

OS Lab2

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Section D

1.) Write a C program to emulate the ls -l UNIX command that prints all files in a current directory and lists access privileges, etc. DO NOT simply exec ls -l from the program.

```
#include <unistd.h>
#include <stdio.h>
#include <sys/stat.h>
#include <sys/types.h>
#include <dirent.h>

int main()
{
    DIR * dir;
    struct stat statbuf;
    struct dirent * entry;

    if((dir = opendir(".")) == NULL)
    {
        printf("Cannot open directory \n");
        return 0;
    }

    chdir(".");
    while((entry = readdir(dir)) != NULL)
    {
        lstat(entry->d_name,&statbuf);

        if(!S_ISDIR(statbuf.st_mode))
        {
            printf("%s : ",entry->d_name);
            printf((S_ISDIR(statbuf.st_mode)) ? "d" : "-");
            printf((statbuf.st_mode & S_IRUSR) ? "r" : "-");
            printf((statbuf.st_mode & S_IWUSR) ? "w" : "-");
            printf((statbuf.st_mode & S_IXUSR) ? "x" : "-");
            printf((statbuf.st_mode & S_IRGRP) ? "r" : "-");
            printf((statbuf.st_mode & S_IWGRP) ? "w" : "-");
            printf((statbuf.st_mode & S_IXGRP) ? "x" : "-");
            printf((statbuf.st_mode & S_IROTH) ? "r" : "-");
            printf((statbuf.st_mode & S_IWOTH) ? "w" : "-");
            printf((statbuf.st_mode & S_IXOTH) ? "x" : "-");
            printf("\n");
        }
    }
}
```

```
190905156_Lab2_OS.odt -rw-rw-r--
Student@project-lab:~/Documents/190905156/OS/Lab2$ gcc first.c -o first
Student@project-lab:~/Documents/190905156/OS/Lab2$ ./first
first : -rwxrwxr-x
first.c : -rw-rw-r--
.~lock.190905156_Lab2_OS.odt# : -rw-rw-r--
190905156_Lab2_OS.odt : -rw-rw-r--
Student@project-lab:~/Documents/190905156/OS/Lab2$
```

2.) Write a program that will list all files in a current directory and all files in subsequent subdirectories.

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

void printdir(char *dir, int depth)
{
    DIR *d;
    struct dirent *entry;
    struct stat statbuf;

    if((d = opendir(dir)) == NULL)
    {
        fprintf(stderr, "Cannot open directory: %s\n", dir);
        return;
    }

    chdir(dir);

    while((entry = readdir(d)) != NULL)
    {
        lstat(entry->d_name, &statbuf);

        if(S_ISDIR(statbuf.st_mode))
        {
            if(strcmp(".", entry->d_name) == 0 || strcmp("..", entry->d_name) == 0)
            {
                continue;
            }

            printf("%s%s\n", depth, "", entry->d_name);

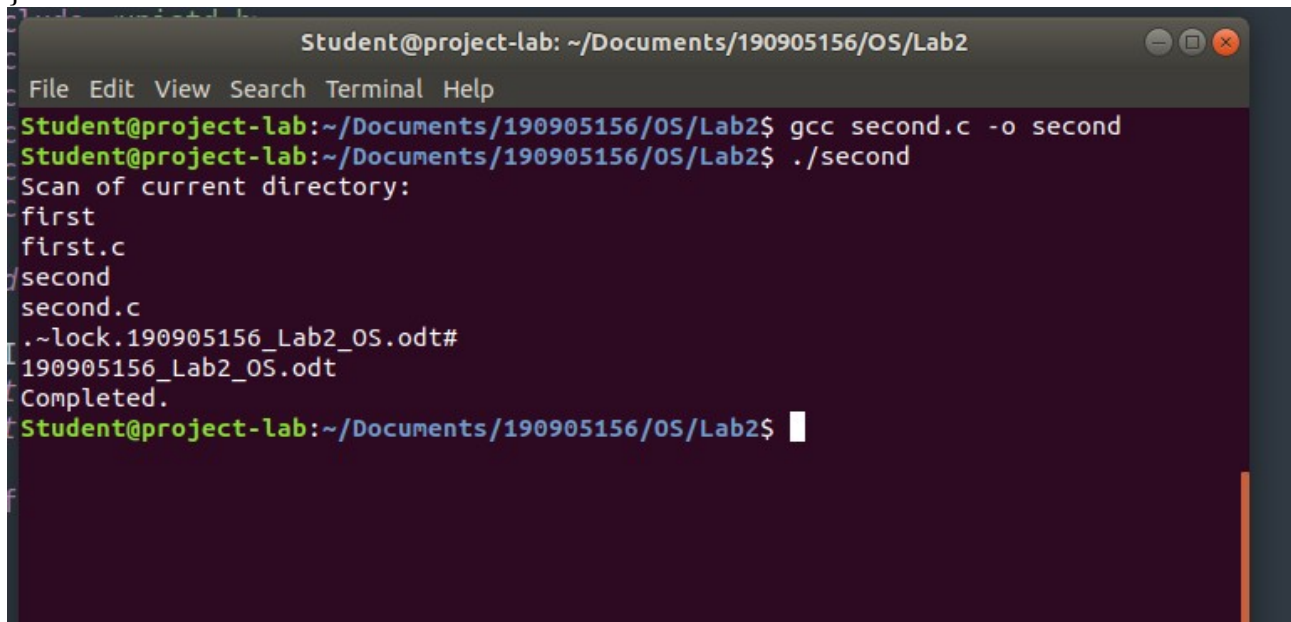
            printdir(entry->d_name, depth+4);
        }
        else {
            printf("%s%s\n", depth, "", entry->d_name);
        }
    }

    chdir("..");
    closedir(d);
}

int main()
{
    printf("Scan of current directory:\n");
    printdir(".", 0);
    printf("Completed.\n");
}
```

```
exit(0);
```

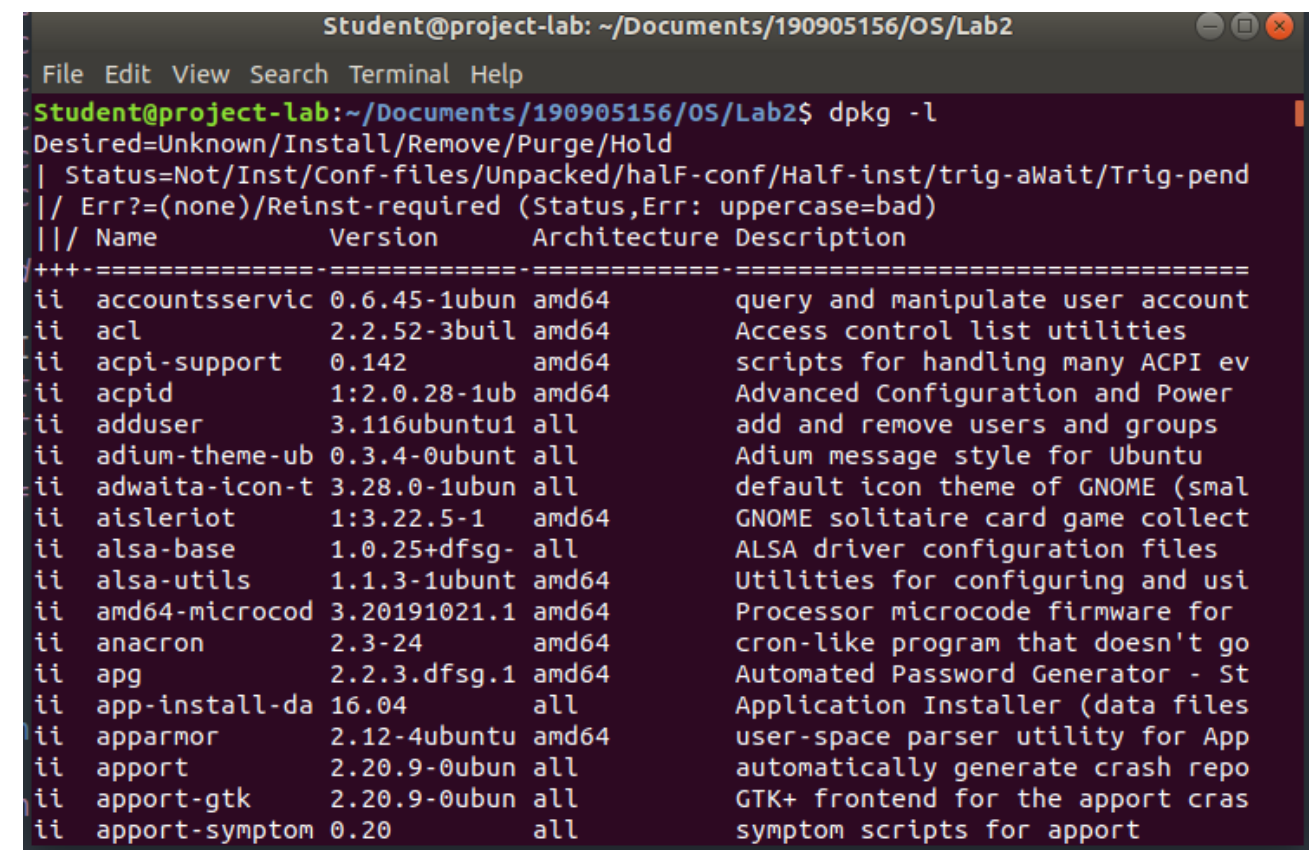
```
}
```



A terminal window titled 'Student@project-lab: ~/Documents/190905156/OS/Lab2'. The menu bar includes File, Edit, View, Search, Terminal, and Help. The user enters the command 'gcc second.c -o second' and then './second'. The program outputs a scan of the current directory listing files: first, first.c, second, second.c, and some lock files. It then prints 'Completed.' and returns to the prompt.

```
Student@project-lab: ~/Documents/190905156/OS/Lab2
File Edit View Search Terminal Help
Student@project-lab:~/Documents/190905156/OS/Lab2$ gcc second.c -o second
Student@project-lab:~/Documents/190905156/OS/Lab2$ ./second
Scan of current directory:
first
first.c
second
second.c
./lock.190905156_Lab2_OS.odt#
190905156_Lab2_OS.odt
Completed.
Student@project-lab:~/Documents/190905156/OS/Lab2$
```

3.) How do you list all installed programs in Linux?

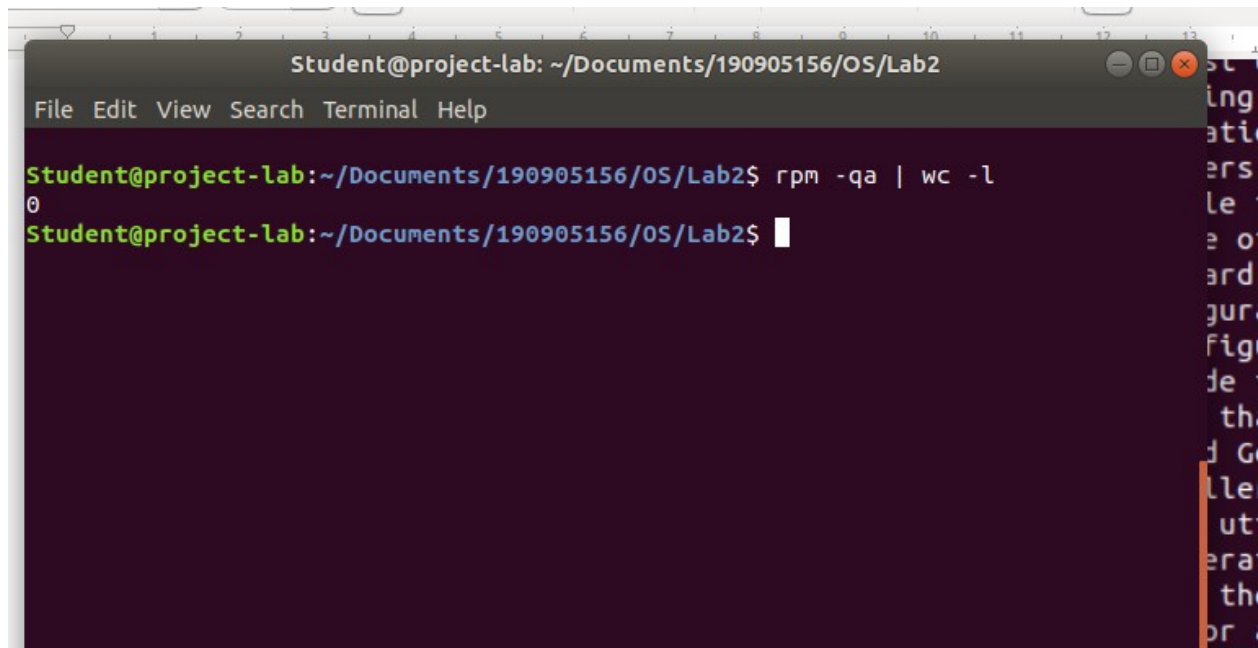


A terminal window titled 'Student@project-lab: ~/Documents/190905156/OS/Lab2'. The user enters the command 'dpkg -l'. The output shows a list of installed packages with columns for Name, Version, Architecture, and Description. The list includes packages like accountsservice, acl, acpi-support, acpid, adduser, adium-theme-ub, adwaita-icon-t, aisleriot, alsa-base, alsa-utils, amd64-microcod, anacron, apg, app-install-da, apparmor, apport, apport-gtk, and apport-symptom.

```
Student@project-lab: ~/Documents/190905156/OS/Lab2
File Edit View Search Terminal Help
Student@project-lab:~/Documents/190905156/OS/Lab2$ dpkg -l
Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Inst/Conf-files/Unpacked/halF-conf/Half-inst/trig-aWait/Trig-pend
|/ Err?=(none)/Reinst-required (Status,Err: uppercase=bad)
||/ Name          Version          Architecture Description
+++-+-----+-----+-----+-----+
ii  accountsservic  0.6.45-1ubun    amd64      query and manipulate user account
ii  acl             2.2.52-3buil    amd64      Access control list utilities
ii  acpi-support    0.142           amd64      scripts for handling many ACPI ev
ii  acpid           1:2.0.28-1ub    amd64      Advanced Configuration and Power
ii  adduser         3.116ubuntu1    all        add and remove users and groups
ii  adium-theme-ub  0.3.4-0ubunt    all        Adium message style for Ubuntu
ii  adwaita-icon-t  3.28.0-1ubun    all        default icon theme of GNOME (smal
ii  aisleriot       1:3.22.5-1      amd64      GNOME solitaire card game collect
ii  alsa-base       1.0.25+dfsg-    all        ALSA driver configuration files
ii  alsa-utils      1.1.3-1ubunt    amd64      Utilities for configuring and usi
ii  amd64-microcod  3.20191021.1    amd64      Processor microcode firmware for
ii  anacron         2.3-24          amd64      cron-like program that doesn't go
ii  apg             2.2.3.dfsg.1    amd64      Automated Password Generator - St
ii  app-install-da  16.04           all        Application Installer (data files
ii  apparmor        2.12-4ubuntu    amd64      user-space parser utility for App
ii  apport          2.20.9-0ubun    all        automatically generate crash repo
ii  apport-gtk      2.20.9-0ubun    all        GTK+ frontend for the apport cras
ii  apport-symptom  0.20            all        symptom scripts for apport
```

apt list
OR
dpkg -l

4.) How do you find out what RPM packages are installed on Linux?

A terminal window titled "Student@project-lab: ~/Documents/190905156/OS/Lab2" with a menu bar (File, Edit, View, Search, Terminal, Help). The prompt is "Student@project-lab:~/Documents/190905156/OS/Lab2\$". The command "rpm -qa | wc -l" has been entered, and the output "0" is displayed on the next line. The prompt "Student@project-lab:~/Documents/190905156/OS/Lab2\$" is shown again with a cursor.

```
Student@project-lab: ~/Documents/190905156/OS/Lab2
File Edit View Search Terminal Help
Student@project-lab:~/Documents/190905156/OS/Lab2$ rpm -qa | wc -l
0
Student@project-lab:~/Documents/190905156/OS/Lab2$
```