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SRN :PES2UG20CS390

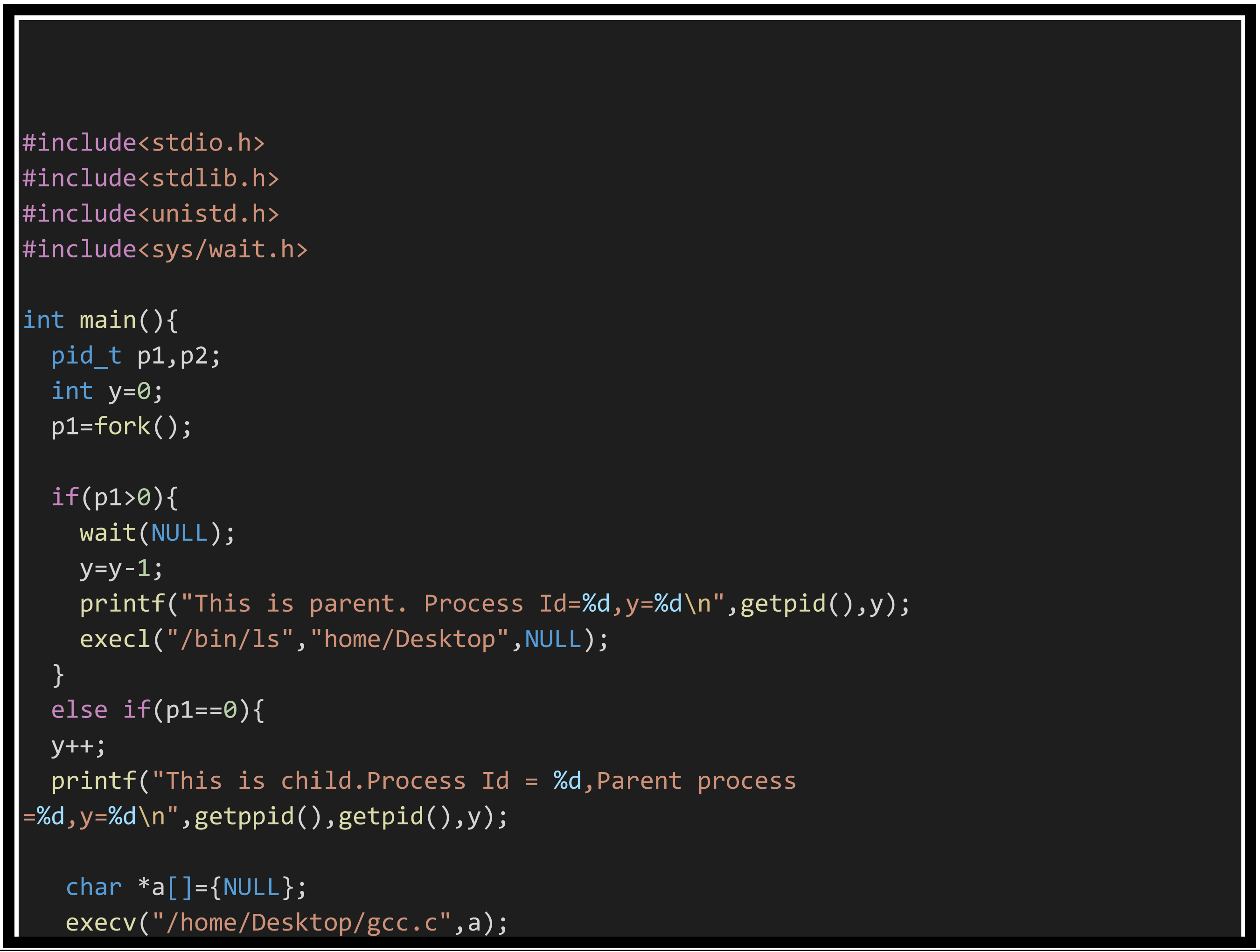
Sec: F
Date: 30/04/2022

Department of Computer Science & Engineering

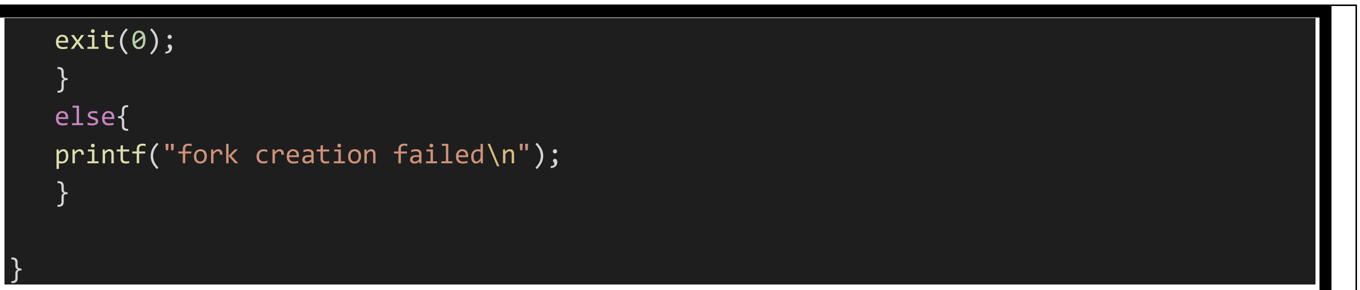
Operating Systems - UE20CS254

LAB ASSIGNMENT PROGRAMS AND OUTPUTS

SL No:	Programs and outputs
1)	Write program to create a child process which lists all files in the current directory along with the size (Avoid creation of Zombie process). Code:

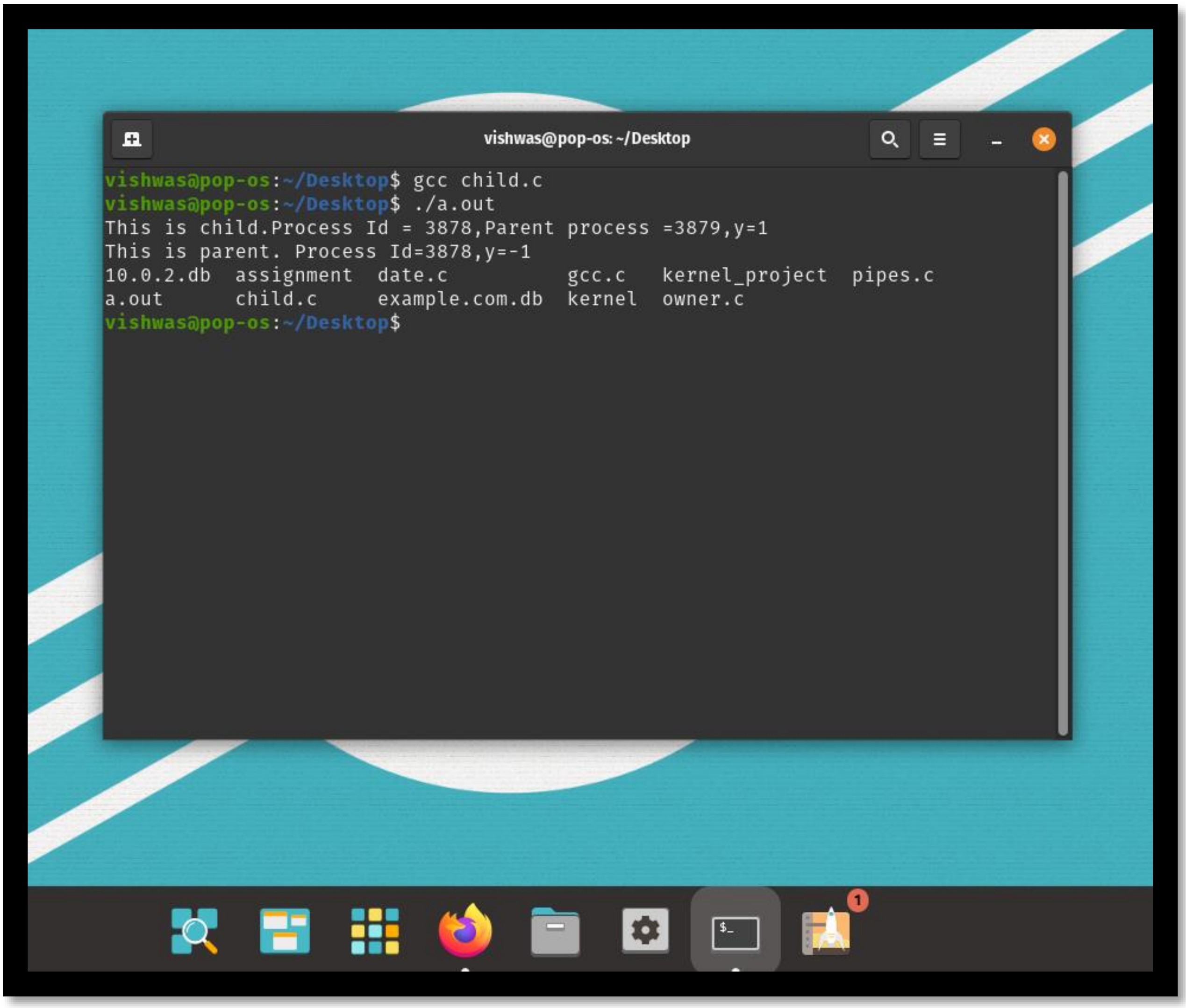


```
#include<stdio.h>
#include<stdlib.h>
#include<unistd.h>
#include<sys/wait.h>

int main(){
  pid_t p1,p2;
  int y=0;
  p1=fork();

  if(p1>0){
    wait(NULL);
    y=y-1;
    printf("This is parent. Process Id=%d,y=%d\n",getpid(),y);
    execl("/bin/ls","home/Desktop",NULL);
  }
  else if(p1==0){
  y++;
  printf("This is child.Process Id = %d,Parent process 
=%d,y=%d\n",getppid(),getpid(),y);

   char *a[]={NULL};
   execv("/home/Desktop/gcc.c",a);
```



```
    exit(0);
    }
    else{
    printf("fork creation failed\n");
    }

}
```

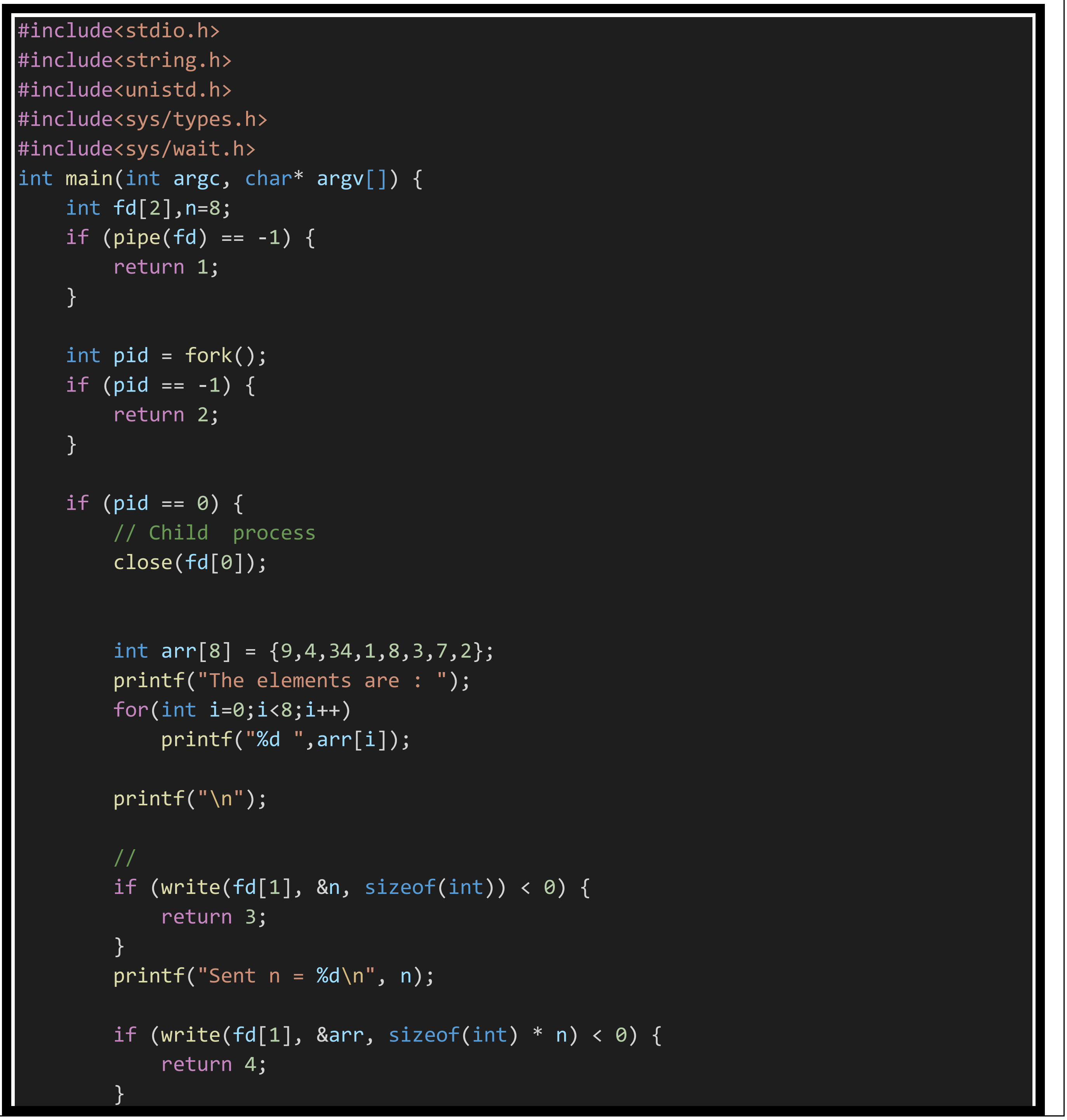
Screenshot of the output:



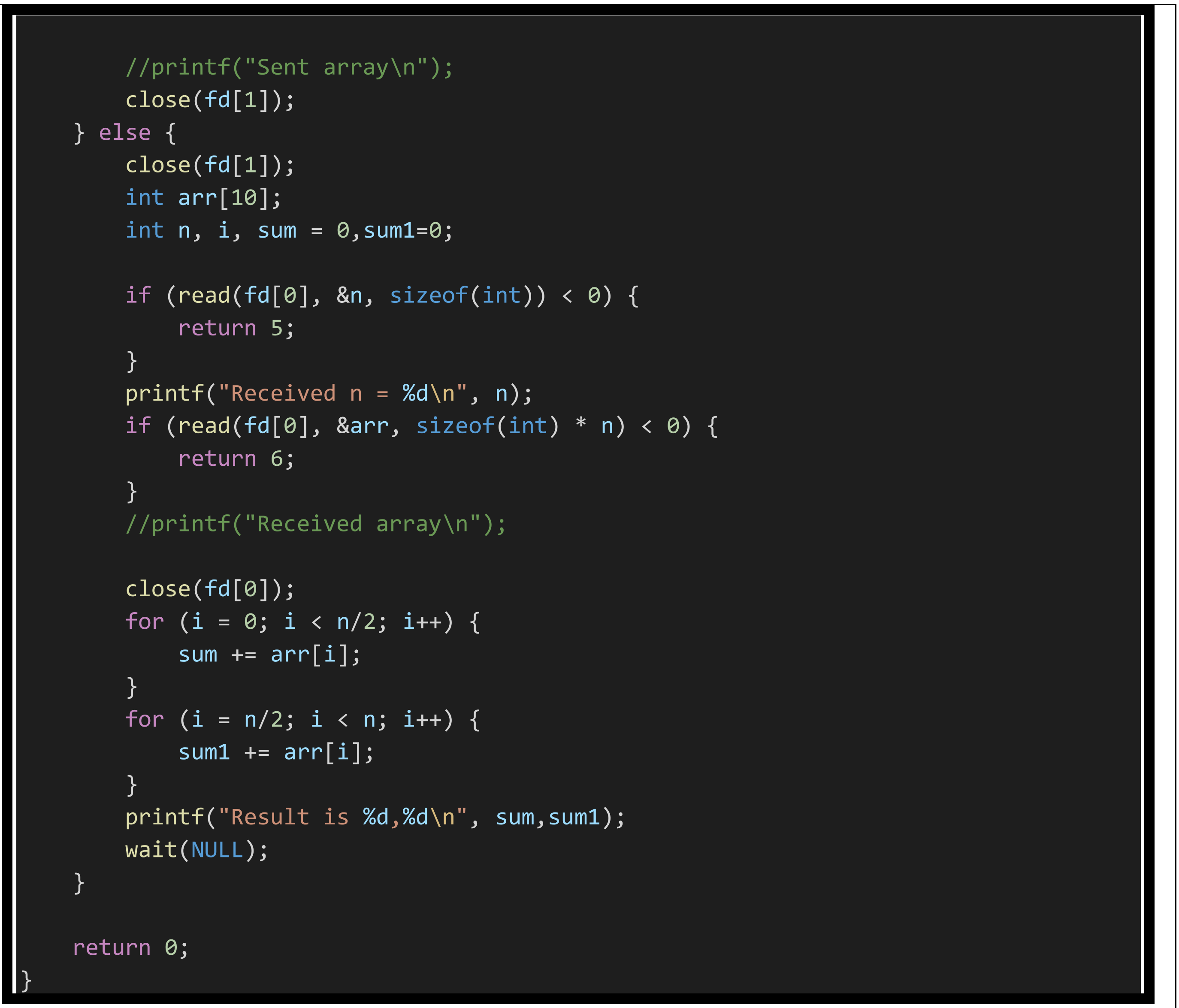
```
vishwas@pop-os:~/Desktop$ gcc child.c
vishwas@pop-os:~/Desktop$ ./a.out
This is child.Process Id = 3878,Parent process =3879,y=1
This is parent. Process Id=3878,y=-1
10.0.2.db  assignment  date.c         gcc.c   kernel_project  pipes.c
a.out      child.c     example.com.db kernel  owner.c
vishwas@pop-os:~/Desktop$
```

2) Given an array, use fork and pipes to create two processes. Each process will find the sum of first half and second half of the elements of an array and return that sum through a pipe to the parent process.

Code:

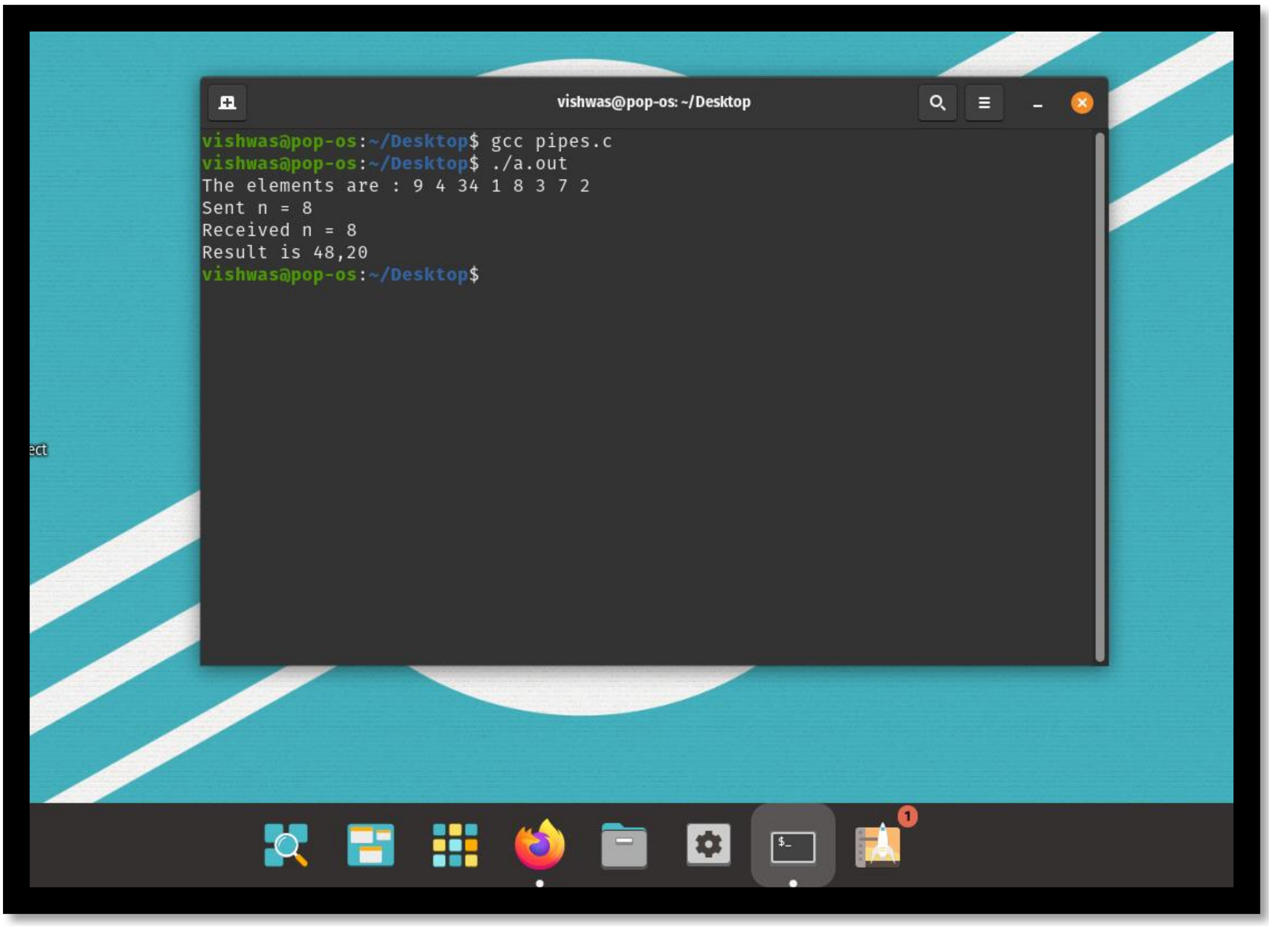


```
#include<stdio.h>
#include<string.h>
#include<unistd.h>
#include<sys/types.h>
#include<sys/wait.h>
int main(int argc, char* argv[]) {
    int fd[2],n=8;
    if (pipe(fd) == -1) {
        return 1;
    }

    int pid = fork();
    if (pid == -1) {
        return 2;
    }

    if (pid == 0) {
        // Child  process
        close(fd[0]);


        int arr[8] = {9,4,34,1,8,3,7,2};
        printf("The elements are : ");
        for(int i=0;i<8;i++)
            printf("%d ",arr[i]);

        printf("\n");

        //
        if (write(fd[1], &n, sizeof(int)) < 0) {
            return 3;
        }
        printf("Sent n = %d\n", n);

        if (write(fd[1], &arr, sizeof(int) * n) < 0) {
            return 4;
        }
```



```
        //printf("Sent array\n");
        close(fd[1]);
    } else {
        close(fd[1]);
        int arr[10];
        int n, i, sum = 0,sum1=0;

        if (read(fd[0], &n, sizeof(int)) < 0) {
            return 5;
        }
        printf("Received n = %d\n", n);
        if (read(fd[0], &arr, sizeof(int) * n) < 0) {
            return 6;
        }
        //printf("Received array\n");

        close(fd[0]);
        for (i = 0; i < n/2; i++) {
            sum += arr[i];
        }
        for (i = n/2; i < n; i++) {
            sum1 += arr[i];
        }
        printf("Result is %d,%d\n", sum,sum1);
        wait(NULL);
    }

    return 0;
}
```

Screenshot of the output:



```
vishwas@pop-os:~/Desktop$ gcc pipes.c
vishwas@pop-os:~/Desktop$ ./a.out
The elements are : 9 4 34 1 8 3 7 2
Sent n = 8
Received n = 8
Result is 48,20
vishwas@pop-os:~/Desktop$
```

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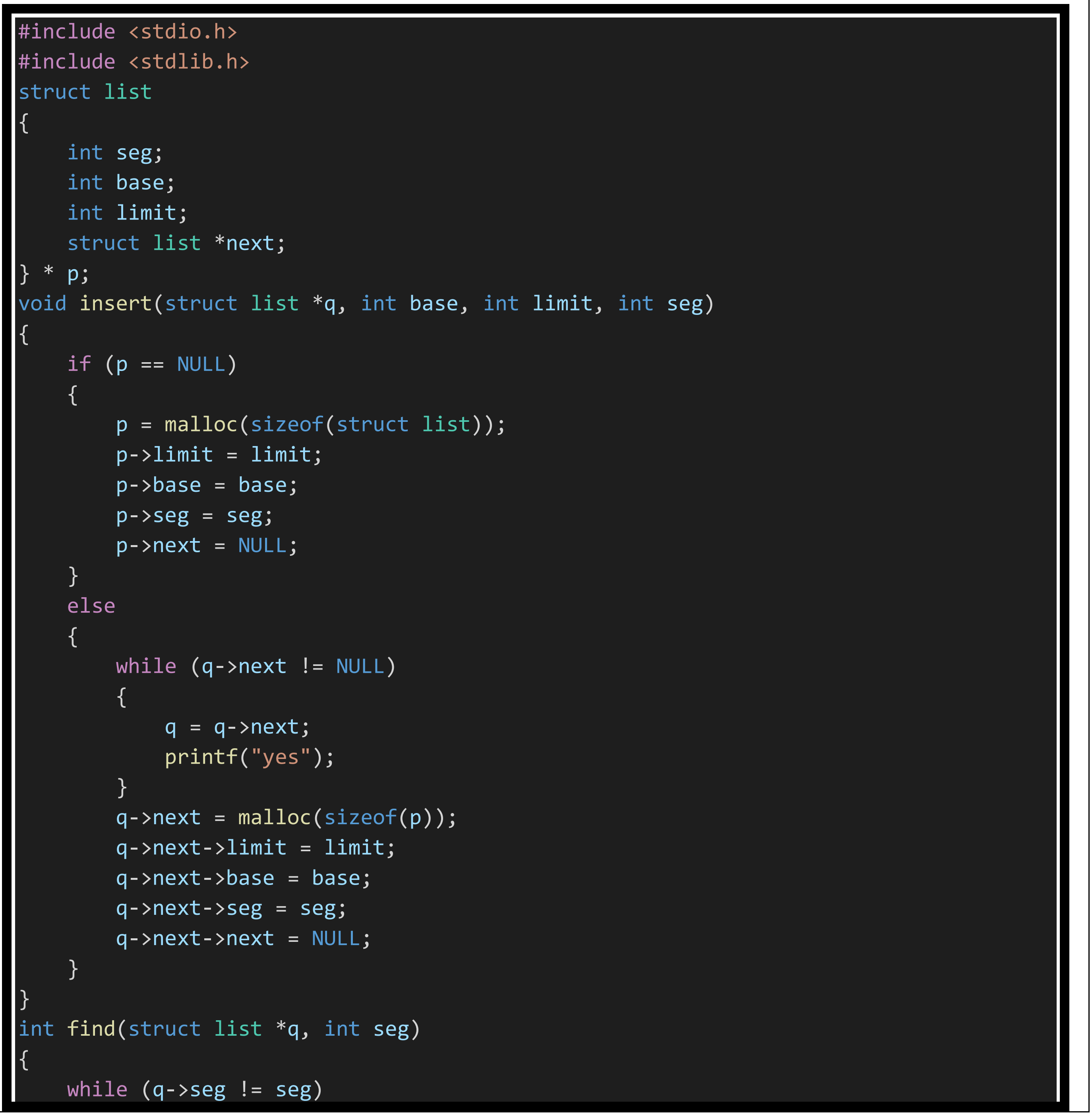
3) Write a C programme to simulate Segmentation:

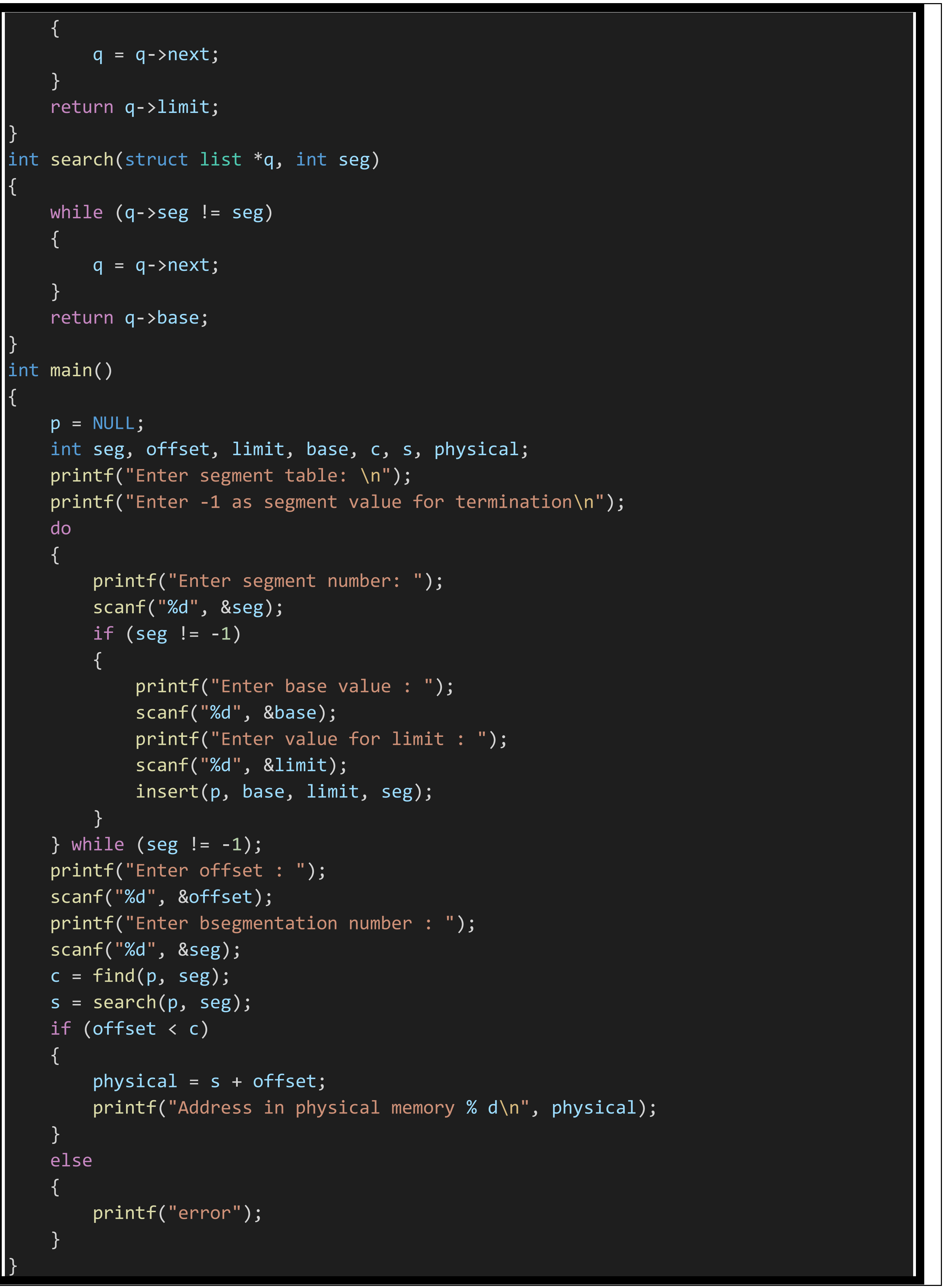
Take as Input:

a) Segmentation number
b) Base Address
c) Segment limit

Code:

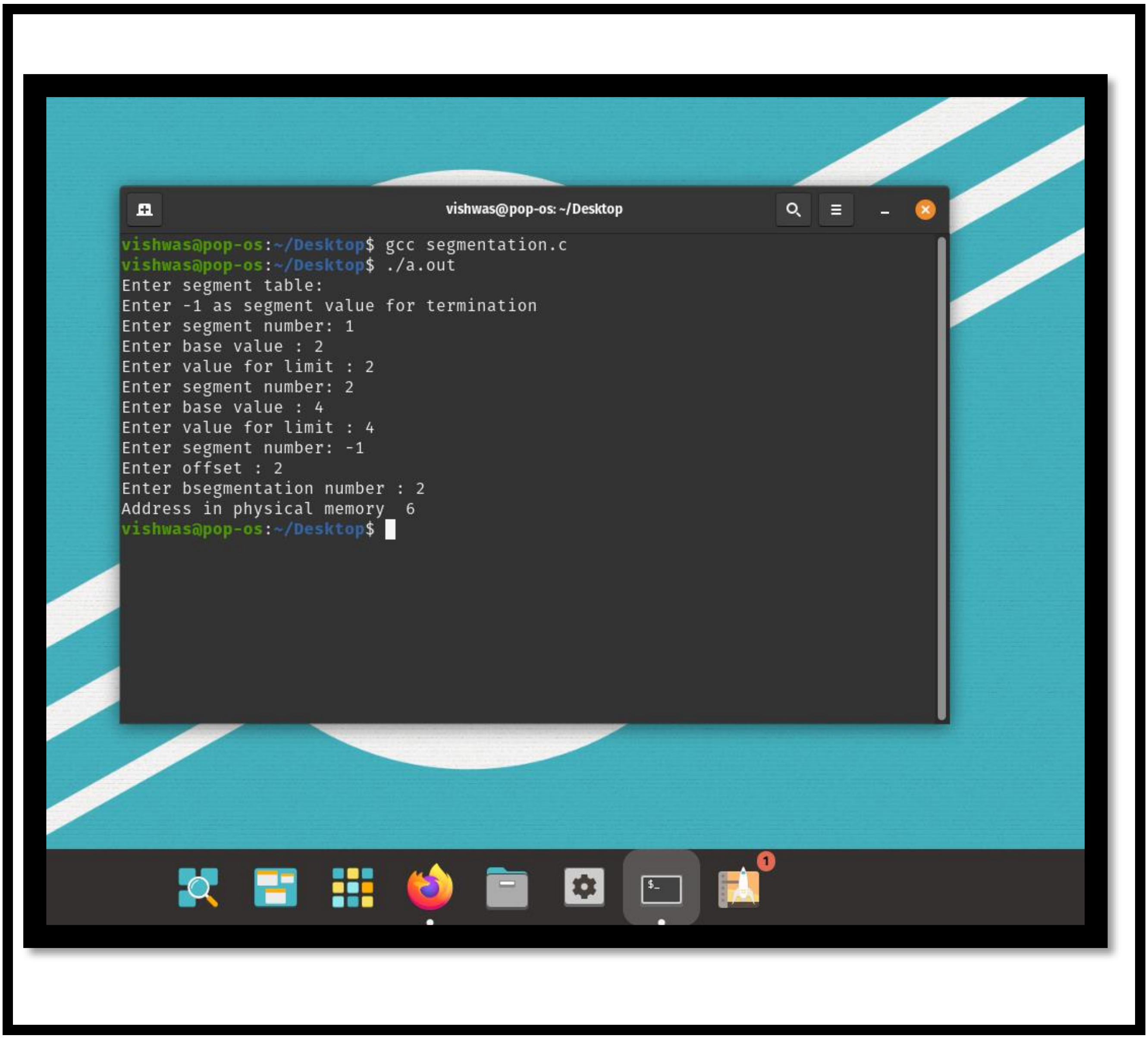


```
#include <stdio.h>
#include <stdlib.h>
struct list
{
    int seg;
    int base;
    int limit;
    struct list *next;
} * p;
void insert(struct list *q, int base, int limit, int seg)
{
    if (p == NULL)
    {
        p = malloc(sizeof(struct list));
        p->limit = limit;
        p->base = base;
        p->seg = seg;
        p->next = NULL;
    }
    else
    {
        while (q->next != NULL)
        {
            q = q->next;
            printf("yes");
        }
        q->next = malloc(sizeof(p));
        q->next->limit = limit;
        q->next->base = base;
        q->next->seg = seg;
        q->next->next = NULL;
    }
}
int find(struct list *q, int seg)
{
    while (q->seg != seg)
```



```
    {
        q = q->next;
    }
    return q->limit;
}
int search(struct list *q, int seg)
{
    while (q->seg != seg)
    {
        q = q->next;
    }
    return q->base;
}
int main()
{
    p = NULL;
    int seg, offset, limit, base, c, s, physical;
    printf("Enter segment table: \n");
    printf("Enter -1 as segment value for termination\n");
    do
    {
        printf("Enter segment number: ");
        scanf("%d", &seg);
        if (seg != -1)
        {
            printf("Enter base value : ");
            scanf("%d", &base);
            printf("Enter value for limit : ");
            scanf("%d", &limit);
            insert(p, base, limit, seg);
        }
    } while (seg != -1);
    printf("Enter offset : ");
    scanf("%d", &offset);
    printf("Enter bsegmentation number : ");
    scanf("%d", &seg);
    c = find(p, seg);
    s = search(p, seg);
    if (offset < c)
    {
        physical = s + offset;
        printf("Address in physical memory % d\n", physical);
    }
    else
    {
        printf("error");
    }
}
```

Screenshot of the output:



```
vishwas@pop-os:~/Desktop$ gcc segmentation.c
vishwas@pop-os:~/Desktop$ ./a.out
Enter segment table:
Enter -1 as segment value for termination
Enter segment number: 1
Enter base value : 2
Enter value for limit : 2
Enter segment number: 2
Enter base value : 4
Enter value for limit : 4
Enter segment number: -1
Enter offset : 2
Enter bsegmentation number : 2
Address in physical memory  6
vishwas@pop-os:~/Desktop$ 
```

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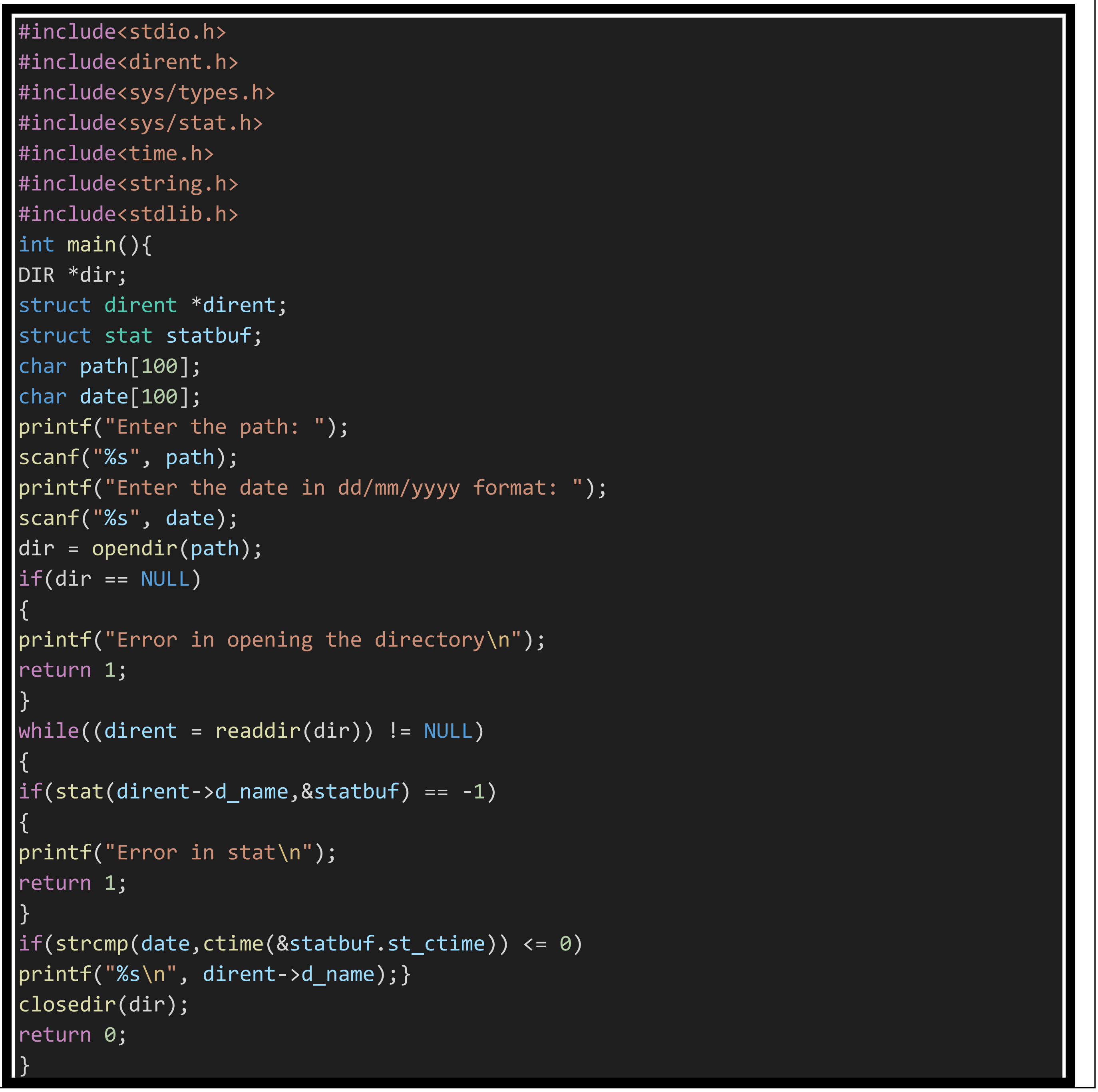
4) Write a C program to list all the files that have been created after a certain date.

Inputs to the program:

a) Directory
b) Date

Code:



```
#include<stdio.h>
#include<dirent.h>
#include<sys/types.h>
#include<sys/stat.h>
#include<time.h>
#include<string.h>
#include<stdlib.h>
int main(){
DIR *dir;
struct dirent *dirent;
struct stat statbuf;
char path[100];
char date[100];
printf("Enter the path: ");
scanf("%s", path);
printf("Enter the date in dd/mm/yyyy format: ");
scanf("%s", date);
dir = opendir(path);
if(dir == NULL)
{
printf("Error in opening the directory\n");
return 1;
}
while((dirent = readdir(dir)) != NULL)
{
if(stat(dirent->d_name,&statbuf) == -1)
{
printf("Error in stat\n");
return 1;
}
if(strcmp(date,ctime(&statbuf.st_ctime)) <= 0)
printf("%s\n", dirent->d_name);}
closedir(dir);
return 0;
}
```

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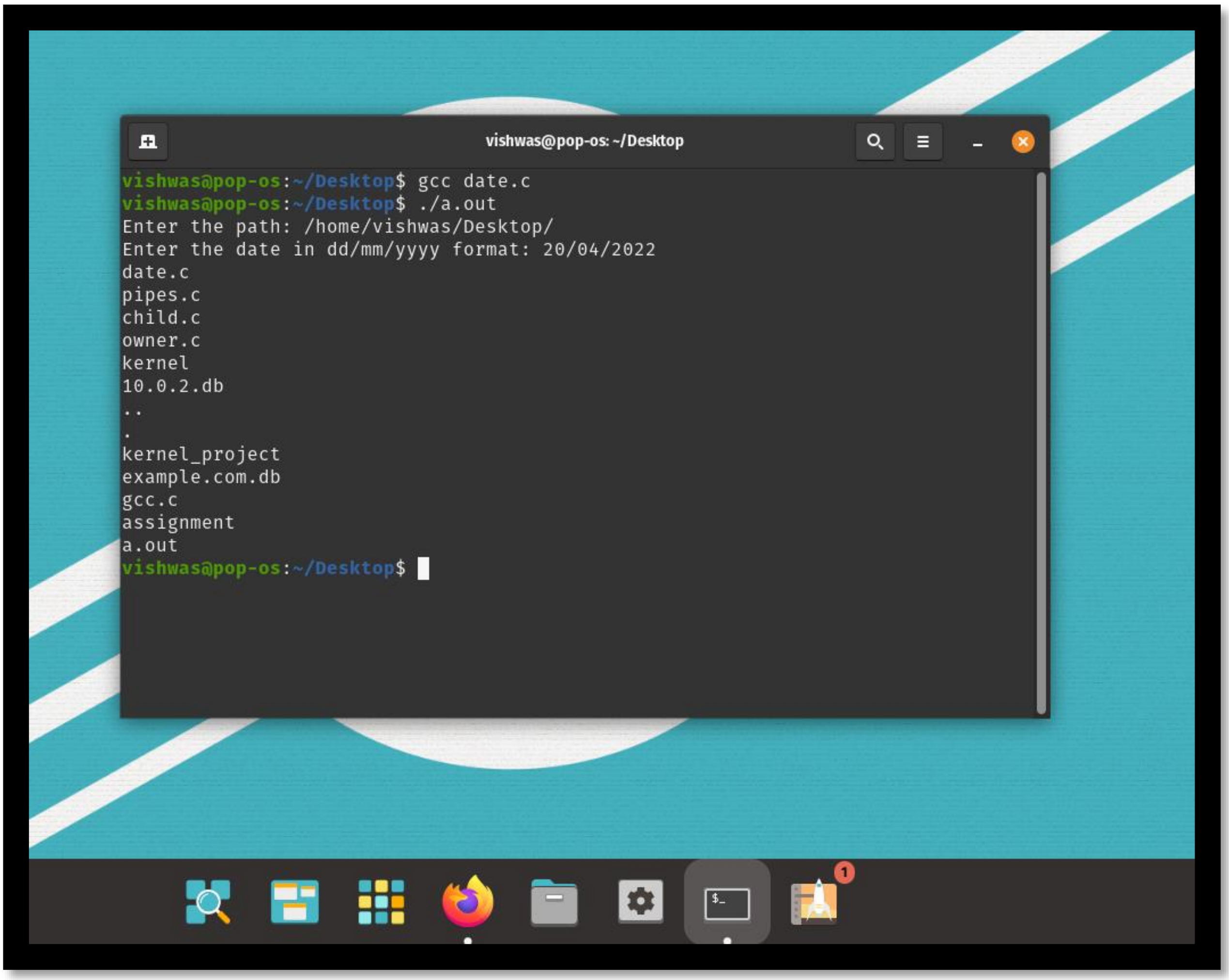
Screenshot of the output:



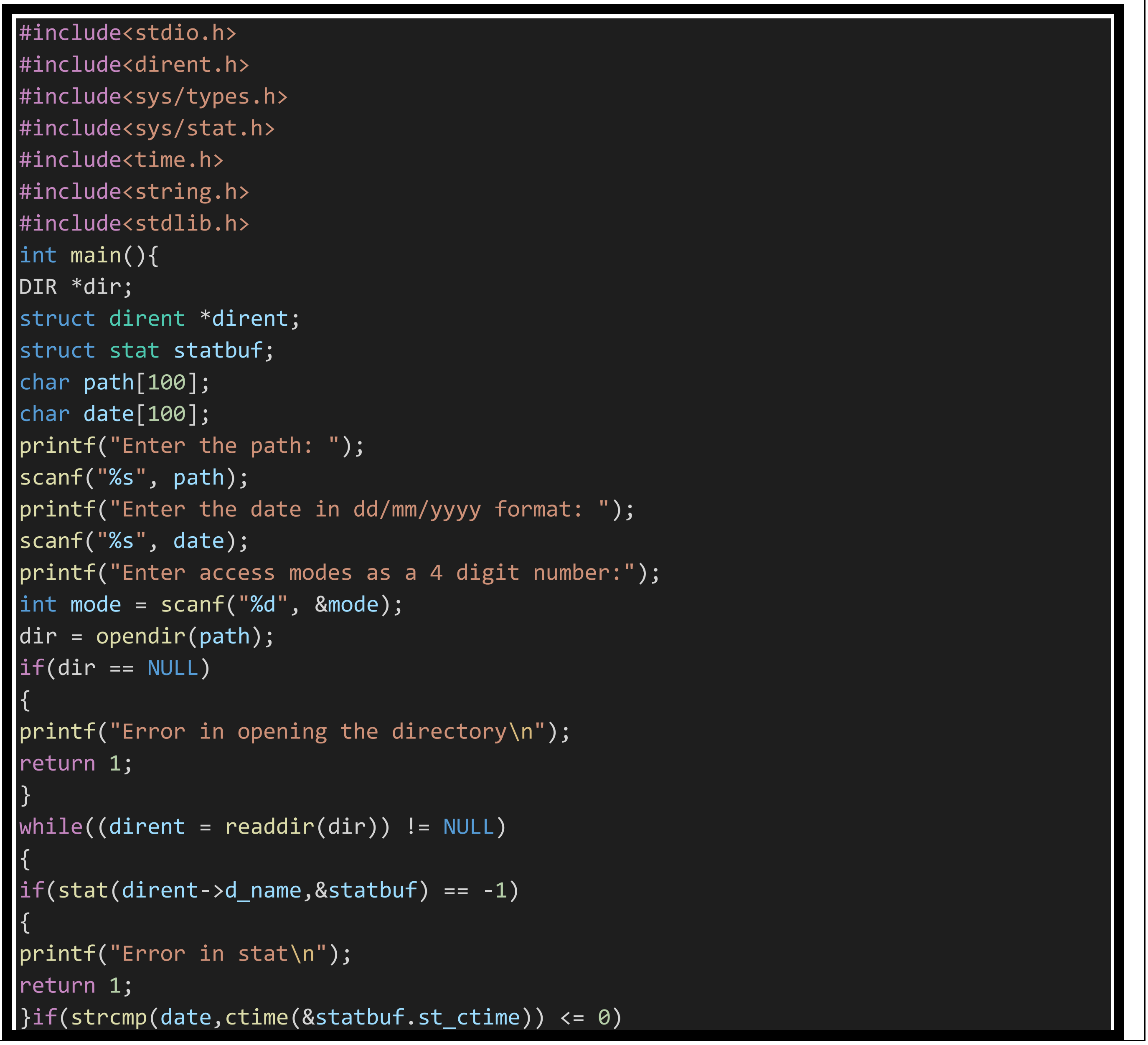
```
vishwas@pop-os:~/Desktop$ gcc date.c
vishwas@pop-os:~/Desktop$ ./a.out
Enter the path: /home/vishwas/Desktop/
Enter the date in dd/mm/yyyy format: 20/04/2022
date.c
pipes.c
child.c
owner.c
kernel
10.0.2.db
..
.
kernel_project
example.com.db
gcc.c
assignment
a.out
vishwas@pop-os:~/Desktop$ 
```

5) Write a C programme to change the ownership of files in a directory created after a certain date.

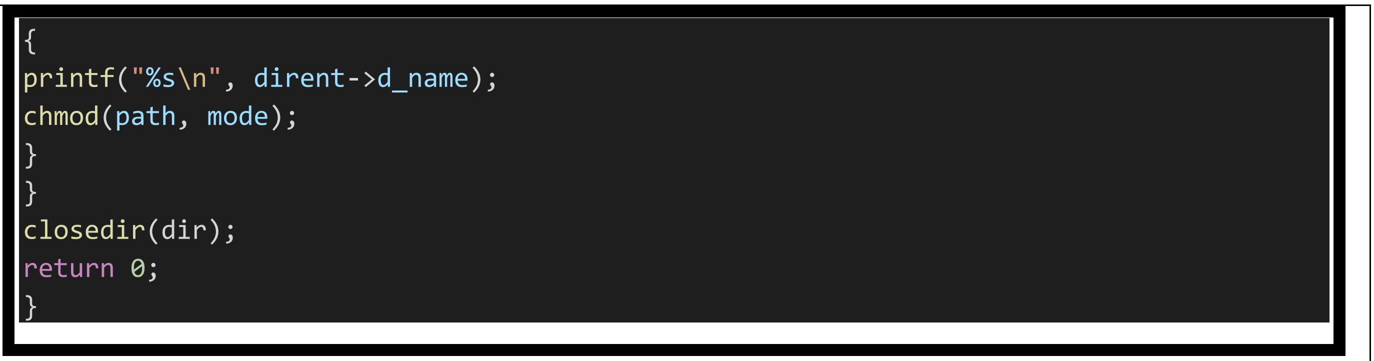
Inputs to the program:

a) Directory
b) Date
c) New permission to be set as run time arguments(access code).

Code:

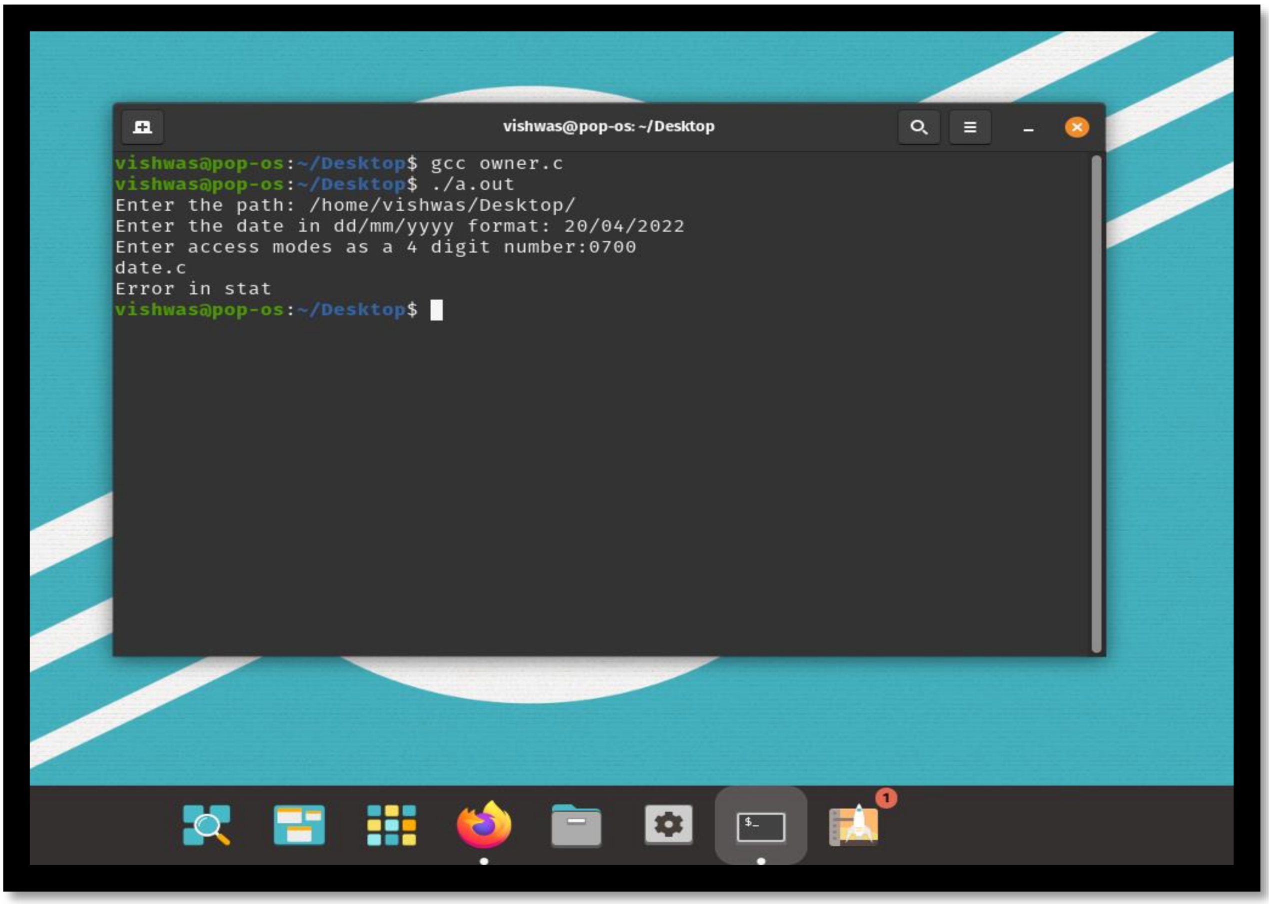


```
#include<stdio.h>
#include<dirent.h>
#include<sys/types.h>
#include<sys/stat.h>
#include<time.h>
#include<string.h>
#include<stdlib.h>
int main(){
DIR *dir;
struct dirent *dirent;
struct stat statbuf;
char path[100];
char date[100];
printf("Enter the path: ");
scanf("%s", path);
printf("Enter the date in dd/mm/yyyy format: ");
scanf("%s", date);
printf("Enter access modes as a 4 digit number:");
int mode = scanf("%d", &mode);
dir = opendir(path);
if(dir == NULL)
{
printf("Error in opening the directory\n");
return 1;
}
while((dirent = readdir(dir)) != NULL)
{
if(stat(dirent->d_name,&statbuf) == -1)
{
printf("Error in stat\n");
return 1;
}if(strcmp(date,ctime(&statbuf.st_ctime)) <= 0)
```

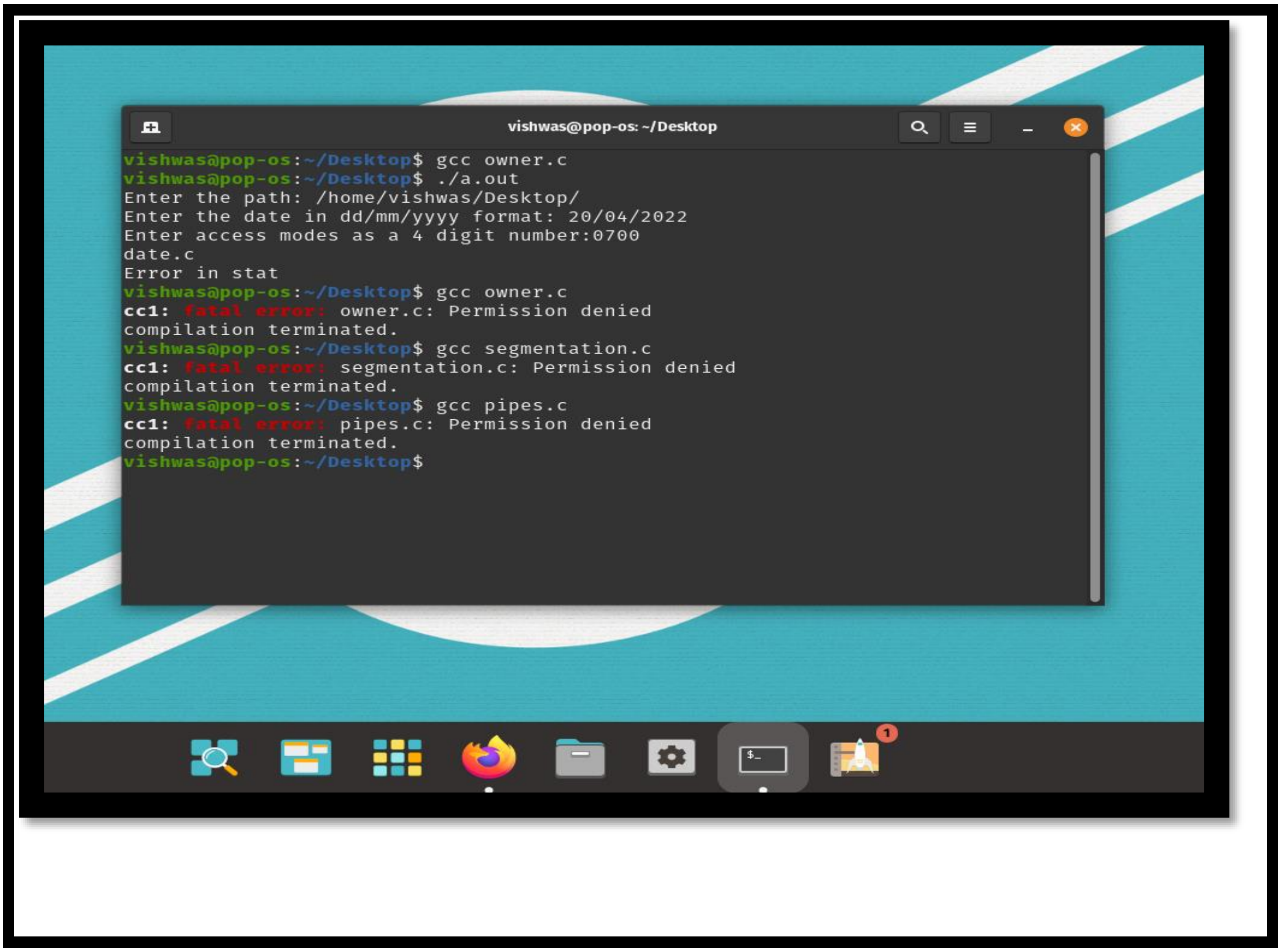


```
{
printf("%s\n", dirent->d_name);
chmod(path, mode);
}
}
closedir(dir);
return 0;
}
```

Screenshots of the output:



```
vishwas@pop-os:~/Desktop$ gcc owner.c
vishwas@pop-os:~/Desktop$ ./a.out
Enter the path: /home/vishwas/Desktop/
Enter the date in dd/mm/yyyy format: 20/04/2022
Enter access modes as a 4 digit number:0700
date.c
Error in stat
vishwas@pop-os:~/Desktop$ 
```



```
vishwas@pop-os:~/Desktop$ gcc owner.c
vishwas@pop-os:~/Desktop$ ./a.out
Enter the path: /home/vishwas/Desktop/
Enter the date in dd/mm/yyyy format: 20/04/2022
Enter access modes as a 4 digit number:0700
date.c
Error in stat
vishwas@pop-os:~/Desktop$ gcc owner.c
cc1: fatal error: owner.c: Permission denied
compilation terminated.
vishwas@pop-os:~/Desktop$ gcc segmentation.c
cc1: fatal error: segmentation.c: Permission denied
compilation terminated.
vishwas@pop-os:~/Desktop$ gcc pipes.c
cc1: fatal error: pipes.c: Permission denied
compilation terminated.
vishwas@pop-os:~/Desktop$
```

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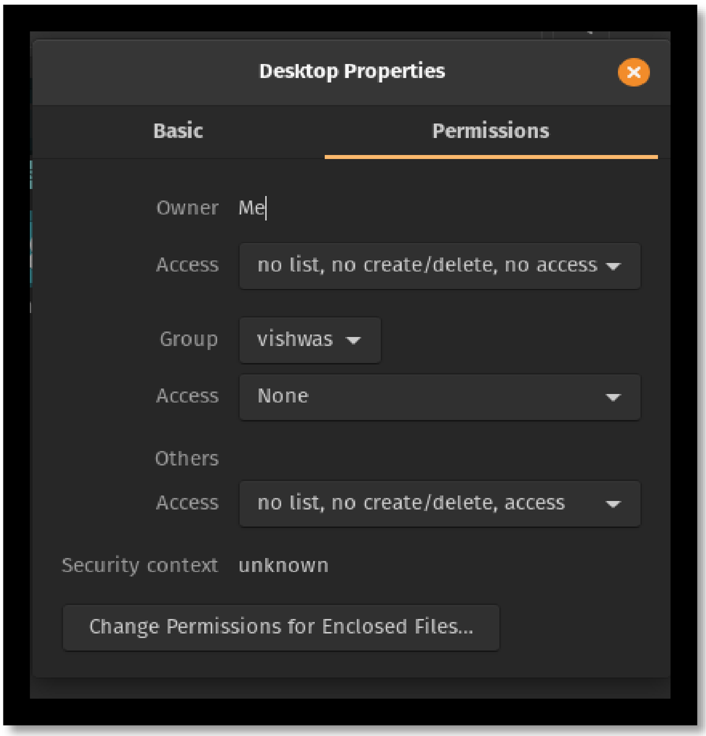

Desktop Properties

Owner Me

Access no list, no create/delete, no access

Group vishwas

Access None

Others

Access no list, no create/delete, access

Security context unknown