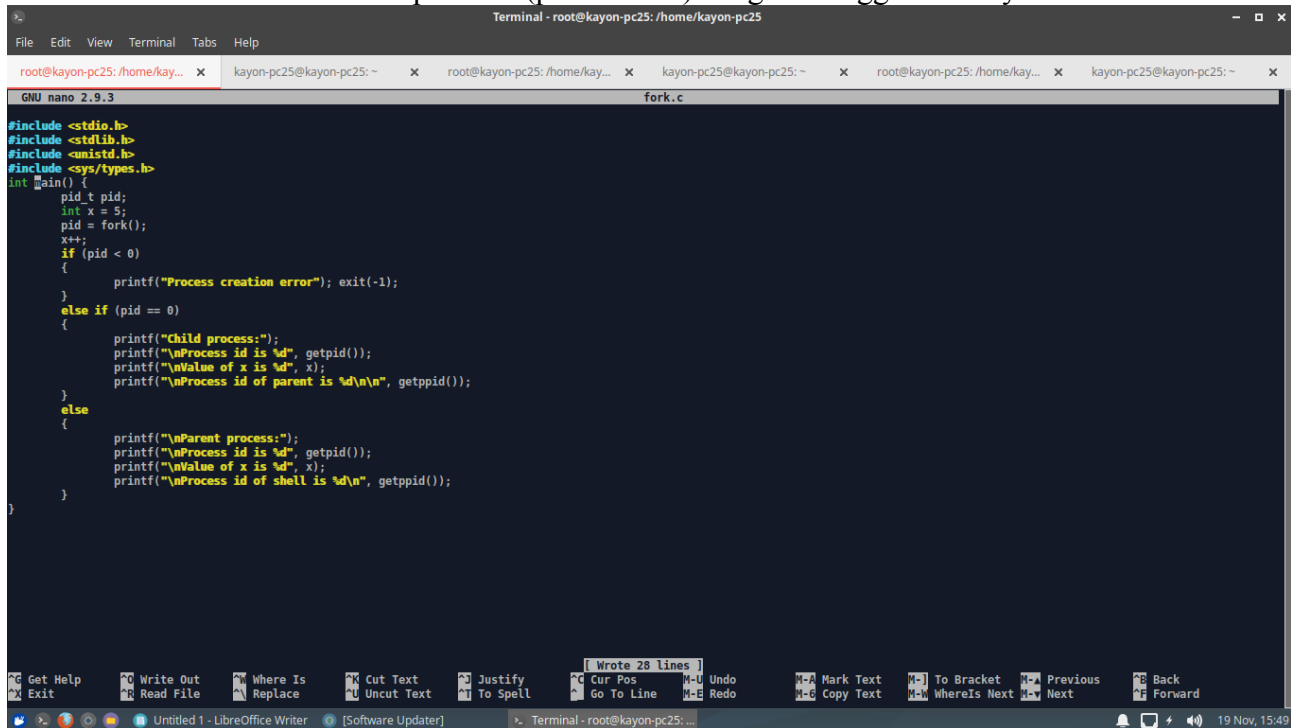


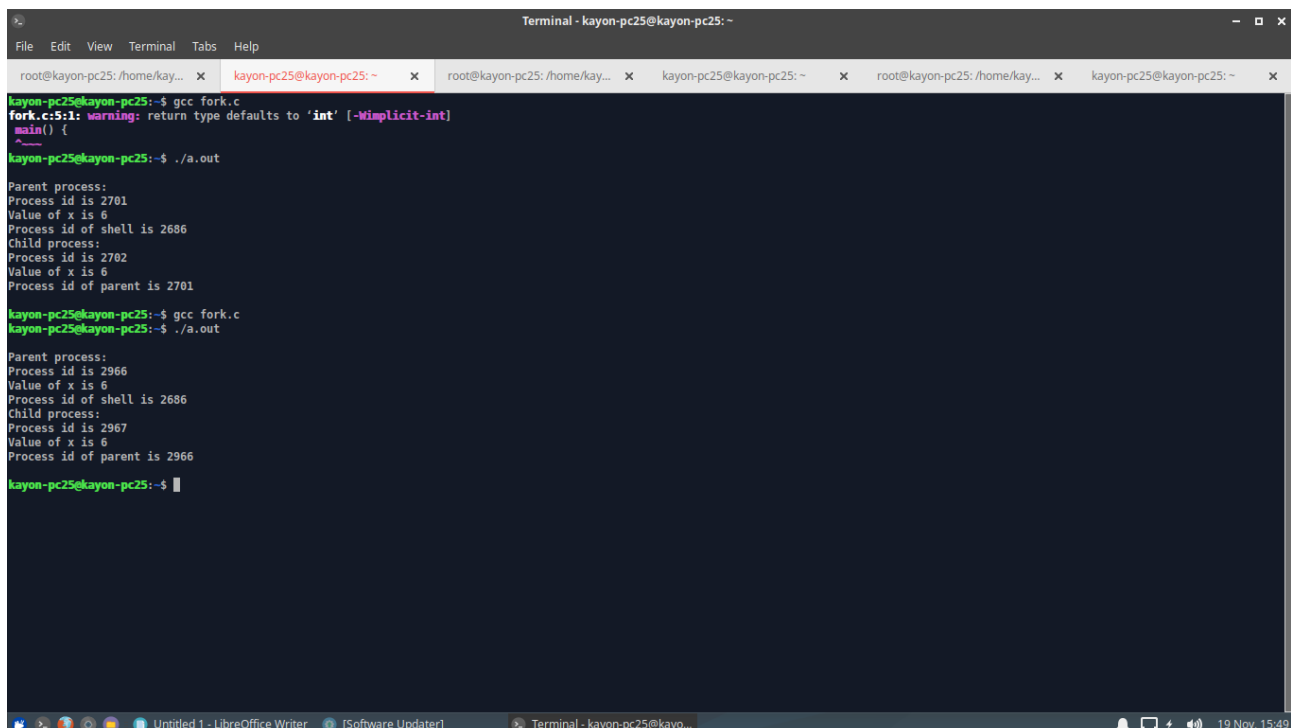
Nama : Nur Fitria Melani
NIM : L200180012
Kelas : A

MODUL 8. System Call

1. Membuat sebuah 'child process' (proses baru) dengan menggunakan system call 'fork'.

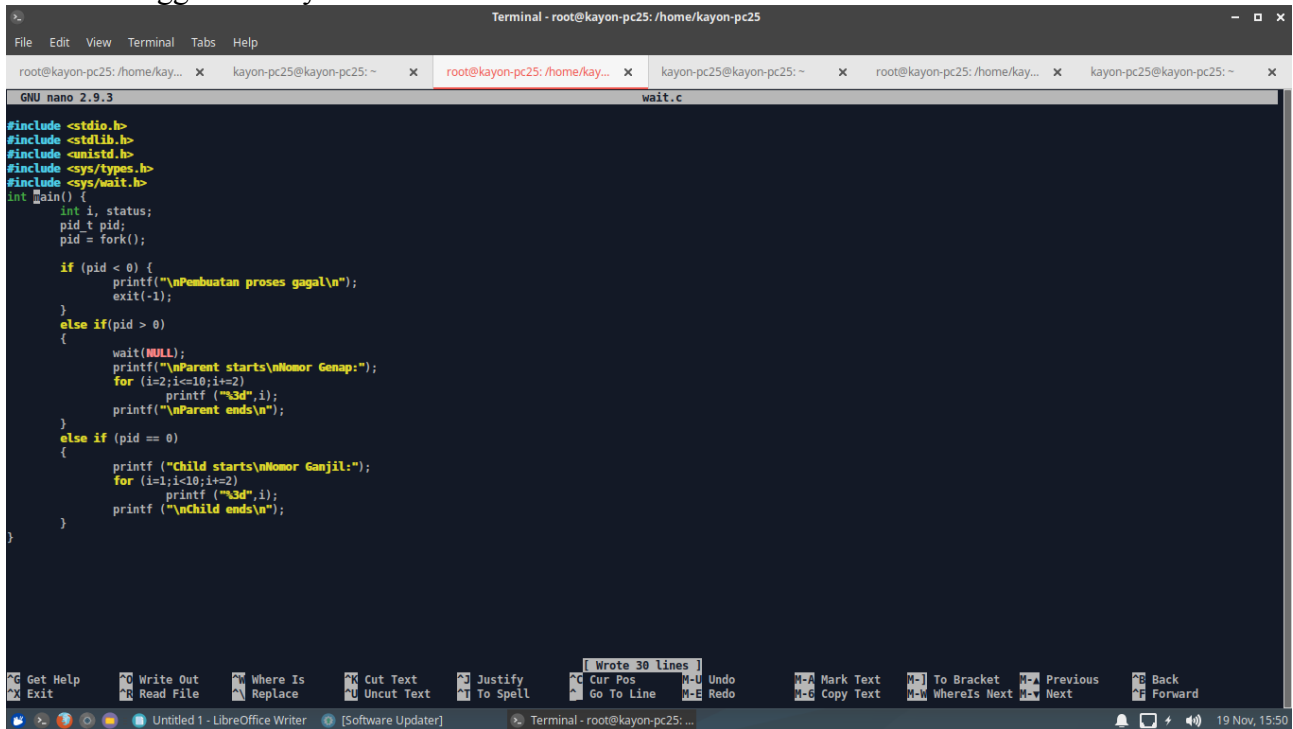


```
GNU nano 2.9.3 fork.c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/types.h>
int main() {
    pid_t pid;
    int x = 5;
    pid = fork();
    x++;
    if (pid < 0)
    {
        printf("Process creation error"); exit(-1);
    }
    else if (pid == 0)
    {
        printf("Child process:");
        printf("\nProcess id is %d", getpid());
        printf("\nValue of x is %d", x);
        printf("\nProcess id of parent is %d\n\n", getppid());
    }
    else
    {
        printf("\nParent process:");
        printf("\nProcess id is %d", getpid());
        printf("\nValue of x is %d", x);
        printf("\nProcess id of shell is %d\n", getppid());
    }
}
```



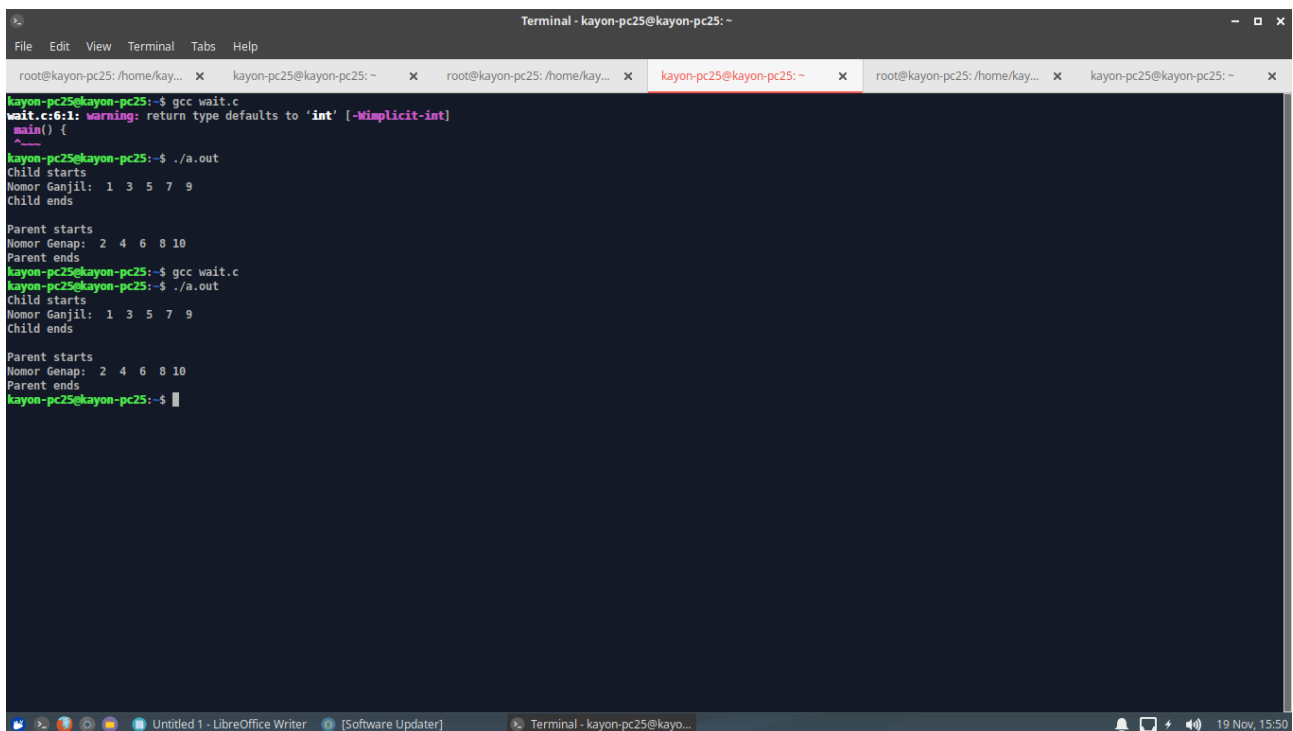
```
kayon-pc25@kayon-pc25:~$ gcc fork.c
fork.c:5:1: warning: return type defaults to 'int' [-Wimplicit-int]
main() {
^
kayon-pc25@kayon-pc25:~$ ./a.out
Parent process:
Process id is 2701
Value of x is 6
Process id of shell is 2686
Child process:
Process id is 2702
Value of x is 6
Process id of parent is 2701
kayon-pc25@kayon-pc25:~$ gcc fork.c
kayon-pc25@kayon-pc25:~$ ./a.out
Parent process:
Process id is 2966
Value of x is 6
Process id of shell is 2686
Child process:
Process id is 2967
Value of x is 6
Process id of parent is 2966
kayon-pc25@kayon-pc25:~$
```

2. Menghentikan sementara(block) proses parent sampai dengan proses child selesai, menggunakan system call 'wait'.



```
GNU nano 2.9.3 wait.c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/types.h>
#include <sys/wait.h>
int main() {
    int i, status;
    pid_t pid;
    pid = fork();

    if (pid < 0) {
        printf("\nPembuatan proses gagal\n");
        exit(-1);
    }
    else if (pid > 0) {
        wait(NULL);
        printf("Parent starts\nNomor Genap:");
        for (i=2; i<=10; i+=2)
            printf(" %3d", i);
        printf("\nParent ends\n");
    }
    else if (pid == 0) {
        printf("Child starts\nNomor Ganjil:");
        for (i=1; i<=10; i+=2)
            printf(" %3d", i);
        printf("\nChild ends\n");
    }
}
```



```
kayon-pc25@kayon-pc25:~$ gcc wait.c
wait.c:6:1: warning: return type defaults to 'int' [-Wimplicit-int]
main() {
^
kayon-pc25@kayon-pc25:~$ ./a.out
Child starts
Nomor Ganjil: 1 3 5 7 9
Child ends

Parent starts
Nomor Genap: 2 4 6 8 10
Parent ends
kayon-pc25@kayon-pc25:~$ gcc wait.c
kayon-pc25@kayon-pc25:~$ ./a.out
Child starts
Nomor Ganjil: 1 3 5 7 9
Child ends

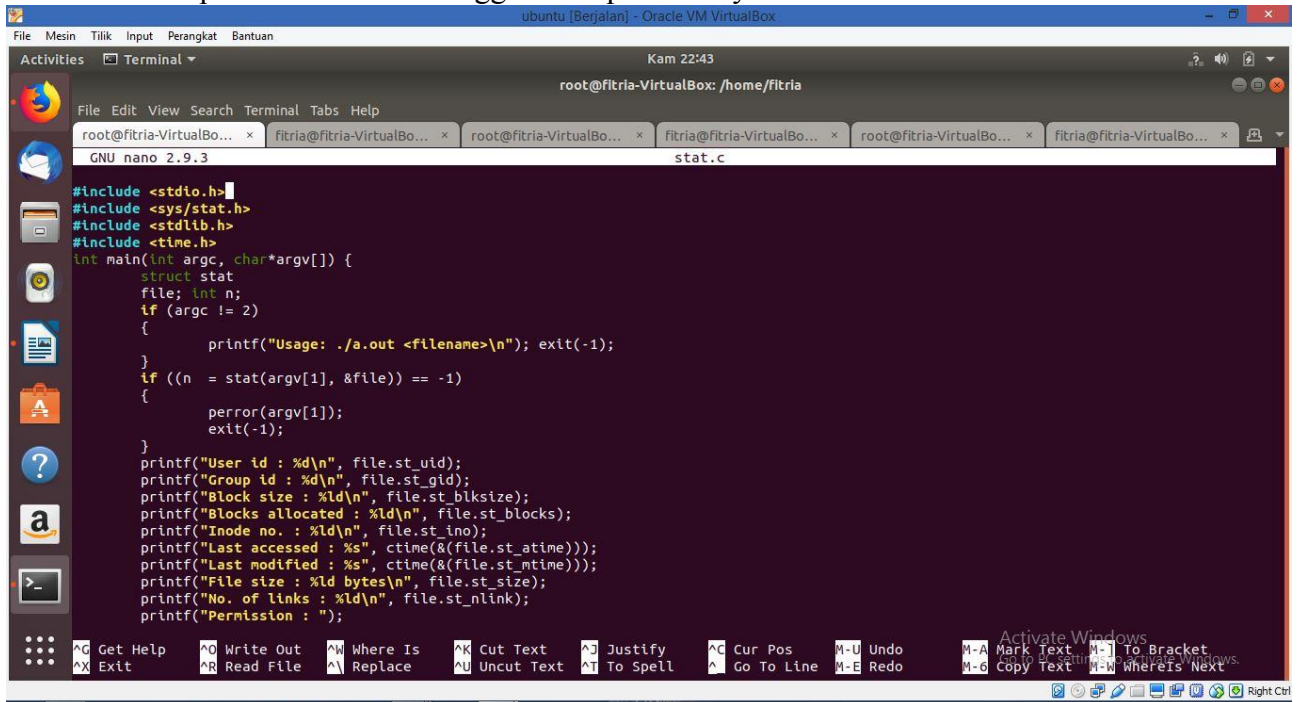
Parent starts
Nomor Genap: 2 4 6 8 10
Parent ends
kayon-pc25@kayon-pc25:~$
```

3. Loading program yang dapat dieksekusi dalam sebuah 'child' proses menggunakan perintah system call 'exec'.

```
Terminal - root@kayon-pc25: /home/kayon-pc25
File Edit View Terminal Tabs Help
root@kayon-pc25: /home/kay... x kayon-pc25@kayon-pc25: ~ x root@kayon-pc25: /home/kay... x kayon-pc25@kayon-pc25: ~ x root@kayon-pc25: /home/kay... x kayon-pc25@kayon-pc25: ~ x
GNU nano 2.9.3 exec.c
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
#include <stdlib.h>
#include <sys/wait.h>
int main(int argc, char*argv[]) {
    pid_t pid;
    int i;
    if (argc != 3) {
        printf("\nInsufficient arguments to load program");
        printf("\nUsage: ./a.out <path> <cmd>\n"); exit(-1);
    }
    switch(pid = fork())
    {
        case -1:
            printf("Fork failed");
            exit(-1);
        case 0:
            printf("Child process\n");
            i = execl(argv[1], argv[2], NULL);
            if (i < 0) {
                printf("%s program not loaded using exec system call\n", argv[2]);
                exit(-1);
            }
        default:
            wait(NULL);
            printf("Child Terminated\n");
            exit(-1);
    }
}
```

```
Terminal - kayon-pc25@kayon-pc25: ~
File Edit View Terminal Tabs Help
root@kayon-pc25: /home/kay... x kayon-pc25@kayon-pc25: ~ x root@kayon-pc25: /home/kay... x kayon-pc25@kayon-pc25: ~ x root@kayon-pc25: /home/kay... x kayon-pc25@kayon-pc25: ~ x
kayon-pc25@kayon-pc25:~$ gcc exec.c
exec.c:5:1: warning: return type defaults to 'int' [-Wimplicit-int]
main(int argc, char*argv[]) {
^
exec.c: In function 'main':
exec.c:23:3: warning: missing sentinel in function call [-Wformat=]
    i = execl(argv[1], argv[2], 0);
    ^
exec.c:30:3: warning: implicit declaration of function 'wait'; did you mean 'main'? [-Wimplicit-function-declaration]
    wait(NULL);
    ^
    main
kayon-pc25@kayon-pc25:~$ ./a.out /bin/ls ls
Child process
a.out Desktop Documents Downloads exec.c fork.c info1200180110.sh.save info1200180110.sh.save.1 Music Pictures Public Templates Videos wait.c
Child Terminated
kayon-pc25@kayon-pc25:~$ gcc exec.c
exec.c:5:1: warning: return type defaults to 'int' [-Wimplicit-int]
main(int argc, char*argv[]) {
^
exec.c: In function 'main':
exec.c:20:3: warning: missing sentinel in function call [-Wformat=]
    i = execl(argv[1], argv[2], 0);
    ^
exec.c:27:3: warning: implicit declaration of function 'wait'; did you mean 'main'? [-Wimplicit-function-declaration]
    wait(NULL);
    ^
    main
kayon-pc25@kayon-pc25:~$ gcc exec.c
exec.c:5:10: fatal error: sys/wait.c: No such file or directory
#include <sys/wait.c>
         ^
compilation terminated.
kayon-pc25@kayon-pc25:~$ gcc exec.c
exec.c:6:1: warning: return type defaults to 'int' [-Wimplicit-int]
main(int argc, char*argv[]) {
^
kayon-pc25@kayon-pc25:~$ gcc exec.c
kayon-pc25@kayon-pc25:~$ ./a.out /bin/ls ls
Child process
a.out Desktop Documents Downloads exec.c fork.c info1200180110.sh.save info1200180110.sh.save.1 Music Pictures Public Templates Videos wait.c
Child Terminated
kayon-pc25@kayon-pc25:~$
```

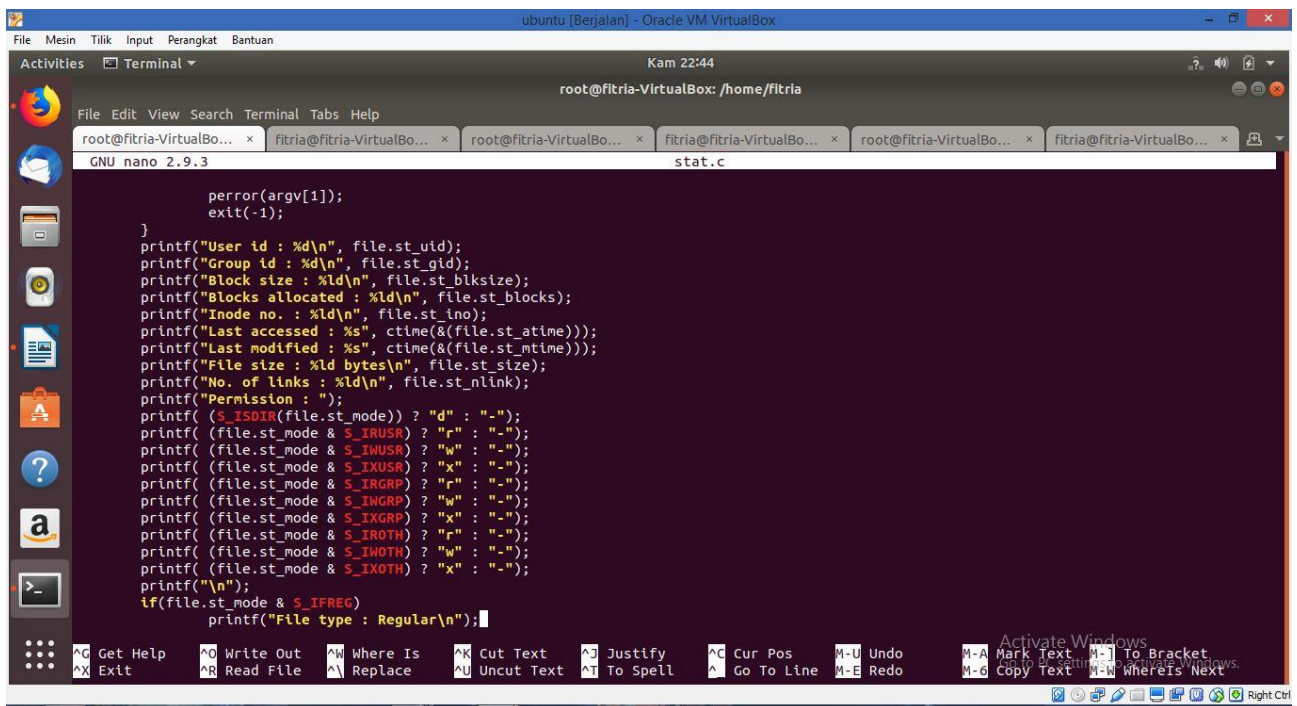
4. Menampilkan status file menggunakan perintah system call 'stat'.



```
root@fitria-VirtualBox: /home/fitria
GNU nano 2.9.3 stat.c

#include <stdio.h>
#include <sys/stat.h>
#include <stdlib.h>
#include <time.h>

int main(int argc, char*argv[]) {
    struct stat
    file; int n;
    if (argc != 2)
    {
        printf("Usage: ./a.out <filename>\n"); exit(-1);
    }
    if ((n = stat(argv[1], &file)) == -1)
    {
        perror(argv[1]);
        exit(-1);
    }
    printf("User id : %d\n", file.st_uid);
    printf("Group id : %d\n", file.st_gid);
    printf("Block size : %ld\n", file.st_blksize);
    printf("Blocks allocated : %ld\n", file.st_blocks);
    printf("Inode no. : %ld\n", file.st_ino);
    printf("Last accessed : %s", ctime(&(file.st_atime)));
    printf("Last modified : %s", ctime(&(file.st_mtime)));
    printf("File size : %ld bytes\n", file.st_size);
    printf("No. of links : %ld\n", file.st_nlink);
    printf("Permission : ");
```



```
perror(argv[1]);
exit(-1);
}
printf("User id : %d\n", file.st_uid);
printf("Group id : %d\n", file.st_gid);
printf("Block size : %ld\n", file.st_blksize);
printf("Blocks allocated : %ld\n", file.st_blocks);
printf("Inode no. : %ld\n", file.st_ino);
printf("Last accessed : %s", ctime(&(file.st_atime)));
printf("Last modified : %s", ctime(&(file.st_mtime)));
printf("File size : %ld bytes\n", file.st_size);
printf("No. of links : %ld\n", file.st_nlink);
printf("Permission : ");
printf(" (%s_ISDIR(file.st_mode) ? "d" : "-");
printf(" (%s_IRUSR ? "r" : "-");
printf(" (%s_IWUSR ? "w" : "-");
printf(" (%s_IXUSR ? "x" : "-");
printf(" (%s_IRGRP ? "r" : "-");
printf(" (%s_IWGRP ? "w" : "-");
printf(" (%s_IXGRP ? "x" : "-");
printf(" (%s_IROTH ? "r" : "-");
printf(" (%s_IWOTH ? "w" : "-");
printf(" (%s_IXOTH ? "x" : "-");
printf("\n");
if(file.st_mode & S_IFREG)
printf("File type : Regular\n");
```

ubuntu [Berjalan] - Oracle VM VirtualBox

File Mesin Tilik Input Perangkat Bantuan

Activities Terminal

Kam 22:44

root@fitria-VirtualBox: /home/fitria

File Edit View Search Terminal Tabs Help

root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x

GNU nano 2.9.3 stat.c

```
printf( (S_ISDIR(file.st_mode)) ? "d" : "-");
printf( (file.st_mode & S_IRUSR) ? "r" : "-");
printf( (file.st_mode & S_IWUSR) ? "w" : "-");
printf( (file.st_mode & S_IXUSR) ? "x" : "-");
printf( (file.st_mode & S_IRGRP) ? "r" : "-");
printf( (file.st_mode & S_IWGRP) ? "w" : "-");
printf( (file.st_mode & S_IXGRP) ? "x" : "-");
printf( (file.st_mode & S_IROTH) ? "r" : "-");
printf( (file.st_mode & S_IWOTH) ? "w" : "-");
printf( (file.st_mode & S_IXOTH) ? "x" : "-");
printf("\n");
if(file.st_mode & S_IFREG)
    printf("File type : Regular\n");
if(file.st_mode & S_IFDIR)
    printf("File type : Directory\n");
}
```

Get Help Write Out Where Is Cut Text Justify Cur Pos M-U Undo M-A Mark Text M-B To Bracket
Exit Read File Replace AU Uncut Text AT To Spell Go To Line M-E Redo M-6 Copy Text M-7 Whereis Next

Activate Windows
Go to PC settings to activate Windows.

ubuntu [Berjalan] - Oracle VM VirtualBox

File Mesin Tilik Input Perangkat Bantuan

Activities Terminal

Kam 22:45

fitria@fitria-VirtualBox: ~

File Edit View Search Terminal Tabs Help

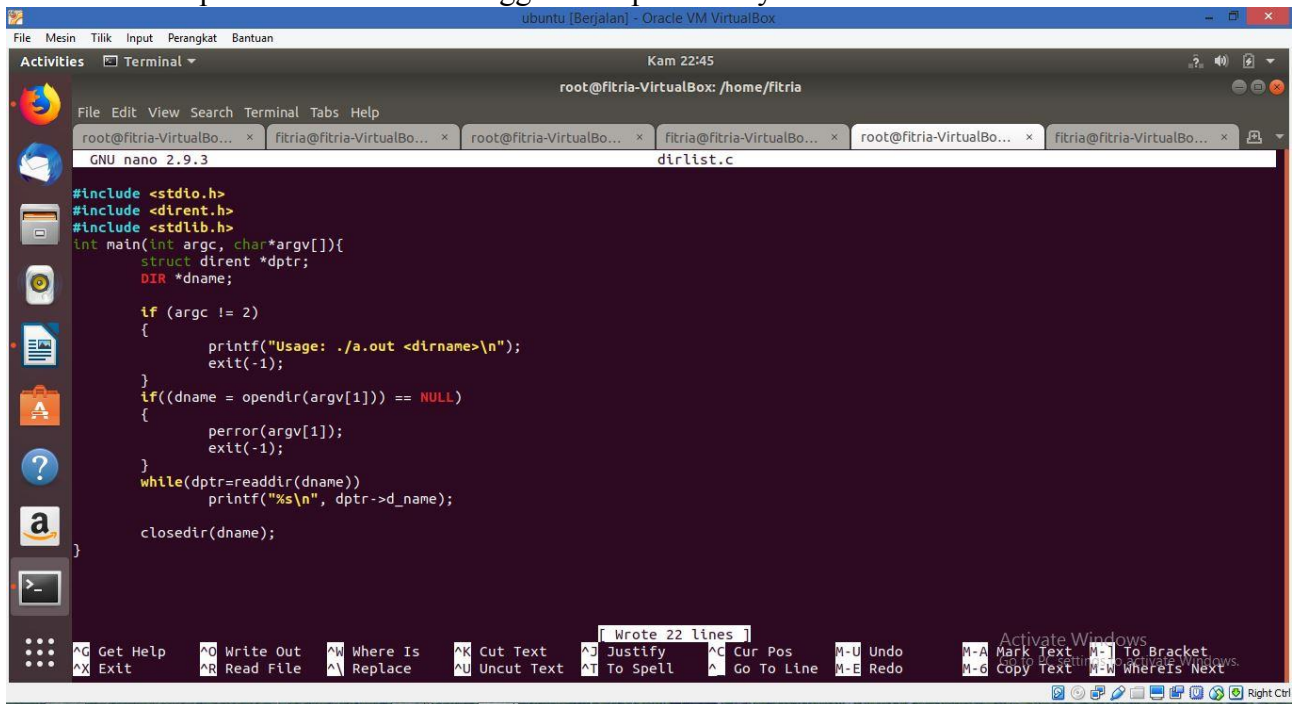
root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x

File type : Regular

```
fitria@fitria-VirtualBox:~$ gcc stat.c
fitria@fitria-VirtualBox:~$ ./a.out
Usage: ./a.out <filename>
fitria@fitria-VirtualBox:~$ gcc stat.c
fitria@fitria-VirtualBox:~$ ./a.out stat.c
User id : 0
Group id : 0
Block size : 4096
Blocks allocated : 8
Inode no. : 555318
Last accessed : Thu Nov 21 21:09:24 2019
Last modified : Thu Nov 21 21:09:16 2019
File size : 1375 bytes
No. of links : 1
Permission : -rw-r--r--
File type : Regular
fitria@fitria-VirtualBox:~$ gcc stat.c
fitria@fitria-VirtualBox:~$ ./a.out stat.c
User id : 0
Group id : 0
Block size : 4096
Blocks allocated : 8
Inode no. : 555318
Last accessed : Thu Nov 21 21:09:24 2019
Last modified : Thu Nov 21 21:09:16 2019
File size : 1375 bytes
No. of links : 1
Permission : -rw-r--r--
File type : Regular
fitria@fitria-VirtualBox:~$
```

Activate Windows
Go to PC settings to activate Windows.

5. Menampilkan isi direktori menggunakan perintah system call 'readdir'.

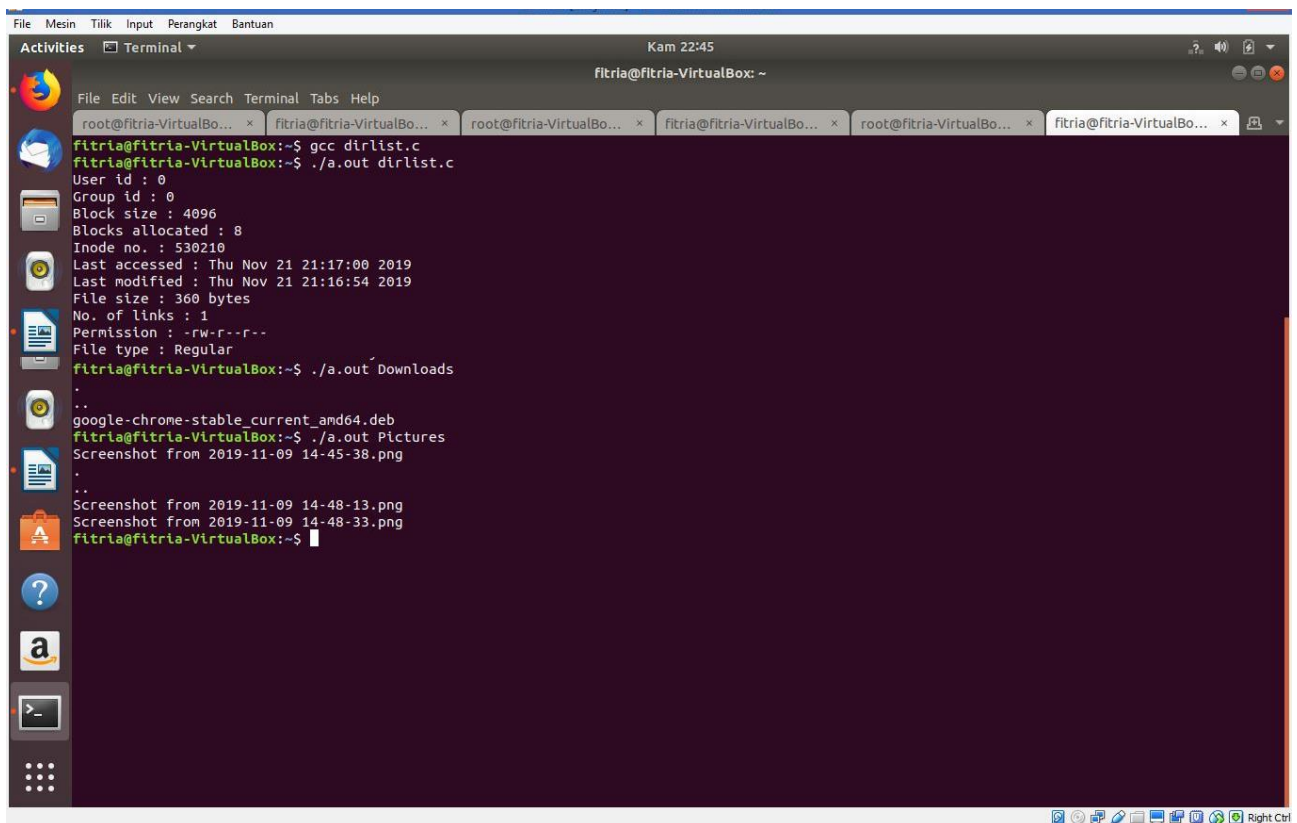


```
File Edit View Search Terminal Tabs Help
root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x
GNU nano 2.9.3 dirlist.c

#include <stdio.h>
#include <dirent.h>
#include <stdlib.h>
int main(int argc, char*argv[]){
    struct dirent *dptr;
    DIR *dname;

    if (argc != 2)
    {
        printf("Usage: ./a.out <dirname>\n");
        exit(-1);
    }
    if((dname = opendir(argv[1])) == NULL)
    {
        perror(argv[1]);
        exit(-1);
    }
    while(dptr=readdir(dname))
        printf("%s\n", dptr->d_name);

    closedir(dname);
}
```



```
File Edit View Search Terminal Tabs Help
fitria@fitria-VirtualBox: ~
root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x root@fitria-VirtualBo... x fitria@fitria-VirtualBo... x
fitria@fitria-VirtualBox:~$ gcc dirlist.c
fitria@fitria-VirtualBox:~$ ./a.out dirlist.c
User id : 0
Group id : 0
Block size : 4096
Blocks allocated : 8
Inode no. : 530210
Last accessed : Thu Nov 21 21:17:00 2019
Last modified : Thu Nov 21 21:16:54 2019
File size : 360 bytes
No. of links : 1
Permission : -rw-r--r--
File type : Regular
fitria@fitria-VirtualBox:~$ ./a.out Downloads
..
..
google-chrome-stable_current_amd64.deb
fitria@fitria-VirtualBox:~$ ./a.out Pictures
Screenshot from 2019-11-09 14-45-38.png
..
Screenshot from 2019-11-09 14-48-13.png
Screenshot from 2019-11-09 14-48-33.png
fitria@fitria-VirtualBox:~$
```