

Name : Rajvardhan Reddy

Reg No : 180905093

Sec : B

Roll No : 19

Lab 2 : Working with Directory Structures

LAB EXERCISES :

P1)

Code :

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

int main()
{
    char pwd[256];
    if(!getcwd(pwd, sizeof(pwd)))
        printf("Directory name exceeds size of buffer or is removed or
permissions are changed.");
    DIR *dp;
    struct dirent *entry;
    struct stat fileStat;
    if((dp = opendir(pwd))==NULL)
        printf("Can not open directory.");
    else
    {
        while((entry = readdir(dp))!=NULL)
        {
            if(strcmp(".", entry->d_name)==0 || strcmp("..", entry-
>d_name)==0 || entry->d_name[0]!='.') continue;
            else
            {
                printf("%s\t", entry->d_name);
                lstat(entry->d_name, &fileStat);
                printf((S_ISDIR(fileStat.st_mode)) ? "d" : "-");
                printf((fileStat.st_mode & S_IRUSR) ? "r" : "-");
                printf((fileStat.st_mode & S_IWUSR) ? "w" : "-");
```

```

        printf((fileStat.st_mode & S_IXUSR) ? "x" : "-");
        printf((fileStat.st_mode & S_IRGRP) ? "r" : "-");
        printf((fileStat.st_mode & S_IWGRP) ? "w" : "-");
        printf((fileStat.st_mode & S_IXGRP) ? "x" : "-");
        printf((fileStat.st_mode & S_IROTH) ? "r" : "-");
        printf((fileStat.st_mode & S_IWOTH) ? "w" : "-");
        printf((fileStat.st_mode & S_IXOTH) ? "x" : "-");
        printf("\t%d",fileStat.st_size);
    printf("\t%s",ctime(&fileStat.st_ctime));
    }
}
closedir(dp);
}
return 0;
}

```

Output :

```

rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx:~/Desktop/5th_sem_LABS/OS_LAB/l
ab 2$ cc lab2_p1.c
lab2_p1.c: In function 'main':
lab2_p1.c:38:16: warning: format '%d' expects argument of type 'int', but argumen
t 2 has type '__off_t' {aka 'long int'} [-Wformat=]
   38 |     printf("\t%d",fileStat.st_size);
      |           ~^~~~~~
      |           |           |
      |           int        __off_t {aka long int}
      |           %ld
rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx:~/Desktop/5th_sem_LABS/OS_LAB/l
ab 2$ ./a.out
lab2_p4.c      -rw-rw-r--      739      Thu Jun 24 11:31:05 2021
lab2_p1.c      -rw-rw-r--     1334      Thu Jun 24 10:43:45 2021
lab2_p3.c      -rw-rw-r--      502      Thu Jun 24 11:07:40 2021
lab2_p2.c      -rw-rw-r--      868      Thu Jun 24 10:48:31 2021
a.out          -rwxrwxr-x     17120     Thu Jun 24 11:35:07 2021

```

P2)

Code :

```
#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 *dp;
    struct dirent *entry;
    struct stat statbuf;

    if((dp = opendir(dir)) == NULL) {
        fprintf(stderr, "Cannot open directory: %s\n", dir);
        return;
    }
    chdir(dir);
    while((entry = readdir(dp)) != 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(dp);
}

int main(int argc, char* argv[])
{
    if(argc != 2)
    {
```

```

        printf("Invalid arguments. Only enter required directory.");
    }
    printdir(argv[1], 0);
    return 0;
}

```

Output :

```

rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx:~/Desktop/5th_sem_LABS/OS_LAB/
lab 2$ cc lab2_p2.c
rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx:~/Desktop/5th_sem_LABS/OS_LAB/
lab 2$ ./a.out /home/rajvardhan/Desktop/5th_sem_LABS/OS_LAB/
lab 2/
lab2_p1.c
lab2_p2.c
a.out
180905093_Rajvardhan_Reddy_OS_Lab-2.odt
.~lock.180905093_Rajvardhan_Reddy_OS_Lab-2.odt#
OS Lab Manual 2020 - Final Copy.pdf
lab 1/
sample.txt
180905093_Rajvardhan_Reddy_OS_Lab_Week-1.odt
sample.c
p4.c
p3.c
random.txt
p1.c
a.out
p2.c
180905093_Rajvardhan_Reddy_OS_Lab_Week-1.pdf

```

P3) Method-1

Code :

\$ apt list --installed

Output :

```
rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx: ~  
rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx:~$ apt list --installed  
Listing... Done  
accountsservice/focal-updates,focal-security,now 0.6.55-0ubuntu12~20.04.4 amd64 [installed]  
acl/focal,now 2.2.53-6 amd64 [installed]  
acpi-support/focal,now 0.143 amd64 [installed]  
acpid/focal,now 1:2.0.32-1ubuntu1 amd64 [installed]  
adduser/focal,focal,now 3.118ubuntu2 all [installed]  
adiun-theme-ubuntu/focal,focal,now 0.3.4-0ubuntu4 all [installed]  
adwaita-icon-theme/focal-updates,focal-updates,now 3.36.1-2ubuntu0.20.04.2 all [installed]  
alsa-base/focal,focal,now 1.0.25+dfsg-0ubuntu5 all [installed]  
alsa-topology-conf/focal,focal,now 1.2.2-1 all [installed,automatic]  
alsa-ucm-conf/now 1.2.2-1ubuntu0.7 all [installed,upgradable to: 1.2.2-1ubuntu0.8]  
alsa-utils/focal-updates,now 1.2.2-1ubuntu2.1 amd64 [installed]  
amd64-microcode/focal,now 3.20191218.1ubuntu1 amd64 [installed,automatic]  
anacron/focal,now 2.3-29 amd64 [installed]  
apg/focal,now 2.2.3.dfsg.1-5 amd64 [installed]  
app-install-data-partner/focal,focal,now 19.04 all [installed]  
apparmor/focal-updates,now 2.13.3-7ubuntu5.1 amd64 [installed]  
appport-gtk/focal-updates,focal-updates,focal-security,focal-security,now 2.20.11-0ubuntu27.18 all [installed]  
appport-symptoms/focal,focal,now 0.23 all [installed]  
appport/focal-updates,focal-updates,focal-security,focal-security,now 2.20.11-0ubuntu27.18 all [installed]  
appstream/focal,now 0.12.10-2 amd64 [installed]  
apt-config-icons-hidpi/focal,focal,now 0.12.10-2 all [installed,automatic]  
apt-config-icons/focal,focal,now 0.12.10-2 all [installed]  
apt-utils/focal-updates,now 2.0.5 amd64 [installed]  
apt/focal-updates,now 2.0.5 amd64 [installed]  
aptdaemon-data/focal-updates,focal-updates,focal-security,focal-security,now 1.1.1+bzr982-0ubuntu32.3 all [installed]  
aptdaemon/focal-updates,focal-updates,focal-security,focal-security,now 1.1.1+bzr982-0ubuntu32.3 all [installed]  
apturl-common/focal,now 0.5.2ubuntu19 amd64 [installed]  
apturl/focal,now 0.5.2ubuntu19 amd64 [installed]  
aspell-en/focal,focal,now 2018.04.16-0-1 all [installed]  
aspell/focal,now 0.60.8-1build1 amd64 [installed]  
at-spi2-core/focal,now 2.36.0-2 amd64 [installed]  
avahi-autoipd/focal,now 0.7-4ubuntu7 amd64 [installed]  
avahi-daemon/focal,now 0.7-4ubuntu7 amd64 [installed]  
avahi-utils/focal,now 0.7-4ubuntu7 amd64 [installed]  
baobab/focal,now 3.34.0-1 amd64 [installed]  
base-files/focal-updates,now 11ubuntu5.3 amd64 [installed]  
base-passwd/focal,now 3.5.47 amd64 [installed]  
bash-completion/focal,focal,now 1:2.10-1ubuntu1 all [installed]  
bash/focal-updates,now 5.0-6ubuntu1.1 amd64 [installed]  
bc/focal,now 1.07.1-2build1 amd64 [installed]  
bind9-dnsutils/focal-updates,focal-security,now 1:9.16.1-0ubuntu2.8 amd64 [installed,automatic]  
bind9-host/focal-updates,focal-security,now 1:9.16.1-0ubuntu2.8 amd64 [installed]  
bind9-libs/focal-updates,focal-security,now 1:9.16.1-0ubuntu2.8 amd64 [installed,automatic]
```

P3) Method-2

Code :

```
#include <string.h>  
#include <sys/types.h>  
#include <sys/stat.h>  
#include <unistd.h>  
#include <stdio.h>  
#include <stdlib.h>  
#include <dirent.h>  
#include <time.h>  
#include <pwd.h>  
#include <grp.h>
```

```
int main(int argc, char* argv[])
```

```

{
    DIR *dp = opendir(argv[1]);
    struct dirent *entry;

    while((entry = readdir(dp)) != NULL)
    {
        if(strcmp(".", entry->d_name) == 0 || strcmp("..", entry->d_name) == 0)
            continue;
        printf("%s\n", entry->d_name);
    }
    closedir(dp);
}

```

Output :

```

rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx:~/Desktop/5th_sem_LABS/OS_LAB/lab 2$ cc lab2_p3.c
rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx:~/Desktop/5th_sem_LABS/OS_LAB/lab 2$ ./a.out /usr/bin
fc-cat
dbus-uuidgen
cc
mpif77.mpich
ovp2ovf
mflujit-nowin
utmpdump
texstudio
cvsudoers
ptardiff
pooltype
HEAD
hp-probe
x86_64-linux-gnu-ld.gold
sha224sum
gcc-ar-9
tracker
gamemoded
hostnamectl
x86_64-linux-gnu-strip
mmdbresolve
lsns
scp-dbus-service
locate
bdftruncate
amixer
unshare
xzgrep
wish
pbmtogo
pdf2dsc
splitdiff
avahi-set-host-name
pamstack
mpifort
colormgr
bluemoon
lorder
apt-key

```

P4)

Code : Method-1

\$ rpm -qa

Output :



```
rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx:~/Desktop/5th_sem_LABS/OS_LAB/lab 2$ rpm -qa
rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx:~/Desktop/5th_sem_LABS/OS_LAB/lab 2$ rpm -qa | wc -l
```

P4)

Code : Method-2

```
#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 * dp;
```

```
    struct dirent * entry;
```

```
    struct stat statbuf;
```

```
    if((dp = opendir(dir)) == NULL) {
```

```
        printf("Cannot open directory \n");
```

```
        return;
```

```
    }
```

```
    chdir(dir);
```

```
    while((entry = readdir(dp)) != 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(dp);
}

int main() {
    printDir("/var/lib/dpkg/info",0);
}

```

Output :

```

rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx:~/Desktop/5th_sem_LABS/OS_LAB/l
ab 2$ cc lab2_p4.c
rajvardhan@rajvardhan-HP-Pavilion-Laptop-15-cc1xx:~/Desktop/5th_sem_LABS/OS_LAB/l
ab 2$ ./a.out
fonts-tlwg-waree-ttf.md5sums/
python3-matplotlib.md5sums/
fonts-tlwg-loma.list/
fonts-orya-extra.conf/
libgpgmepp6:amd64.triggers/
hdparm.postinst/
duplicity.list/
libboost-locale1.71.0:amd64.shlibs/
dictionaries-common.templates/
network-manager-gnome.conf/
libx11-xcb1:amd64.shlibs/
update-notifier.md5sums/
grub-pc.postrm/
tracker-extract.md5sums/
ubridge.list/
x11-xserver-utils.postinst/
python3-monotonic.list/
adduser.md5sums/
gir1.2-accountsservice-1.0.list/
libgvnc-1.0-0:amd64.md5sums/
gvfs:amd64.list/
libcusolvermg10:amd64.shlibs/
tracker-miner-fs.conf/
bolt.postrm/
libudev1:amd64.shlibs/
syslinux.list/
poppler-data.prerm/
apport.md5sums/
libmnl0:amd64.md5sums/
branding-ubuntu.list/
libqt5svg5:amd64.shlibs/
libnetfilter-conntrack3:amd64.md5sums/
python3-rfc3339.prerm/
liblmbase24:amd64.list/
libcairomm-1.0-1v5:amd64.list/
libxml-twig-perl.md5sums/
python3-uno.postinst/
python3-mako.md5sums/

```