##

Experiment No. 2

##

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Source code: prac2_b468.c

##

Aim: To write and execute I/O system calls in Linux.

Problem Statement:

Write a menu driven program in C that uses different Linux I/O system commands to execute following tasks to –

[1] Create a file on the disk drive. Check if the said file already exists.

[2] Open a disk file for writing data content.

[3] Open a disk file for reading data content.

[4] Close a file.

[5] Remove the file from the disk.

[6] Read and write a file starting from a specified position.

[7] Change file permissions and masking certain privileges.

[8] Display pre-state and post-state for appropriate I/o commands.

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Menu Driven C program: prac2_b468.c

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```
#include<sys/types.h>
#include<sys/stat.h>
#include<fcntl.h>
#include<stdio.h>
#include<unistd.h>
#include<string.h>
#include<stdlib.h>

int main(){
  int s, fd;
  char readbuffer[40];
```

```
printf("Enter 1 for creating an empty file, \n 2 for opening a disk file
for writing, \n 3 for opening a file to read,\n 4 for removing a file, \n
5 for performing seek operations, \n 6 for applying permission mask.\n");
  printf("Enter your choice: ");
  scanf("%d", &s);

  switch(s){

/** [1] CREATING AN EMPTY FILE **/
    case 1:
      printf("Creating an empty file.\n");
      system("rm viddata1.txt");
      printf("lm Before creation: pre state.\n");
      printf("lm checking for viddata1.txt\n");
      system("ls -l viddata1.txt");
      fd = creat("viddata1.txt",0664);
      if(fd<0)
      printf("error\n");
      else
      printf("File created with fd: %d\n",fd);
      printf("ls for postchecking viddata1.txt\n");
      system("ls -l viddata1.txt");

printf("============================================================\n");
      break;

/** [2] CREATING AND WRITING IN A FILE. **/
    case 2:
      system("rm viddata1.txt");
      printf("lm Before creation: pre state.\n");
      printf("lm checking for viddata1.txt\n");
      system("ls -l viddata1.txt");
      fd = open("viddata1.txt",O_CREAT|O_WRONLY,0664);
      if(fd<0)
      printf("File failed to open.");
      else{
      printf("After opening: ........\n");
      printf("file opened with fd: %d \n",fd);
      printf("Writing on a file.\n");
      int wr = write(fd, "This file was written by B4_68.", 31);
      printf("written %d bytes to viddata1.txt\n",wr);
      }

printf("============================================================\n");
      break;

/** [3,4] READING A FILE AND CLOSING IT. **/
    case 3:
      fd = open("viddata1.txt",O_RDONLY,0664);
      if(fd<0)
```

```
      printf("File opening failed...");
      else{
      printf("file is opened with fd: %d.\n", fd);
      printf("Reading a file.\n");
      int noc = read(fd, readbuffer, 31);
      printf("Data read is:\n");
      printf("%s",readbuffer);
      printf("\nClosing the file.... \n");
      close(fd);
      }

printf("=============================================================\n");
      break;

/** [5] DELETING A FILE. **/
    case 4:
      system("touch vidalpha.txt");
      printf("ls before deletion: \n");
      system("ls -l vidalpha*.*");
      int flag = unlink("vidalpha.txt");
      printf("After deletion/unlinking: \n");
      system("ls -l vidalpha*.*");

printf("=============================================================\n");
      break;

/** [6] Read and write a file starting from a specified position. **/

    case 5:
      char readbuff[40];
      int fd = open("vidquote.txt", O_CREAT|O_RDWR, 0664);
      if(fd<0)
      printf("File failed to open.");
      else{
      printf("After opening with fd: %d ........\n",fd);
      printf("Writing on a file.\n");
      int wr = write(fd, "Only in the darkness do we find light. -Harry
Potter", 52);
      printf("Displaying contents of written file with cat....\n");
      system("cat vidquote.txt");
      printf("\nseeking position 12...displaying 8 chars.\n");
      int seek = lseek(fd,12,SEEK_SET);
      read(fd, readbuff, 9);
      printf("%s\n",readbuff);
      system("rm vidquote.txt");
      }

printf("=============================================================\n");
      break;
```

```
/** [7] Change file permissions and masking certain privileges. **/

   case 6:
      int DEF_MASK = 011;
      int DEF_MODE = 751;
      printf("Applying permission masks...\n");
      printf("====================================\n");
      umask(DEF_MASK);
      fd = creat("b468.txt", DEF_MODE);
      printf("After applying Mask 011 on 751...\n");
      printf("File permissions on b468.txt: \n");
      system("ls -l b468.txt");

printf("============================================================\n");
      break;
    default:
      printf("Wrong value entered.");
  }
  return 0;
}

##############################################################################
```

EXECUTION TRACE:

```
==============================================================================
```

[1] Create a file on the disk drive. Check if the said file already exists.

```
vidyut@vidyut-VirtualBox:~$ gcc prac2_b468.c -o prac2_b468.out
~$ ./prac2_b468.out
Enter 1 for creating an empty file,
 2 for opening a disk file for reading,
 3 for opening a file to write,
 5 for removing a file,
 6 for performing seek operations.
Enter your choice: 1
Creating an empty file.
lm Before creation: pre state.
lm checking for viddata1.txt
ls: cannot access 'viddata1.txt': No such file or directory
File created with fd: 3
ls for postchecking viddata1.txt
-rw-r--r-- 1 user user 0 Feb  8 11:49 viddata1.txt

==============================================================================
```

[2] Open a disk file for writing data content.

```
$ ./prac2_b468.out
Enter 1 for creating an empty file,
```

```
 2 for opening a disk file for writing,
 3 for opening a file to read,
 5 for removing a file,
 6 for performing seek operations.
Enter your choice: 2
lm Before creation: pre state.
lm checking for viddata1.txt
ls: cannot access 'viddata1.txt': No such file or directory
After opening: ........
file opened with fd: 3
Writing on a file.
written 31 bytes to viddata1.txt

=====================================================================
```

[3] Open a disk file for reading data content.

[4] Close a file.

```
$ ./prac2_b468.out
Enter 1 for creating an empty file,
 2 for opening a disk file for writing,
 3 for opening a file to read,
 5 for removing a file,
 6 for performing seek operations.
Enter your choice: 3
file is opened with fd: 3.
Reading a file.
Data read is:
This file was written by B4_68.
Closing the file....

=====================================================================
```

[5] Remove a file from the disk.

```
$ ./prac2_b468.out
Enter 1 for creating an empty file,
 2 for opening a disk file for writing,
 3 for opening a file to read,
 4 for removing a file,
 5 for performing seek operations.
Enter your choice: 4
ls before deletion:
-rw-r--r-- 1 user user 0 Feb  8 12:33 vidalpha.txt
After deletion/unlinking:
ls: cannot access 'vidalpha*.*': No such file or directory

=====================================================================
```

[6] Read and write a file starting from a specified position.

```
$ ./prac2_b468.out
Enter 1 for creating an empty file,
 2 for opening a disk file for writing,
 3 for opening a file to read,
 4 for removing a file,
 5 for performing seek operations.
Enter your choice: 5
After opening with fd: 3 ........
Writing on a file.
Displaying contents of written file with cat....
Only in the darkness do we find light. -Harry Potter
seeking position 12... displaying 8 chars.
Darkness

=====================================================================
```

[7] Change file permissions and masking certain privileges.

```
Enter 1 for creating an empty file,
 2 for opening a disk file for writing,
 3 for opening a file to read,
 4 for removing a file,
 5 for performing seek operations,
 6 for applying permission mask.
Enter your choice: 6
Applying permission masks...
====================================
After applying Mask 011 on 751...
File permissions on b468.txt:
--wxr--rwT 1 user user 0 Feb  9 04:00 b468.txt

=====================================================================



EOF
```