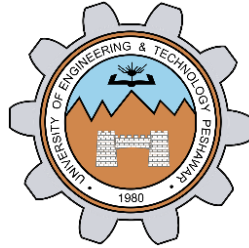


LAB # 06



CSE302L System Programming Lab

Submitted by: ALI ASGHAR

Registration No: **21PWCSE2059**

Class Section: **C**

Submitted to:

Engr. Abdullah Hamid

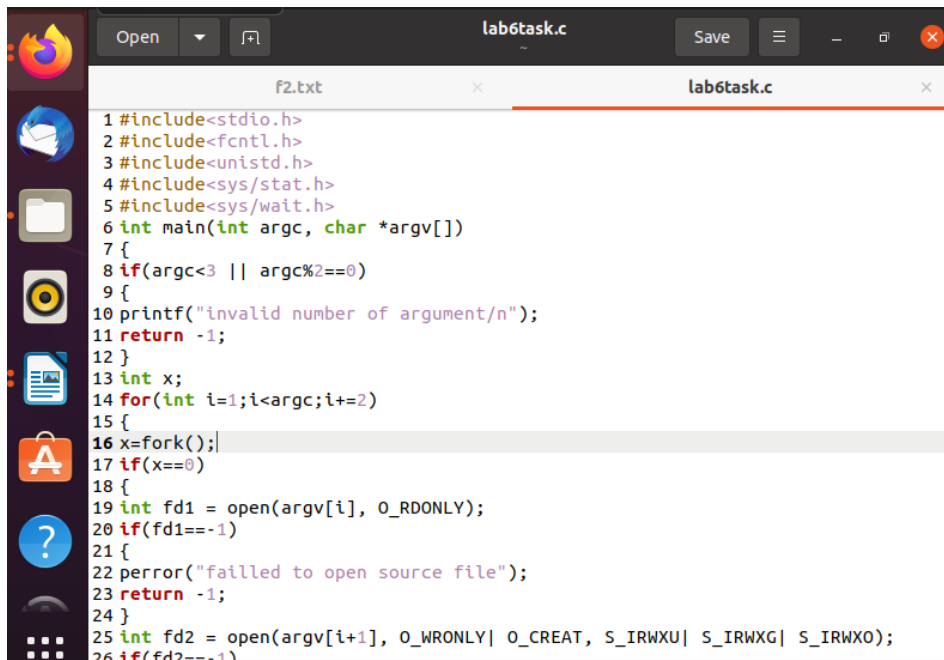
Lab Objectives:

- To understand different Unix IO Commands
- Implement different Unix Commands.

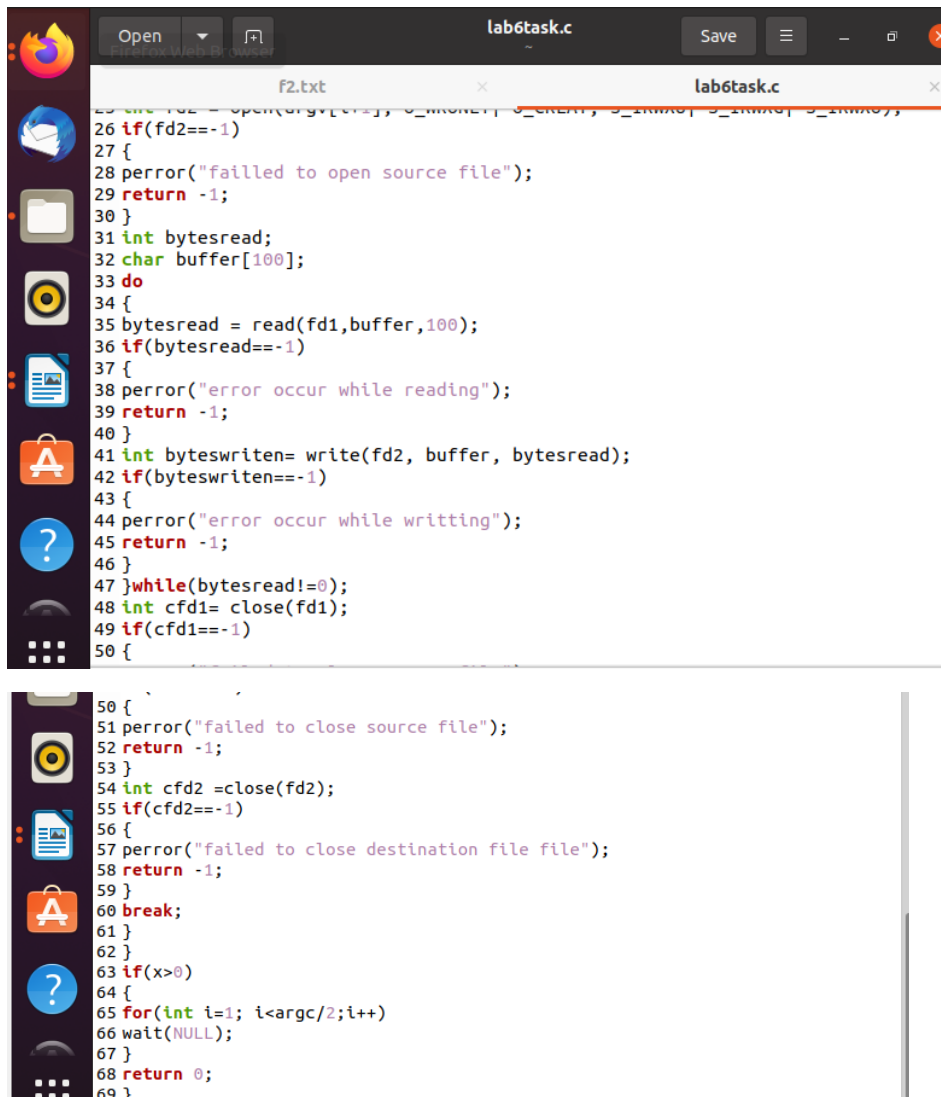
Lab Tasks:

Task 1:

Write a program for parallel file copying using multiple processes.

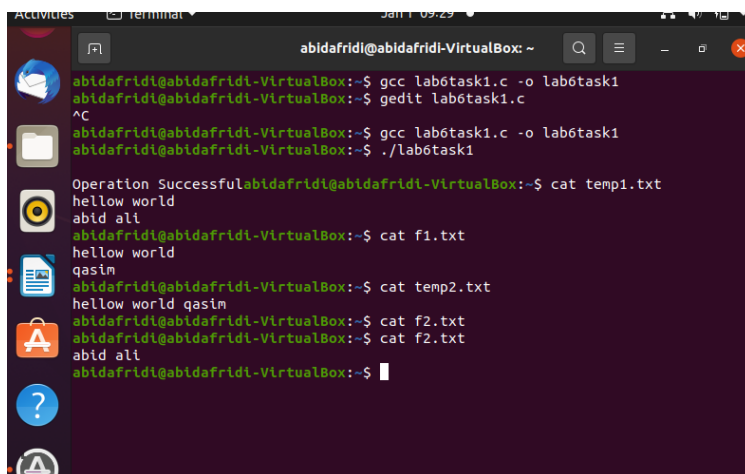
A screenshot of a code editor window titled 'lab6task.c'. The editor has a dark theme and a sidebar on the left with various icons. The code is written in C and implements a parallel file copying program. It includes headers for stdio, fcntl, unistd, sys/stat, and sys/wait. The main function checks the number of arguments. If there are fewer than 3 arguments, it prints an error and returns -1. It then iterates over the arguments in pairs, for each pair it forks a child process. The parent process opens the source file (argv[i]) in read-only mode. The child process opens the destination file (argv[i+1]) in write-only mode with O_CREAT, S_IRWXU, S_IRWXG, and S_IRWXO flags. The code is as follows:

```
1 #include<stdio.h>
2 #include<fcntl.h>
3 #include<unistd.h>
4 #include<sys/stat.h>
5 #include<sys/wait.h>
6 int main(int argc, char *argv[])
7 {
8     if(argc<3 || argc%2==0)
9     {
10 printf("invalid number of argument/n");
11 return -1;
12 }
13 int x;
14 for(int i=1;i<argc;i+=2)
15 {
16 x=fork();
17 if(x==0)
18 {
19 int fd1 = open(argv[i], O_RDONLY);
20 if(fd1==-1)
21 {
22 perror("failed to open source file");
23 return -1;
24 }
25 int fd2 = open(argv[i+1], O_WRONLY| O_CREAT, S_IRWXU| S_IRWXG| S_IRWXO);
26 if(fd2==-1)
```



```
26 if(fd2== -1)
27 {
28 perror("failed to open source file");
29 return -1;
30 }
31 int bytesread;
32 char buffer[100];
33 do
34 {
35 bytesread = read(fd1,buffer,100);
36 if(bytesread== -1)
37 {
38 perror("error occur while reading");
39 return -1;
40 }
41 int byteswriten= write(fd2, buffer, bytesread);
42 if(byteswriten== -1)
43 {
44 perror("error occur while writting");
45 return -1;
46 }
47 }while(bytesread!=0);
48 int cfd1= close(fd1);
49 if(cfd1== -1)
50 {
51 perror("failed to close source file");
52 return -1;
53 }
54 int cfd2 =close(fd2);
55 if(cfd2== -1)
56 {
57 perror("failed to close destination file file");
58 return -1;
59 }
60 break;
61 }
62 }
63 if(x>0)
64 {
65 for(int i=1; i<argc/2;i++)
66 wait(NULL);
67 }
68 return 0;
69 }
```

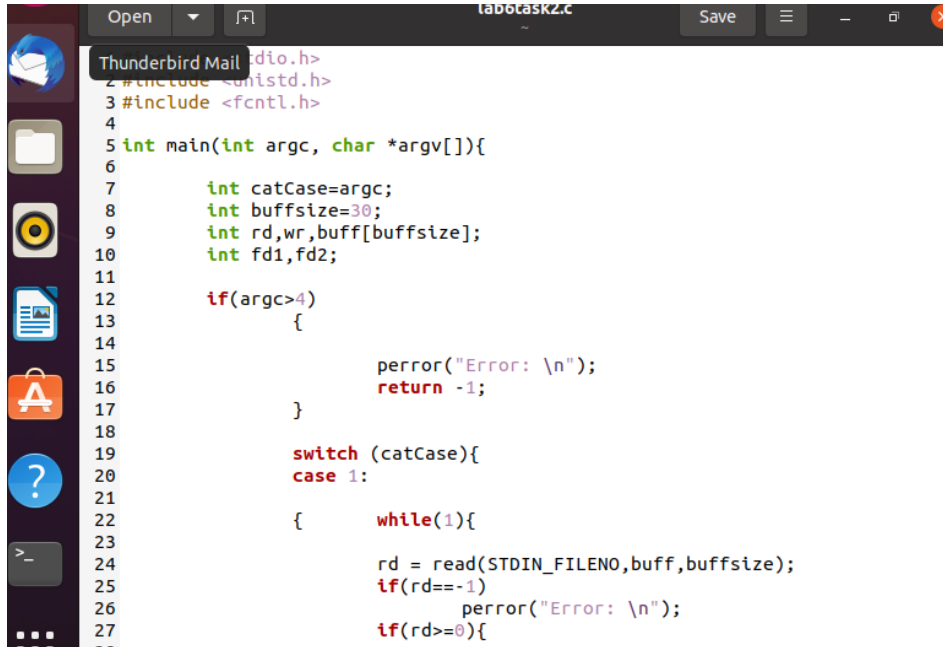
Output;



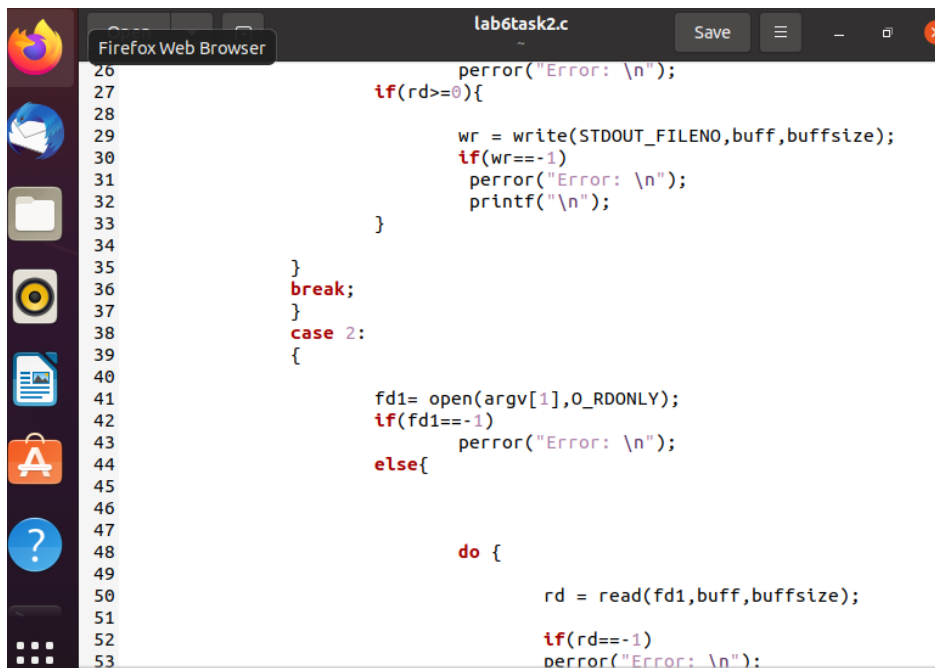
```
abidafridi@abidafridi-VirtualBox: ~
abidafridi@abidafridi-VirtualBox:~$ gcc lab6task1.c -o lab6task1
abidafridi@abidafridi-VirtualBox:~$ gedit lab6task1.c
^C
abidafridi@abidafridi-VirtualBox:~$ gcc lab6task1.c -o lab6task1
abidafridi@abidafridi-VirtualBox:~$ ./lab6task1
Operation Successful
abidafridi@abidafridi-VirtualBox:~$ cat temp1.txt
hellow world
abid ali
abidafridi@abidafridi-VirtualBox:~$ cat f1.txt
hellow world
qasim
abidafridi@abidafridi-VirtualBox:~$ cat temp2.txt
hellow world qasim
abidafridi@abidafridi-VirtualBox:~$ cat f2.txt
abid ali
abidafridi@abidafridi-VirtualBox:~$
```

Task2

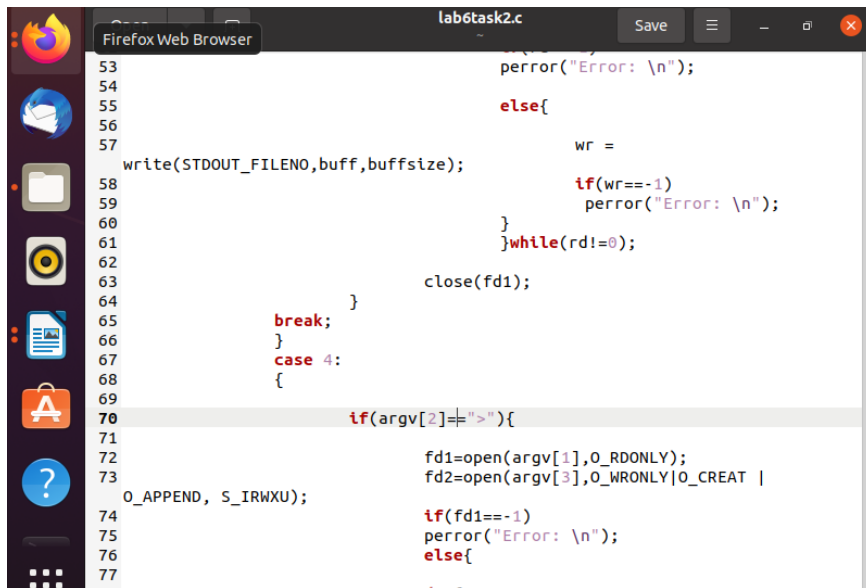
Implement “Cat” utility.



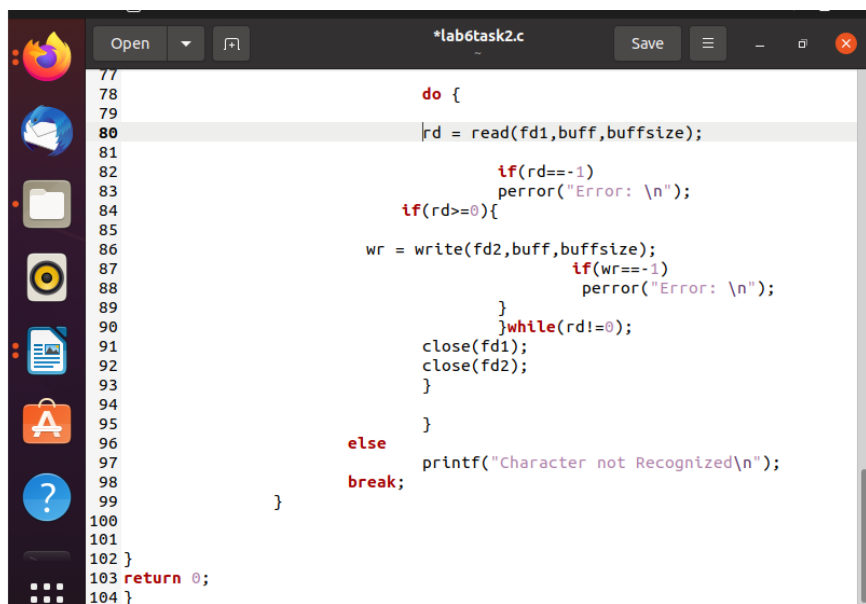
```
lab6task2.c
Open Save
Thunderbird Mail
1 #include <stdio.h>
2 #include <unistd.h>
3 #include <fcntl.h>
4
5 int main(int argc, char *argv[]){
6
7     int catCase=argc;
8     int buffsize=30;
9     int rd,wr,buff[buffsize];
10    int fd1,fd2;
11
12    if(argc>4)
13    {
14
15        perror("Error: \n");
16        return -1;
17    }
18
19    switch (catCase){
20    case 1:
21
22        while(1){
23
24            rd = read(STDIN_FILENO,buff,buffsize);
25            if(rd==-1)
26                perror("Error: \n");
27            if(rd>=0){
```



```
lab6task2.c
Firefox Web Browser Save
26        perror("Error: \n");
27        if(rd>=0){
28
29            wr = write(STDOUT_FILENO,buff,buffsize);
30            if(wr==-1)
31                perror("Error: \n");
32            printf("\n");
33        }
34    }
35    }
36    break;
37    }
38    case 2:
39    {
40
41        fd1= open(argv[1],O_RDONLY);
42        if(fd1==-1)
43            perror("Error: \n");
44        else{
45
46
47            do {
48
49                rd = read(fd1,buff,buffsize);
50
51                if(rd==-1)
52                    perror("Error: \n");
53
```

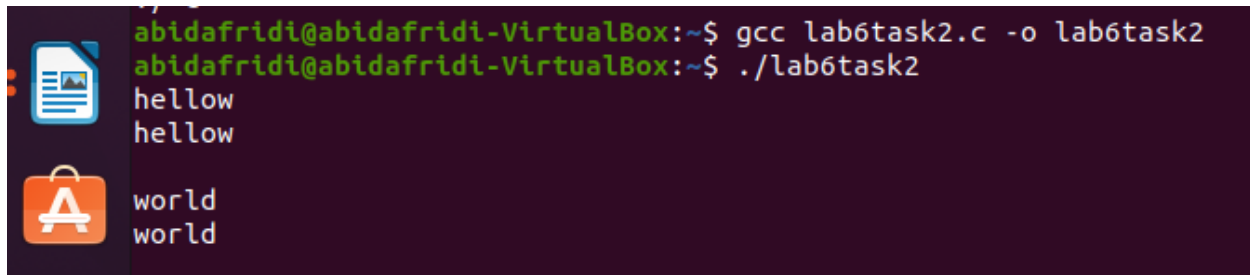


```
53         perror("Error: \n");
54
55         else{
56
57             wr =
58             write(STDOUT_FILENO,buff,buffsize);
59             if(wr==-1)
60                 perror("Error: \n");
61             }while(rd!=0);
62         }
63         close(fd1);
64     }
65     break;
66 }
67 case 4:
68 {
69
70     if(argv[2]!=">"){
71
72         fd1=open(argv[1],O_RDONLY);
73         fd2=open(argv[3],O_WRONLY|O_CREAT |
74             O_APPEND, S_IRWXU);
75         if(fd1==-1)
76             perror("Error: \n");
77         else{
78
```



```
77
78         do {
79
80             rd = read(fd1,buff,buffsize);
81
82             if(rd==-1)
83                 perror("Error: \n");
84             if(rd>=0){
85
86                 wr = write(fd2,buff,buffsize);
87                 if(wr==-1)
88                     perror("Error: \n");
89                 }while(rd!=0);
90             }
91             close(fd1);
92             close(fd2);
93         }
94     }
95     else
96         printf("Character not Recognized\n");
97     break;
98 }
99
100 }
101
102 }
103 return 0;
104 }
```

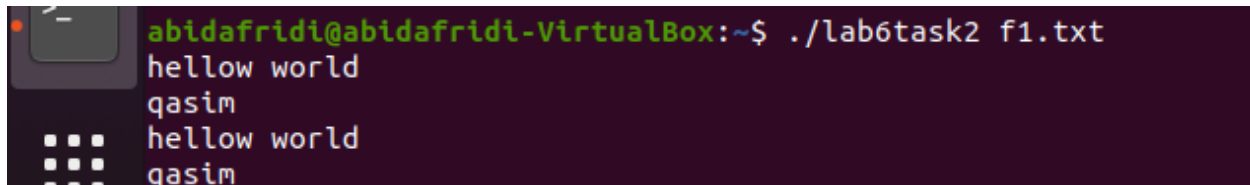
Case1



```
abidafridi@abidafridi-VirtualBox:~$ gcc lab6task2.c -o lab6task2
abidafridi@abidafridi-VirtualBox:~$ ./lab6task2
hellow
hellow

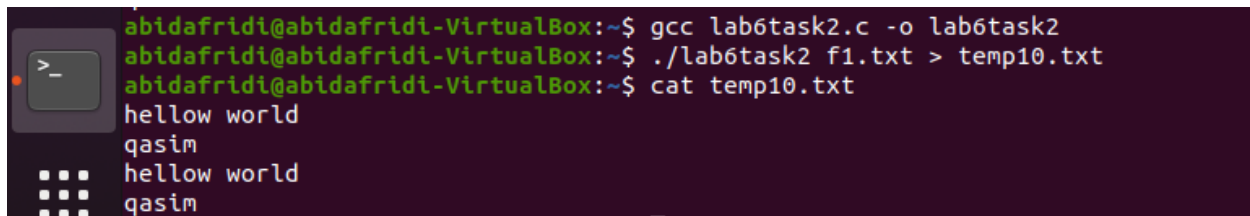
world
world
```

Case2;



```
abidafridi@abidafridi-VirtualBox:~$ ./lab6task2 f1.txt
hellow world
qasim
hellow world
qasim
```

Case3;



```
abidafridi@abidafridi-VirtualBox:~$ gcc lab6task2.c -o lab6task2
abidafridi@abidafridi-VirtualBox:~$ ./lab6task2 f1.txt > temp10.txt
abidafridi@abidafridi-VirtualBox:~$ cat temp10.txt
hellow world
qasim
hellow world
qasim
```