

Operating Systems - Lab 05 Revision-Lab Tasks

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Lab Questions:

Task 1:

Create a directory called project in your home directory.

```
ibrahim-johar@ibrahim-johar-VirtualBox: ~  
ibrahim-johar@ibrahim-johar-VirtualBox:~$ mkdir -p ~/project  
ibrahim-johar@ibrahim-johar-VirtualBox:~$
```

Task 2:

Navigate to the project directory.

```
ibrahim-johar@ibrahim-johar-VirtualBox: ~/project  
ibrahim-johar@ibrahim-johar-VirtualBox:~$ mkdir -p ~/project  
ibrahim-johar@ibrahim-johar-VirtualBox:~$ cd ~/project  
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 3:

Create an empty file named task1.txt in the project directory.

```
ibrahim-johar@ibrahim-johar-VirtualBox: ~/project  
ibrahim-johar@ibrahim-johar-VirtualBox:~$ mkdir -p ~/project  
ibrahim-johar@ibrahim-johar-VirtualBox:~$ cd ~/project  
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ touch task1.txt  
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 4:

List all files in the current directory using the ls command. Create a file called file1.txt.

```
ibrahim-johar@ibrahim-johar-VirtualBox: ~/project  
ibrahim-johar@ibrahim-johar-VirtualBox:~$ mkdir -p ~/project  
ibrahim-johar@ibrahim-johar-VirtualBox:~$ cd ~/project  
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ touch task1.txt  
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ ls -l  
total 0  
-rw-rw-r-- 1 ibrahim-johar ibrahim-johar 0 Mar  5 09:17 task1.txt  
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 5:

Change the permissions of the file file1.txt so that only the owner has read and write permissions, and others have no permissions.

```
-rw-rw-r-- 1 ibrahim-johar ibrahim-johar 0 Mar  5 09:22 file1.txt
-rw-rw-r-- 1 ibrahim-johar ibrahim-johar 0 Mar  5 09:17 task1.txt
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ chmod 600 file1.txt
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 6:

Check the permissions of file1.txt using the ls -l command.

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ ls -l file1.txt
-rw----- 1 ibrahim-johar ibrahim-johar 0 Mar  5 09:22 file1.txt
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 7:

Grant execute permissions to the owner of the file file1.txt.

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ chmod u+x file1.txt
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 8:

Display the current working directory using the pwd command.

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ chmod u+x file1.txt
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ pwd
/home/ibrahim-johar/project
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 9:

Show the current date and time using the date command.

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ date
Wed Mar  5 10:55:48 AM PKT 2025
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 10:

Display your system's disk usage with the df -h command.

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ date
Wed Mar  5 10:55:48 AM PKT 2025
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ df -h
Filesystem      Size  Used Avail Use% Mounted on
tmpfs           971M  1.5M  970M   1% /run
/dev/sda2       9.8G  7.2G  2.1G  78% /
tmpfs           4.8G   0  4.8G   0% /dev/shm
tmpfs           5.0M  8.0K  5.0M   1% /run/lock
tmpfs           971M  132K  971M   1% /run/user/1000
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 11:

Display system uptime using the uptime command.

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ uptime
10:58:46 up 1:56, 1 user, load average: 0.16, 3.26, 4.41
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 12:

Show all users currently logged into the system using the who command.

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ who
ibrahim-johar seat0      2025-03-05 09:02 (login screen)
ibrahim-johar tty2      2025-03-05 09:02 (tty2)
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 13 & 14:

Take a filename as input and count number of lines

```
task13.sh
~/05

Open ▾ [icon]

read -p "enter a filename to count lines: " filename
if [ -f "$filename" ]; then
    line_count=$(wc -l < "$filename")
    echo "the file '$filename' has $line_count lines."
else
    echo "error: file '$filename' not found."
fi
```

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ ./task13.sh
enter a filename to count lines: dummy.txt
the file 'dummy.txt' has 3 lines.
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```

Task 15:

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

#define BUFFER_SIZE 1024

int main()
{
    int fd;
    char buffer[BUFFER_SIZE];

    fd = open("input.txt", O_RDONLY);
    if (fd == -1)
    {
        perror("error opening file");
        exit(1);
    }

    ssize_t bytesRead = read(fd, buffer, BUFFER_SIZE - 1);
    if (bytesRead == -1)
    {
        perror("error reading file");
        close(fd);
        exit(1);
    }
    buffer[bytesRead] = '\0';

    printf("original file content:\n%s\n", buffer);

    pid_t pid = fork();

    if (pid < 0)
    {
        perror("fork failed");
        close(fd);
        exit(1);
    }
    else if (pid == 0)
    {
        //child Process
        const char *newContent = "Processed by child process\n";
        write(fd, newContent, sizeof("Processed by child process\n") - 1);
        close(fd);
        //execute 'cat' to display modified file
        execlp("cat", "cat", "input.txt", (char *)NULL);
        perror("execlp failed");
        exit(1);
    }
    else
    {
        //parent process
        wait(NULL); //waiting for child to complete
        close(fd);
        printf("parent process completed.\n");
    }
    return 0;
}
```

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ gcc task15.c -o task15
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$ ./task15
original file content:
echo "Hello, this is the original content." > input.txt

echo "Hello, this is the original content." > input.txt

Processed by child process
parent process completed.
ibrahim-johar@ibrahim-johar-VirtualBox:~/project$
```