

# PHY473 Assignment 1

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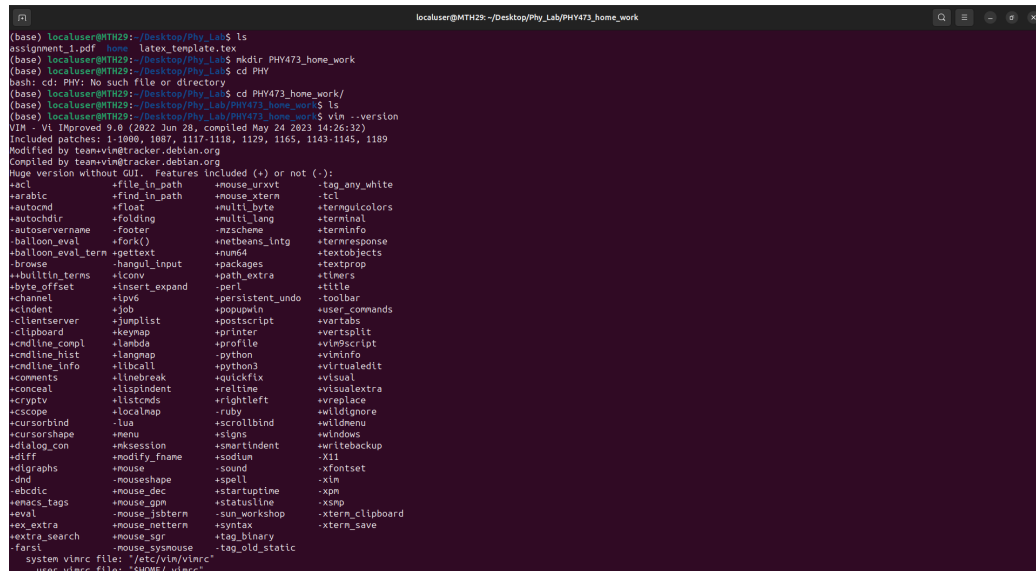
## Answer to the first Question

we have used mkdir to make directories and touch to create text files within the created directory.

### Script Code

```
#!/bin/bash
for ((i=1;i<=10;i++)); do
mkdir  "dir$i"
touch "dir$i/file.txt"
done
```

### Terminal Screenshots



```
(base) localuser@MTN29: ~/Desktop/Phy_Lab$ ls
assignment_1.pdf  latex_template.tex
(base) localuser@MTN29: ~/Desktop/Phy_Lab$ mkdir PHY473_home_work
(base) localuser@MTN29: ~/Desktop/Phy_Lab$ cd PHY
bash: cd: PHY: No such file or directory
(base) localuser@MTN29: ~/Desktop/Phy_Lab$ cd PHY473_home_work/
(base) localuser@MTN29: ~/Desktop/Phy_Lab/PHY473_home_work$ ls
(base) localuser@MTN29: ~/Desktop/Phy_Lab/PHY473_home_work$ vim --version
VIM - Vi IMproved 9.0 (2022 Jun 28, compiled May 24 2023 14:26:32)
Included patches: 1-1080, 1087, 1117-1119, 1129, 1165, 1169-1189, 1189
Modified by team+vim@tracker.debian.org
Compiled by team+vim@tracker.debian.org
huge version without GUI. Features included (+) or not (-):
+acl                +file_in_path      +mouse_urxvt       -tag_any_white
+arabic             +find_in_path      +mouse_xterm       -tcl
+autocmd            +float             +multi_byte        +termguicolors
+autocmdnr          +folding           +multi_lang        +terminal
+autoservername     +footer            +nzscheme          +terminfo
+balloon_eval       +fork()            +netbeans_intg     +termresponse
+balloon_eval_term  +gettext           +num64             +textobjects
+browse             +hangul_input      +packages          +textprop
+builtin_terms      +iconv             +path_extra        +timers
+byte_offset        +insert_expand     +perl              +title
+channel            +ipv6              +persistent_undo   +toolbar
+clientserver       +job               +popupwin          +user_commands
+clipboard          +jumplist          +postscript        +various
+cmdline_compl      +keymap            +printer           +vertsplit
+cmdline_hist       +langmap           +python            +vintinfo
+cmdline_info       +libcall           +python3           +visual
+comments           +linebreak         +quickfix          +visual
+conceal            +listindent        +reltime           +visualextra
+cryptv             +listcmds          +rightleft         +vreplace
+csscope            +localmap          +ruby              +wildignore
+cursorbind         +lua               +scrollbind        +wildmenu
+cursorshape        +menu              +signs             +windows
+dialog_con         +mkession          +smartindent       +writebackup
+diff              +modify_fname      +sodium            +X11
+digraphs           +mouse             +sound             +xfontset
+find               +mouseshape        +spell             +xim
+ebcdic             +mouse_dec         +startuptime       +xpm
+emacs_tags         +mouse_gpm         +statusline        +xmp
+eval               +mouse_jbterm      +sun_workshop      +xterm_clipboard
+extra              +mouse_netterm     +syntax            +xterm_save
+extra_search       +mouse_sgr         +tag_binary
+farai              +mouse_synmouse    +tag_old_static
+system_vimrc file: /etc/vim/vimrc
+user_vimrc file: ~/.vimrc
```

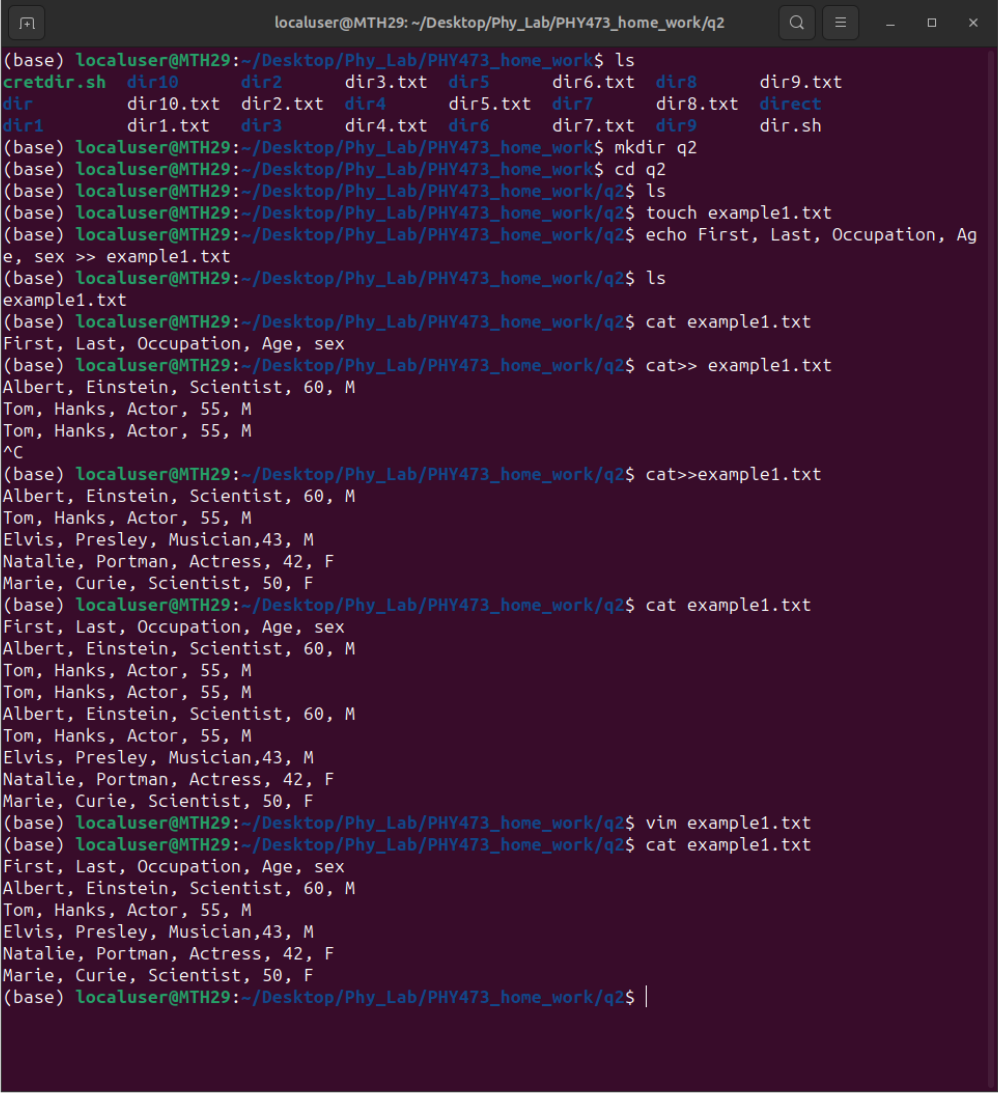
## Answer to the second Question

### Script Code

```
#!/bin/bash

dir="$PWD"
for file in *.txt; do
echo "copying file: $file"
npath=${file::-4}
nfile="$npath-copy.txt"
touch "$nfile"
tail +2 "$file" | head -2 > "$nfile"
echo "copied $file to $nfile"
done
```

## Terminal Screenshots

A terminal window titled 'localuser@MTH29: ~/Desktop/Phy\_Lab/PHY473\_home\_work/q2'. The user runs 'ls' showing a directory with files like 'cretdir.sh', 'dir10', 'dir2', etc. Then they run 'mkdir q2' and 'cd q2'. They create 'example1.txt' with 'touch' and add content with 'echo'. They use 'cat' to view the file, showing a list of names, occupations, ages, and sexes. They then use 'vim' to edit the file, adding more entries. Finally, they run 'cat' again to show the updated file content.

```
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work$ ls
cretdir.sh  dir10      dir2       dir3.txt   dir5       dir6.txt   dir8       dir9.txt
dir         dir10.txt  dir2.txt   dir4       dir5.txt   dir7       dir8.txt   direct
dir1        dir1.txt   dir3       dir4.txt   dir6       dir7.txt   dir9       dir.sh
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work$ mkdir q2
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work$ cd q2
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ ls
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ touch example1.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ echo First, Last, Occupation, Age, sex >> example1.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ ls
example1.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ cat example1.txt
First, Last, Occupation, Age, sex
Albert, Einstein, Scientist, 60, M
Tom, Hanks, Actor, 55, M
Tom, Hanks, Actor, 55, M
^C
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ cat>>example1.txt
Albert, Einstein, Scientist, 60, M
Tom, Hanks, Actor, 55, M
Elvis, Presley, Musician,43, M
Natalie, Portman, Actress, 42, F
Marie, Curie, Scientist, 50, F
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ cat example1.txt
First, Last, Occupation, Age, sex
Albert, Einstein, Scientist, 60, M
Tom, Hanks, Actor, 55, M
Tom, Hanks, Actor, 55, M
Albert, Einstein, Scientist, 60, M
Tom, Hanks, Actor, 55, M
Elvis, Presley, Musician,43, M
Natalie, Portman, Actress, 42, F
Marie, Curie, Scientist, 50, F
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ vim example1.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ cat example1.txt
First, Last, Occupation, Age, sex
Albert, Einstein, Scientist, 60, M
Tom, Hanks, Actor, 55, M
Elvis, Presley, Musician,43, M
Natalie, Portman, Actress, 42, F
Marie, Curie, Scientist, 50, F
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ |
```

Figure 1: created example1.txt

```
localuser@MTH29: ~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems
Tom, Hanks, Actor, 55, M
Elvis, Presley, Musician,43, M
Natalie, Portman, Actress, 42, F
Marie, Curie, Scientist, 50, F
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ mkdir bash-problems
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ ls
bash-problems  example1.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ mv example1.txt bash-problems/ex
ample1.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ ls
bash-problems
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2$ cd bash-problems/
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ ls
example1.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ cp example1.txt ex
ample2.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ ls
example1.txt  example2.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ cat example2.txt
First, Last, Occupation, Age, sex
Albert, Einstein, Scientist, 60, M
Tom, Hanks, Actor, 55, M
Elvis, Presley, Musician,43, M
Natalie, Portman, Actress, 42, F
Marie, Curie, Scientist, 50, F
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt
Albert, Einstein, Scientist, 60, M
Tom, Hanks, Actor, 55, M
Elvis, Presley, Musician,43, M
Natalie, Portman, Actress, 42, F
Marie, Curie, Scientist, 50, F
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | sort
Albert, Einstein, Scientist, 60, M
Elvis, Presley, Musician,43, M
Marie, Curie, Scientist, 50, F
Natalie, Portman, Actress, 42, F
Tom, Hanks, Actor, 55, M
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | sort -k4 -nr
Albert, Einstein, Scientist, 60, M
Tom, Hanks, Actor, 55, M
Marie, Curie, Scientist, 50, F
Natalie, Portman, Actress, 42, F
Elvis, Presley, Musician,43, M
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ |
```

Figure 2: (a) to (d)

```

localuser@MTH29: ~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems
Tom, Hanks, Actor, 55, M
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | sort -k4 -nr
Albert, Einstein, Scientist, 60, M
Tom, Hanks, Actor, 55, M
Marie, Curie, Scientist, 50, F
Natalie, Portman, Actress, 42, F
Elvis, Presley, Musician,43, M
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ ls
example1.txt example2.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ grep "Elvis" examp
le1.txt
Elvis, Presley, Musician,43, M
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | sort -k2 | awk '{print $1 , $2 , $3}' | > names.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ ls
example1.txt example2.txt names.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ cat names.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | sort -k2 | awk '{print $1 , $2 , $3}' | > names.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ cat names.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | sort -k2 | awk '{print $1 , $2 , $3}'
Marie, Curie, Scientist,
Albert, Einstein, Scientist,
Tom, Hanks, Actor,
Natalie, Portman, Actress,
Elvis, Presley, Musician,43,
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | sort -k2 | awk '{print $1 , $2 , $3}' > names.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ cat names.txt
Marie, Curie, Scientist,
Albert, Einstein, Scientist,
Tom, Hanks, Actor,
Natalie, Portman, Actress,
Elvis, Presley, Musician,43,
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ vim example
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ vim example1.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | sort -k2 | awk '{print $1 , $2 , $3}' > names.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ cat names.txt
Marie, Curie, Scientist,
Albert, Einstein, Scientist,
Tom, Hanks, Actor,
Natalie, Portman, Actress,
Elvis, Presley, Musician,
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ |

```

Figure 3: (e) to (g)

```
localuser@MTH29: ~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems
F
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | awk / $5==$var /
awk: line 1: runaway regular expression / ...
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | awk /$5==$var/
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ ?
?: command not found
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | awk $5 == 'F'
awk: line 1: syntax error at or near ==
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | awk $5 == 'F'
awk: line 1: syntax error at or near ==
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | awk $5=='F'
awk: line 1: syntax error at or near ==
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | awk '$F = "F"'
F
F
F
F
F
F
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ cat example1.txt
First, Last, Occupation, Age, sex
Albert, Einstein, Scientist, 60, M
Tom, Hanks, Actor, 55, M
Elvis, Presley, Musician, 43, M
Natalie, Portman, Actress, 42, F
Marie, Curie, Scientist, 50, F
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | awk '/F/{ print $1 , $2 , $3 , $4 }'
Natalie, Portman, Actress, 42,
Marie, Curie, Scientist, 50,
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | awk '/$5-eq F/{ print $1 , $2 , $3 , $4 }'
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | awk '/$5 -eq F/{ print $1 , $2 , $3 , $4 }'
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | awk '/$5 -eq F/{ print $1 , $2 , $3 , $4 }'
awk: line 1: runaway regular expression / ...
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ tail +2 example1.t
xt | awk '/F/{ print $1 , $2 , $3 , $4 }'
Natalie, Portman, Actress, 42,
Marie, Curie, Scientist, 50,
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ |
```

Figure 4: (h) to (i)

```
localuser@MTH29: ~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ ./script.sh
copying file: example1.txt
copied example1.txt to ex-copy.txt
copying file: example2.txt
copied example2.txt to ex-copy.txt
copying file: female.txt
copied female.txt to fe-copy.txt
copying file: names.txt
copied names.txt to na-copy.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ vim script.sh
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ ./script.sh
copying file: example1.txt
copied example1.txt to example1-copy.txt
copying file: example2.txt
copied example2.txt to example2-copy.txt
copying file: female.txt
copied female.txt to female-copy.txt
copying file: names.txt
copied names.txt to names-copy.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ ls
example1-copy.txt  example2-copy.txt  female-copy.txt  names-copy.txt  script.sh
example1.txt       example2.txt       female.txt       names.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ cat names.txt
Marie, Curie, Scientist,
Albert, Einstein, Scientist,
Tom, Hanks, Actor,
Natalie, Portman, Actress,
Elvis, Presley, Musician,
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ cat names-copy.txt
Albert, Einstein, Scientist,
Tom, Hanks, Actor,
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ cat script.sh
#!/bin/bash

dir="$PWD"
for file in *.txt; do
    echo "copying file: $file"
    npath=${file::-4}
    nfile="$npath-copy.txt"
    touch "$nfile"
    tail +2 "$file" | head -2 > "$nfile"
    echo "copied $file to $nfile"
done

(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q2/bash-problems$ |
```

Figure 5: (j)

## Answer to the third Question

wrote a recurssive function to calculate factorial of a number

## Script Code

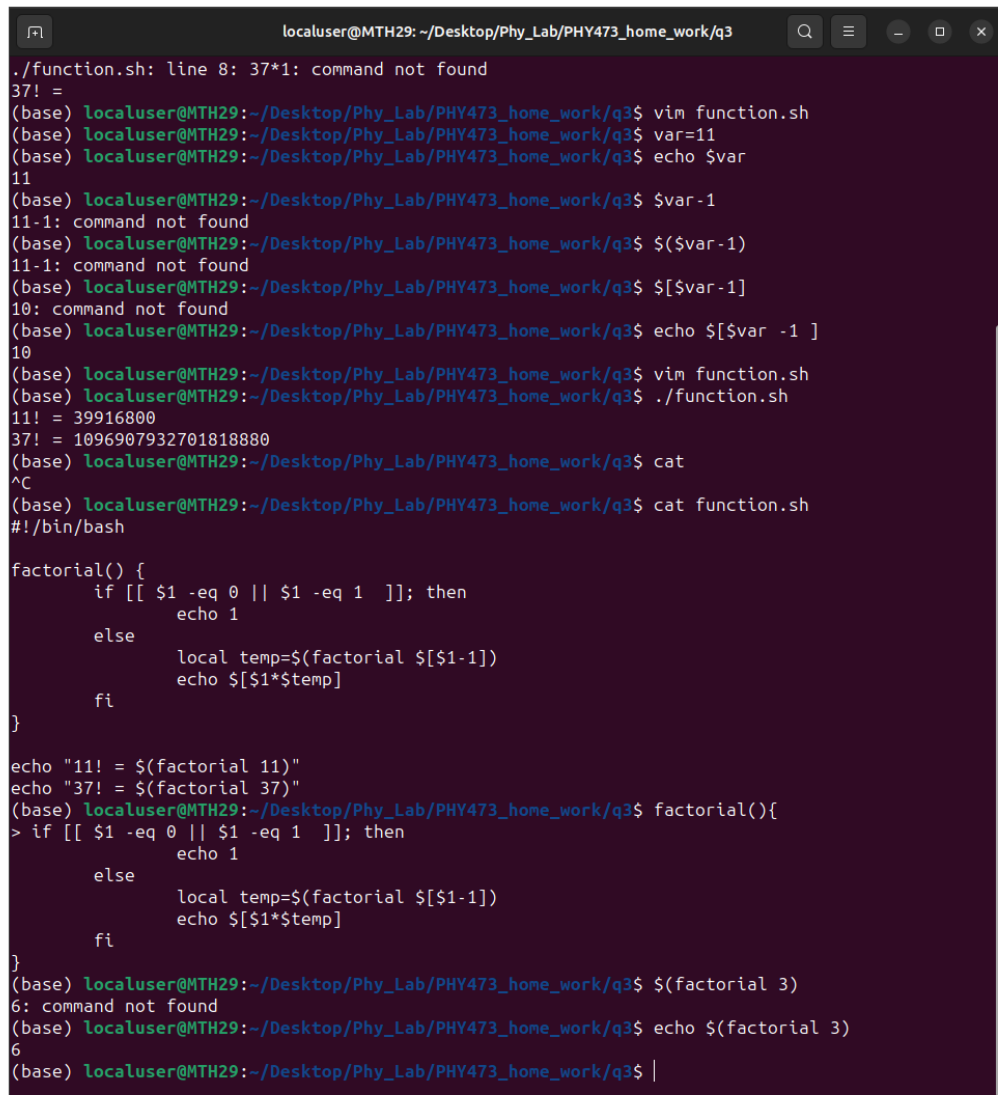
```
#!/bin/bash

factorial() {
if [[ $1 -eq 0 || $1 -eq 1 ]]; then
echo 1
else
local temp=$(factorial ${1-1})
echo ${1*$temp}
fi
}

echo "11! = $(factorial 11)"
echo "37! = $(factorial 37)"
```



## Terminal Screenshots



```
localuser@MTH29: ~/Desktop/Phy_Lab/PHY473_home_work/q3
./function.sh: line 8: 37*1: command not found
37! =
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ vim function.sh
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ var=11
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ echo $var
11
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ $var-1
11-1: command not found
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ ${$var-1}
11-1: command not found
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ ${$var-1}
10: command not found
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ echo ${$var -1 ]
10
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ vim function.sh
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ ./function.sh
11! = 39916800
37! = 1096907932701818880
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ cat
^C
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ cat function.sh
#!/bin/bash

factorial() {
    if [[ $1 -eq 0 || $1 -eq 1 ]]; then
        echo 1
    else
        local temp=$(factorial ${$1-1})
        echo ${$1*$temp}
    fi
}

echo "11! = $(factorial 11)"
echo "37! = $(factorial 37)"
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ factorial(){
> if [[ $1 -eq 0 || $1 -eq 1 ]]; then
    echo 1
    else
        local temp=$(factorial ${$1-1})
        echo ${$1*$temp}
    fi
}
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ ${factorial 3}
6: command not found
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ echo ${factorial 3}
6
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q3$ |
```

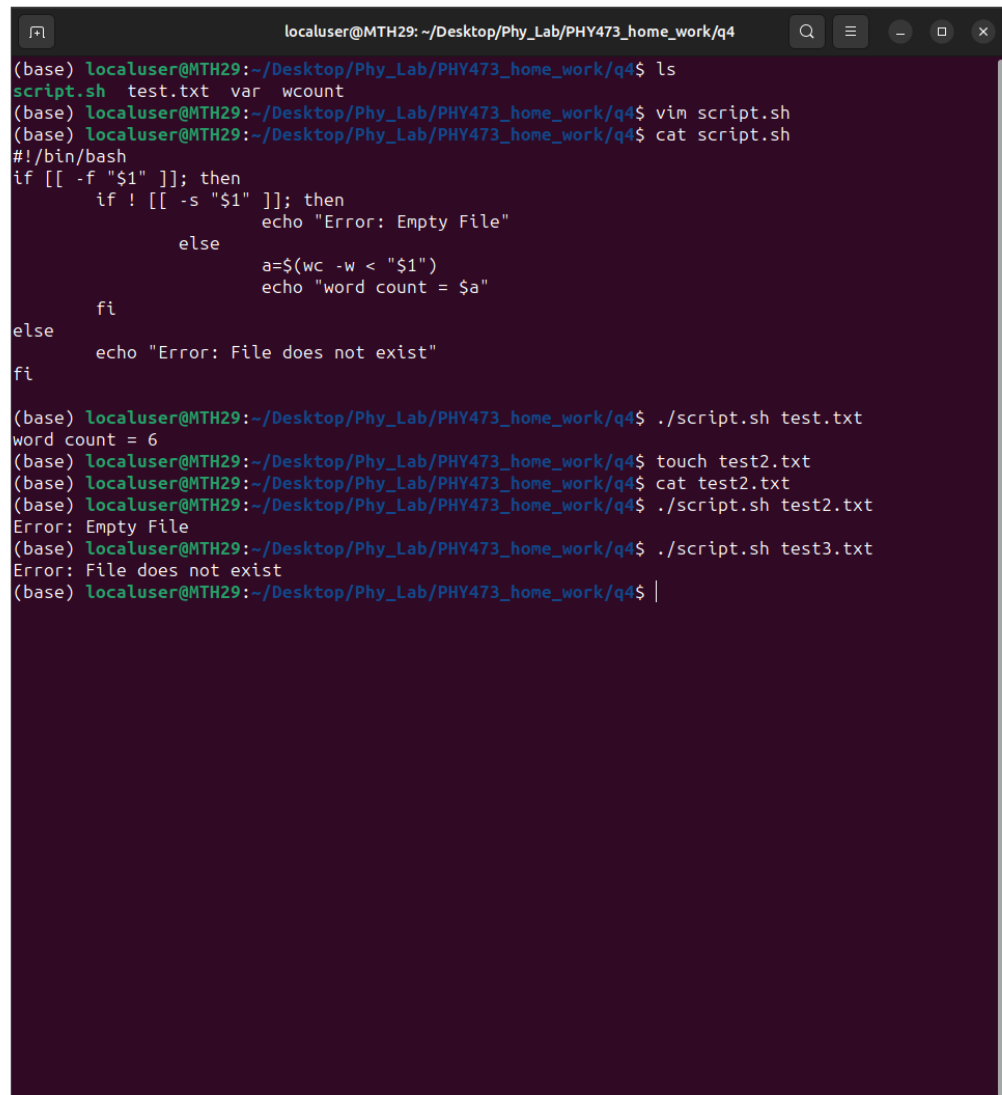
## Answer to the fourth Question

wrote a script to determine whether a file exists or not and also print number of words present in it if file exists

## Script Code

```
#!/bin/bash
if [[ -f "$1" ]]; then
if ! [[ -s "$1" ]]; then
echo "Error: Empty File"
else
a=$(wc -w < "$1")
echo "word count = $a"
fi
else
echo "Error: File does not exist"
fi
```

## Terminal Screenshots



```
localuser@MTH29: ~/Desktop/Phy_Lab/PHY473_home_work/q4
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q4$ ls
script.sh test.txt var wcount
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q4$ vim script.sh
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q4$ cat script.sh
#!/bin/bash
if [[ -f "$1" ]]; then
    if ! [[ -s "$1" ]]; then
        echo "Error: Empty File"
    else
        a=$(wc -w < "$1")
        echo "word count = $a"
    fi
else
    echo "Error: File does not exist"
fi

(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q4$ ./script.sh test.txt
word count = 6
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q4$ touch test2.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q4$ cat test2.txt
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q4$ ./script.sh test2.txt
Error: Empty File
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q4$ ./script.sh test3.txt
Error: File does not exist
(base) localuser@MTH29:~/Desktop/Phy_Lab/PHY473_home_work/q4$ |
```