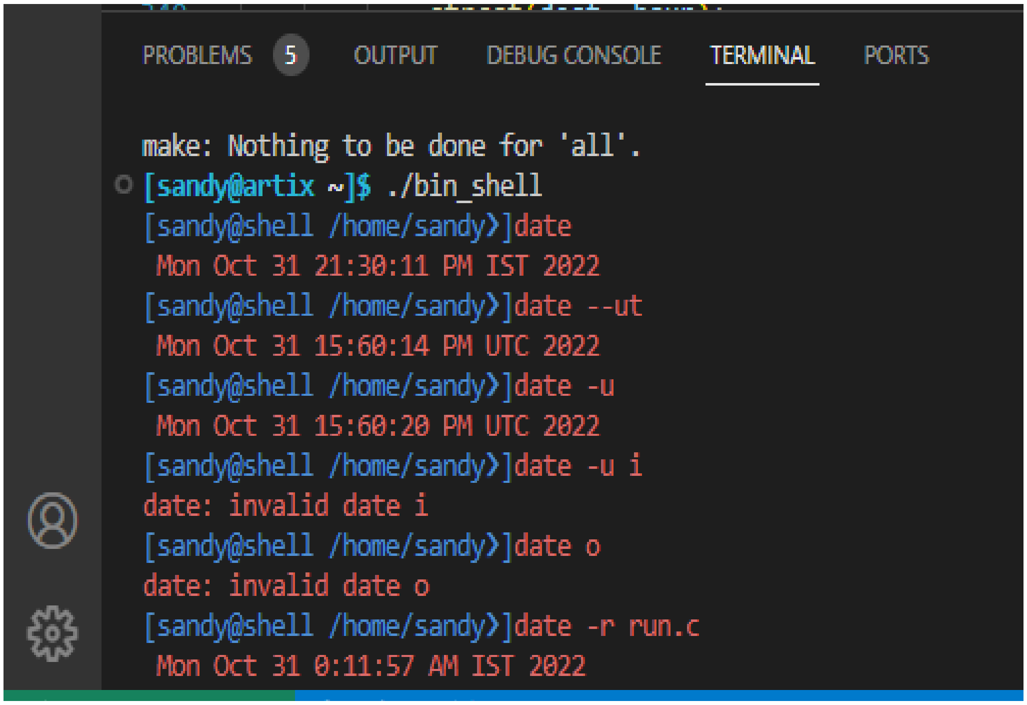
Assumption: The user can only enter two arguments.

Flags:

-r: prints the last modified date and time of the existing file:
-u / –utc / –universal: prints the universal time;

Errors:

```
"date: unrecognized option %s\n"
"date: extra operand %s\n"
"date: invalid option -- %c\n"
"date: invalid date %s\n"
```



```
make: Nothing to be done for 'all'.
[sandy@artix ~]$ ./bin_shell
[sandy@shell /home/sandy>]date
 Mon Oct 31 21:30:11 PM IST 2022
[sandy@shell /home/sandy>]date --ut
 Mon Oct 31 15:60:14 PM UTC 2022
[sandy@shell /home/sandy>]date -u
 Mon Oct 31 15:60:20 PM UTC 2022
[sandy@shell /home/sandy>]date -u i
date: invalid date i
[sandy@shell /home/sandy>]date o
date: invalid date o
[sandy@shell /home/sandy>]date -r run.c
 Mon Oct 31 0:11:57 AM IST 2022
```

iv) rm command:

Remove files.

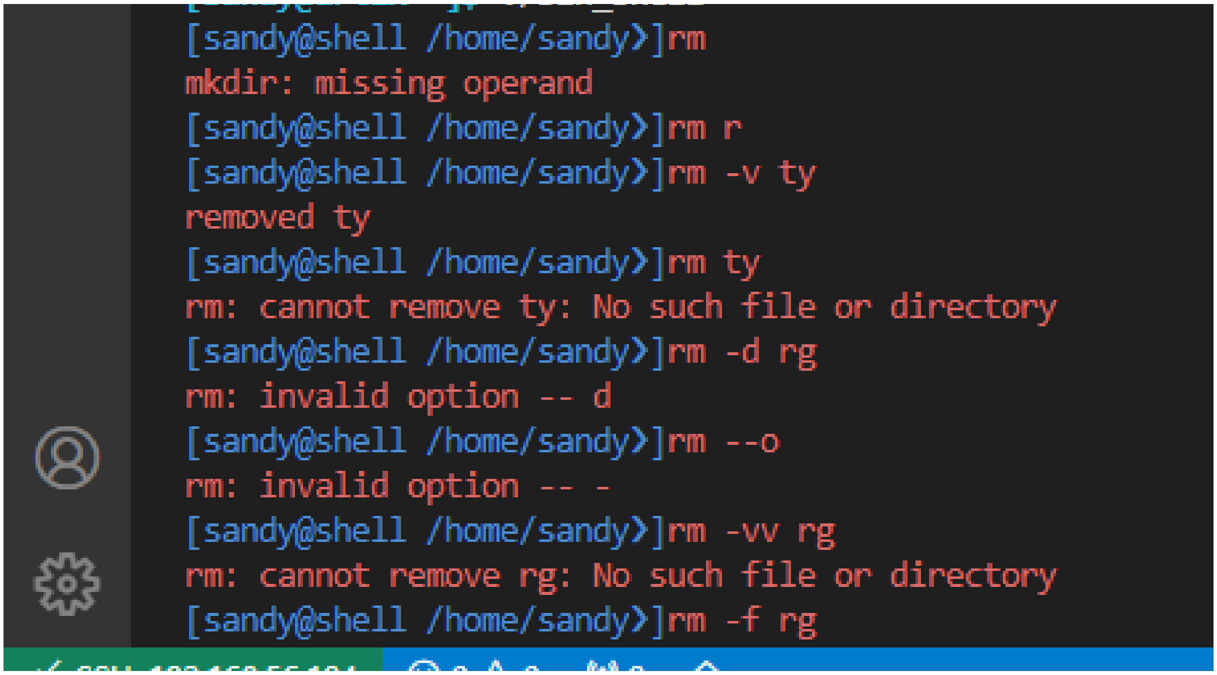
Assumption: The user can enter two arguments. Flags are only present in the first argument. If the flags came at 2nd argument error came.

Flags:

-f: will forcibly delete files without asking, and it ignores nonexistent files and augments
-v: it prints a message when an existing file is deleted and also when it does not exist.

Error:

```
"rm: missing operand”
"rm: cannot remove %s: No such file or directory"
"rm: invalid option -- %c”
rm: unrecognisable option %s”
```



```
[sandy@shell /home/sandy>]rm
mkdir: missing operand
[sandy@shell /home/sandy>]rm r
[sandy@shell /home/sandy>]rm -v ty
removed ty
[sandy@shell /home/sandy>]rm ty
rm: cannot remove ty: No such file or directory
[sandy@shell /home/sandy>]rm -d rg
rm: invalid option -- d
[sandy@shell /home/sandy>]rm --o
rm: invalid option -- -
[sandy@shell /home/sandy>]rm -vv rg
rm: cannot remove rg: No such file or directory
[sandy@shell /home/sandy>]rm -f rg
```

v) mkdir command:

It makes the directory that is given in the argument

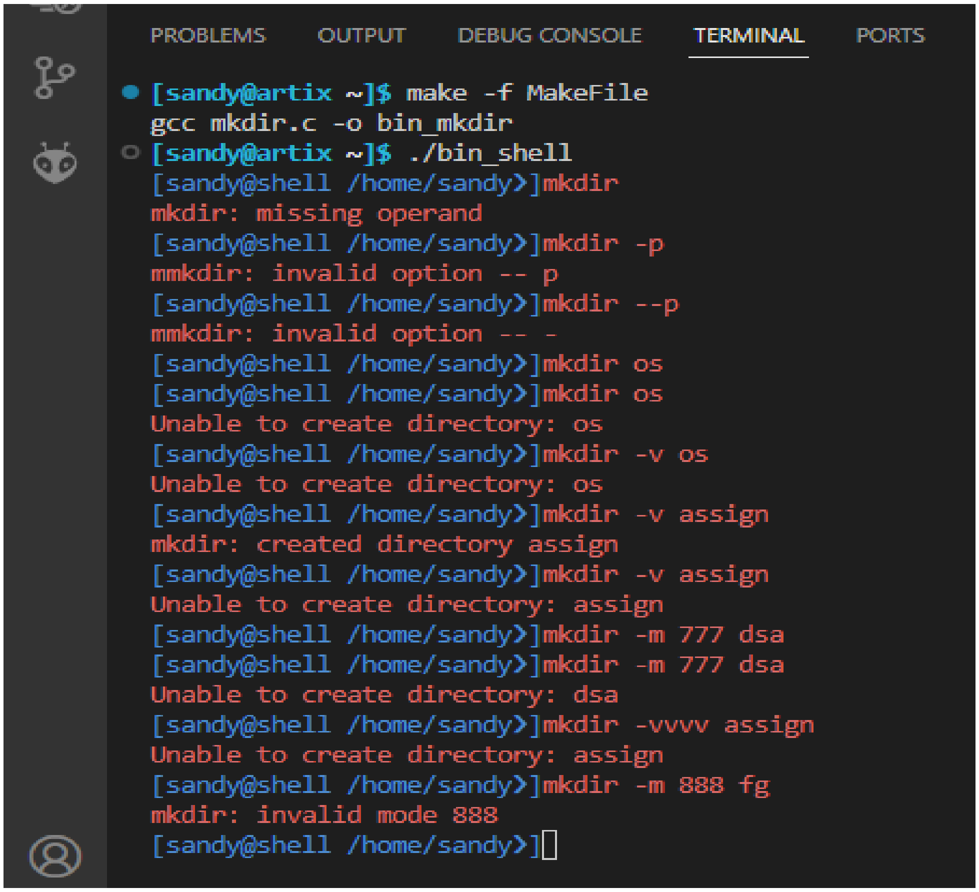
Assumption: the user can enter three arguments. Flags are only valid in the first argument. If flags are present at argument two or three, then an error occurs.
And ‘-’ came at any argument to make a directory then an error occurs
“"(Assemption)::: unable to create directory: use - is invalid at position (number)”

Error:

```
     "Unable to create directory: %s \n"
    "mkdir: invalid mode %s\n"
    "mkdir: missing operand\n"
    "mkdir: option requires an argument -- 'm’
```

Flags

-v: print a message when any directory is created
-m: it set the file mode,not a=rwx -umask



```
[sandy@artix ~]$ make -f MakeFile
gcc mkdir.c -o bin_mkdir
[sandy@artix ~]$ ./bin_shell
[sandy@shell /home/sandy>]mkdir
mkdir: missing operand
[sandy@shell /home/sandy>]mkdir -p
mmkdir: invalid option -- p
[sandy@shell /home/sandy>]mkdir --p
mmkdir: invalid option -- -
[sandy@shell /home/sandy>]mkdir os
[sandy@shell /home/sandy>]mkdir os
Unable to create directory: os
[sandy@shell /home/sandy>]mkdir -v os
Unable to create directory: os
[sandy@shell /home/sandy>]mkdir -v assign
mkdir: created directory assign
[sandy@shell /home/sandy>]mkdir -v assign
Unable to create directory: assign
[sandy@shell /home/sandy>]mkdir -m 777 dsa
[sandy@shell /home/sandy>]mkdir -m 777 dsa
Unable to create directory: dsa
[sandy@shell /home/sandy>]mkdir -vvvv assign
Unable to create directory: assign
[sandy@shell /home/sandy>]mkdir -m 888 fg
mkdir: invalid mode 888
[sandy@shell /home/sandy>]
```