Question 1

```
// Program to emulate the UNIX command : "ls -l"
// to list all files in the current directory and print their access privileges

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

int main(){
        // importing our cwd and buffers
        DIR* d= opendir("/home/student/190905494/OS/Week 2/Q1");
        char* buff;
        DIR* dad;

        // checking to see if the entered directory is valid
        if(d==NULL) {
                printf("Directory not accessible:\n");
                exit(0);
        }

        // structs
        struct dirent *item;    // structure to hold information about a directory
        struct stat mystat;     // struct to hold stats about a directory

        // iterating through each file in the cwd
        while((item=readdir(d))!=NULL){

                // getting the file permissions
                lstat(item->d_name,&mystat);

                // checking to see if the selected object is either a file or a directory
                if(S_ISDIR(mystat.st_mode)){
                        if(strcmp(".",item->d_name)==0 || strcmp("..",item->d_name)==0)
                                continue;
                        printf("d");
                }
                else printf("-");

                // User, group and other perimissions

                // user permissions
                if(mystat.st_mode & S_IRUSR){
                        printf("r");
                } else printf("-");
```

```c
        if(mystat.st_mode & S_IWUSR){
        printf("w");
        } else printf("-");

        if(mystat.st_mode & S_IXUSR){
        printf("x");
        } else printf("-");


        // group permissions
        if(mystat.st_mode & S_IRGRP){
        printf("r");
        } else printf("-");

        if(mystat.st_mode & S_IWGRP){
        printf("w");
        } else printf("-");

        if(mystat.st_mode & S_IXGRP){
        printf("x");
        } else printf("-");


        // other permissions
        if(mystat.st_mode & S_IROTH){
        printf("r");
        } else printf("-");

        if(mystat.st_mode & S_IWOTH){
        printf("w");
        } else printf("-");

        if(mystat.st_mode & S_IXOTH){
        printf("x\t");
        } else printf("-\t");


        // Handling a Directory(2) or File(1)
        if(S_ISDIR(mystat.st_mode)){
        printf("2\t");
        } else printf("1\t");

        // getting and printing login buffer
        buff = getlogin();
        printf("%s\t",buff);

        // Printing the Name of item in consideration
        printf("%s\n",item->d_name);
    }
}
```

```
student@lplab-ThinkCentre-M71e:~/190905494/OS/Week 2/Q1$ gcc 1_printFilePriv.c -o q1.exe
student@lplab-ThinkCentre-M71e:~/190905494/OS/Week 2/Q1$ ./q1.exe
-rw-r--rw-        1      (null)  file3.txt
-r--rw-r--        1      (null)  file2.txt
-rwxrwxr-x        1      (null)  q1.exe
-rw-rw-r--        1      (null)  1_printFilePriv.c
-r-xr-xrwx        1      (null)  file4.txt
-rw-rw-r--        1      (null)  file1.txt
student@lplab-ThinkCentre-M71e:~/190905494/OS/Week 2/Q1$
```

Question 2

// Program to list all files in cwd and its sub directories

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

// function to traverse the directory
void function(char* dir, int depth){

        // insitializig our variables or hadnling files in LINUX
        DIR* d; struct
        dirent* item;
        struct stat mystat;

        // check to see if directory exists
        if((d=opendir(dir))==NULL){
                printf("Directory isn't opening: %s\n", dir);
                return;
        }

        // changing our cwd to the location mentioned int he function
        chdir(dir);

        // iterating through all items in our directory
        while((item = readdir(d))!=NULL){

                // getting a storing permissions in mystat
                lstat(item->d_name,&mystat);

                // checking to see if we have a file or directory
                if(S_ISDIR(mystat.st_mode)){

                        // for files
                        if(strcmp(".",item->d_name)==0 || strcmp("..",item->d_name)==0)
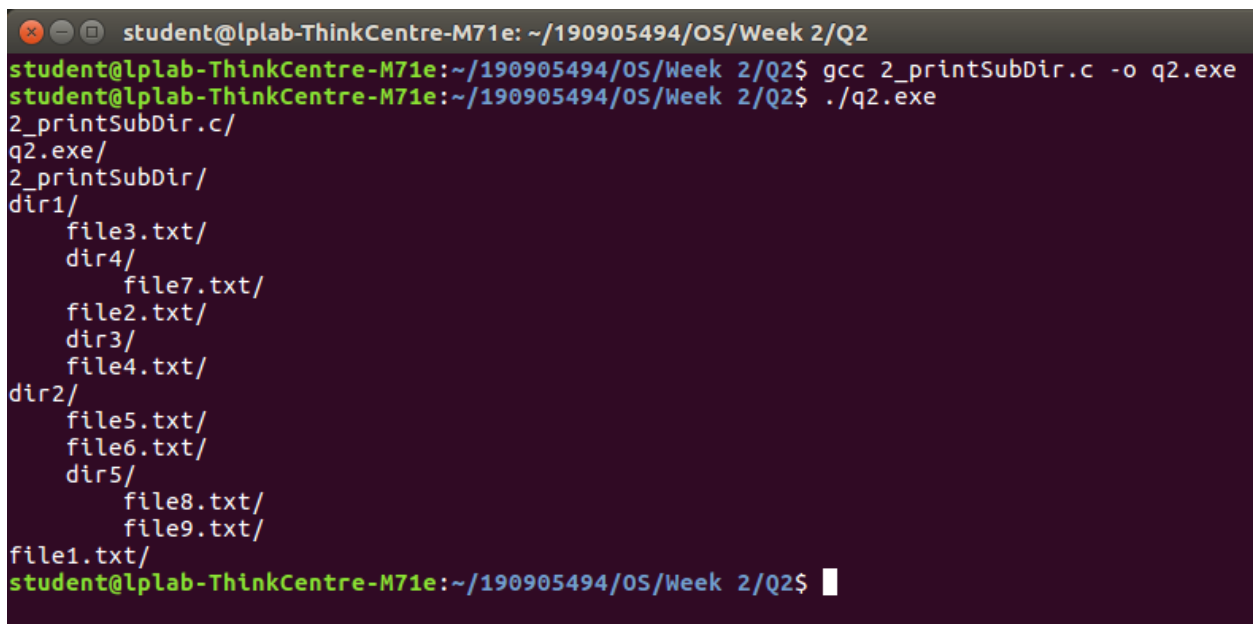
```
                            continue;

                    // for dirs by recursive call
                    printf("%*s%s/\n",depth,"",item->d_name); function(item-
>d_name,depth+4);

                } else printf("%*s%s/\n",depth,"",item->d_name);
        }

        // going back to upper dir
        chdir("..");
        closedir(d);
}

// DRIVER CODE
int main(){
        // Listing our cwd and depth of traversal
        function("/home/student/190905494/OS/Week 2/Q2",0);
        exit(0);
}
```


Question 3

Command to list out all the installed programs in LINUX

apt list --installed

```
student@lplab-ThinkCentre-M71e:~/190905494/OS/Week 2/Q3$ apt list --installed
Listing... Done
a11y-profile-manager-indicator/xenial,now 0.1.10-0ubuntu3 amd64 [installed,automatic]
account-plugin-facebook/xenial,xenial,now 0.12+16.04.20160126-0ubuntu1 all [installed,automatic]
account-plugin-flickr/xenial,xenial,now 0.12+16.04.20160126-0ubuntu1 all [installed,automatic]
account-plugin-google/xenial,xenial,now 0.12+16.04.20160126-0ubuntu1 all [installed,automatic]
accountsservice/xenial-updates,xenial-security,now 0.6.40-2ubuntu11.6 amd64 [installed]
acl/xenial,now 2.2.52-3 amd64 [installed,automatic]
acpi-support/xenial,now 0.142 amd64 [installed,automatic]
acpid/xenial,now 1:2.0.26-1ubuntu2 amd64 [installed,automatic]
activity-log-manager/xenial-updates,now 0.9.7-0ubuntu23.16.04.1 amd64 [installed,automatic]
adduser/xenial,xenial,now 3.113+nmu3ubuntu4 all [installed]
adium-theme-ubuntu/xenial-updates,xenial-updates,now 0.3.4-0ubuntu1.1 all [installed,automatic]
adwaita-icon-theme/xenial-updates,xenial-updates,now 3.18.0-2ubuntu3.1 all [installed,automatic]
aisleriot/xenial,now 1:3.18.2-1ubuntu1 amd64 [installed,automatic]
alsa-base/xenial,xenial,now 1.0.25+dfsg-0ubuntu5 all [installed,automatic]
alsa-utils/xenial,now 1.1.0-0ubuntu5 amd64 [installed,automatic]
anacron/xenial,now 2.3-23 amd64 [installed,automatic]
ant/xenial-updates,xenial-updates,xenial-security,xenial-security,now 1.9.6-1ubuntu1.1 all [installed
]
ant-optional/xenial-updates,xenial-updates,xenial-security,xenial-security,now 1.9.6-1ubuntu1.1 all [
installed,automatic]
apg/xenial,now 2.2.3.dfsg.1-2ubuntu1 amd64 [installed,automatic]
app-install-data/xenial,xenial,now 15.10 all [installed,automatic]
```

Question 4

Command to list out all the installed RPM packages in LINUX

rpm -qa


```
student@lplab-ThinkCentre-M71e:~/190905494/OS/Week 2/Q4$ rpm -qa
The program 'rpm' is currently not installed. To run 'rpm' please ask your administrator to install t
he package 'rpm'
student@lplab-ThinkCentre-M71e:~/190905494/OS/Week 2/Q4$
```