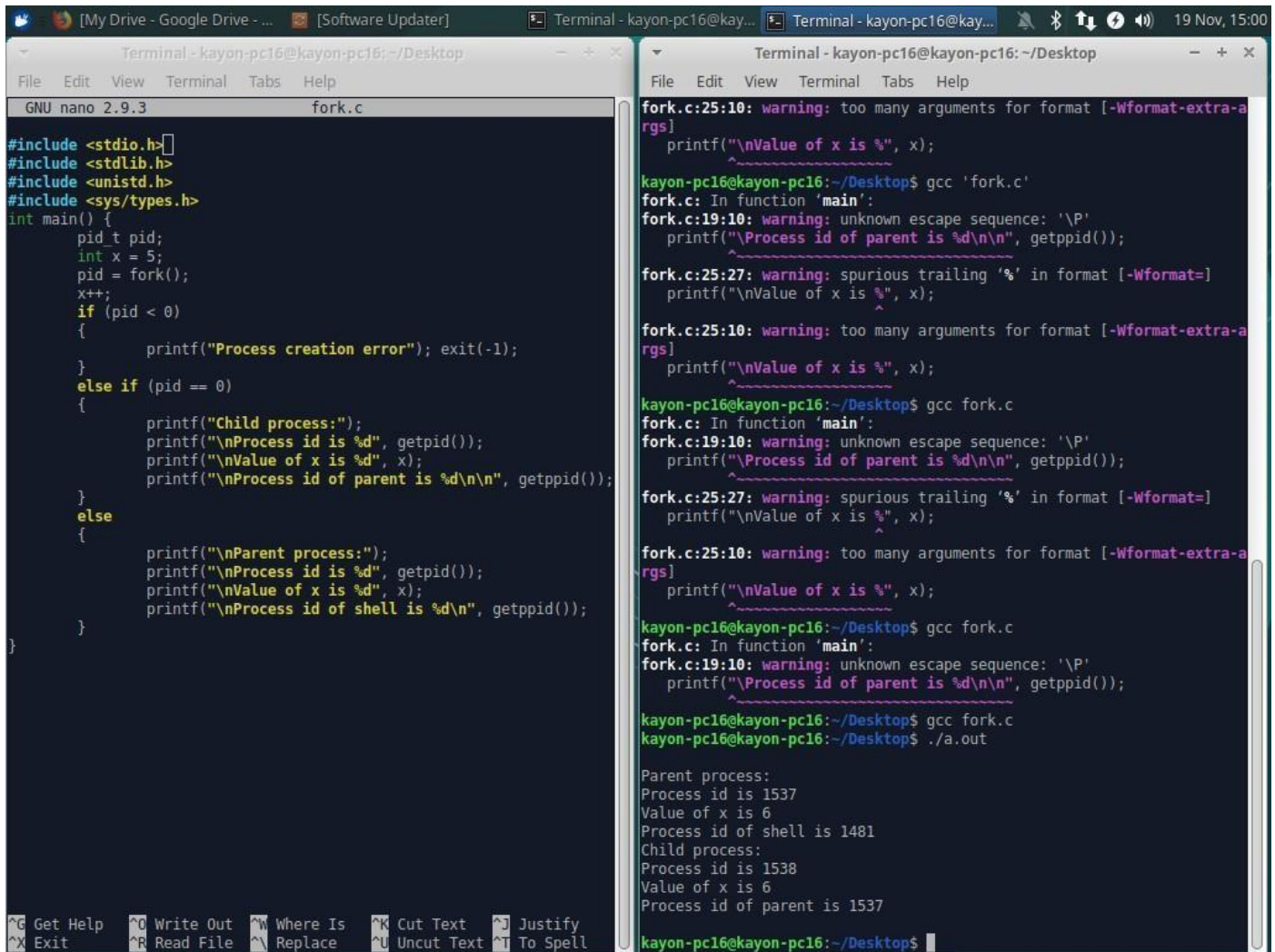


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MODUL 8

1. Membuat child "Child Process" dengan menggunakan System Call "Fork"

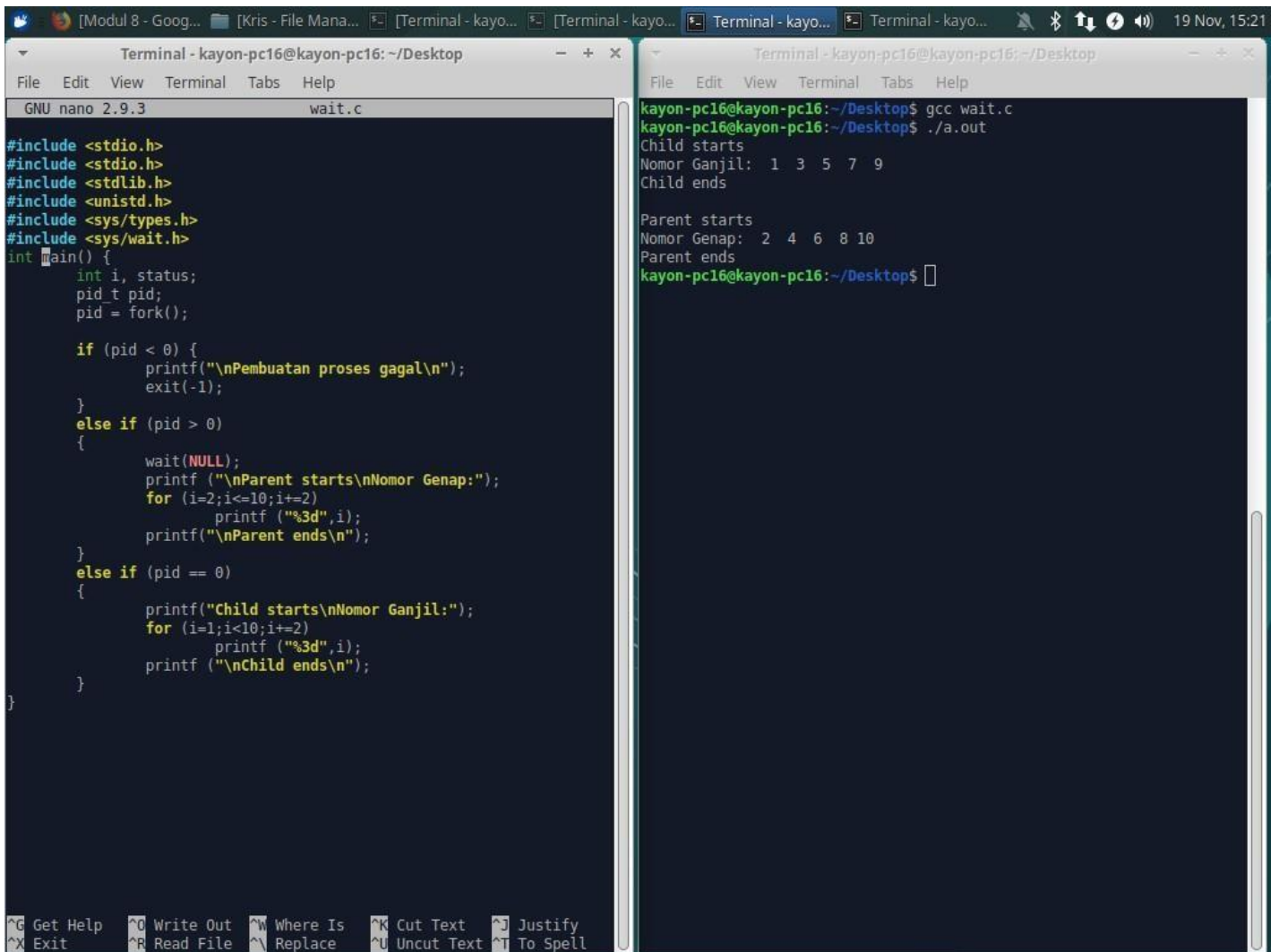


```
GNU nano 2.9.3 fork.c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/types.h>
int main() {
    pid_t pid;
    int x = 5;
    pid = fork();
    x++;
    if (pid < 0)
    {
        printf("Process creation error"); exit(-1);
    }
    else if (pid == 0)
    {
        printf("Child 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());
    }
}
```

```
fork.c:25:10: warning: too many arguments for format [-Wformat-extra-args]
    printf("\nValue of x is %", x);
    ^
kayon-pc16@kayon-pc16:~/Desktop$ gcc 'fork.c'
fork.c: In function 'main':
fork.c:19:10: warning: unknown escape sequence: '\P'
    printf("\Process id of parent is %d\n\n", getppid());
    ^
fork.c:25:27: warning: spurious trailing '%' in format [-Wformat=]
    printf("\nValue of x is %", x);
    ^
fork.c:25:10: warning: too many arguments for format [-Wformat-extra-args]
    printf("\nValue of x is %", x);
    ^
kayon-pc16@kayon-pc16:~/Desktop$ gcc fork.c
fork.c: In function 'main':
fork.c:19:10: warning: unknown escape sequence: '\P'
    printf("\Process id of parent is %d\n\n", getppid());
    ^
fork.c:25:27: warning: spurious trailing '%' in format [-Wformat=]
    printf("\nValue of x is %", x);
    ^
fork.c:25:10: warning: too many arguments for format [-Wformat-extra-args]
    printf("\nValue of x is %", x);
    ^
kayon-pc16@kayon-pc16:~/Desktop$ gcc fork.c
kayon-pc16@kayon-pc16:~/Desktop$ ./a.out

Parent process:
Process id is 1537
Value of x is 6
Process id of shell is 1481
Child process:
Process id is 1538
Value of x is 6
Process id of parent is 1537
kayon-pc16@kayon-pc16:~/Desktop$
```

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



```
Terminal - kayon-pc16@kayon-pc16: ~/Desktop
GNU nano 2.9.3 wait.c
#include <stdio.h>
#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 ("\nParent 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");
    }
}
```

```
Terminal - kayon-pc16@kayon-pc16: ~/Desktop
kayon-pc16@kayon-pc16:~/Desktop$ gcc wait.c
kayon-pc16@kayon-pc16:~/Desktop$ ./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-pc16@kayon-pc16:~/Desktop$
```

3. Loading Program yang dapat dieksekusi dalam sebuah “Child” Proses menggunakan perintah system call “exec”

```
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

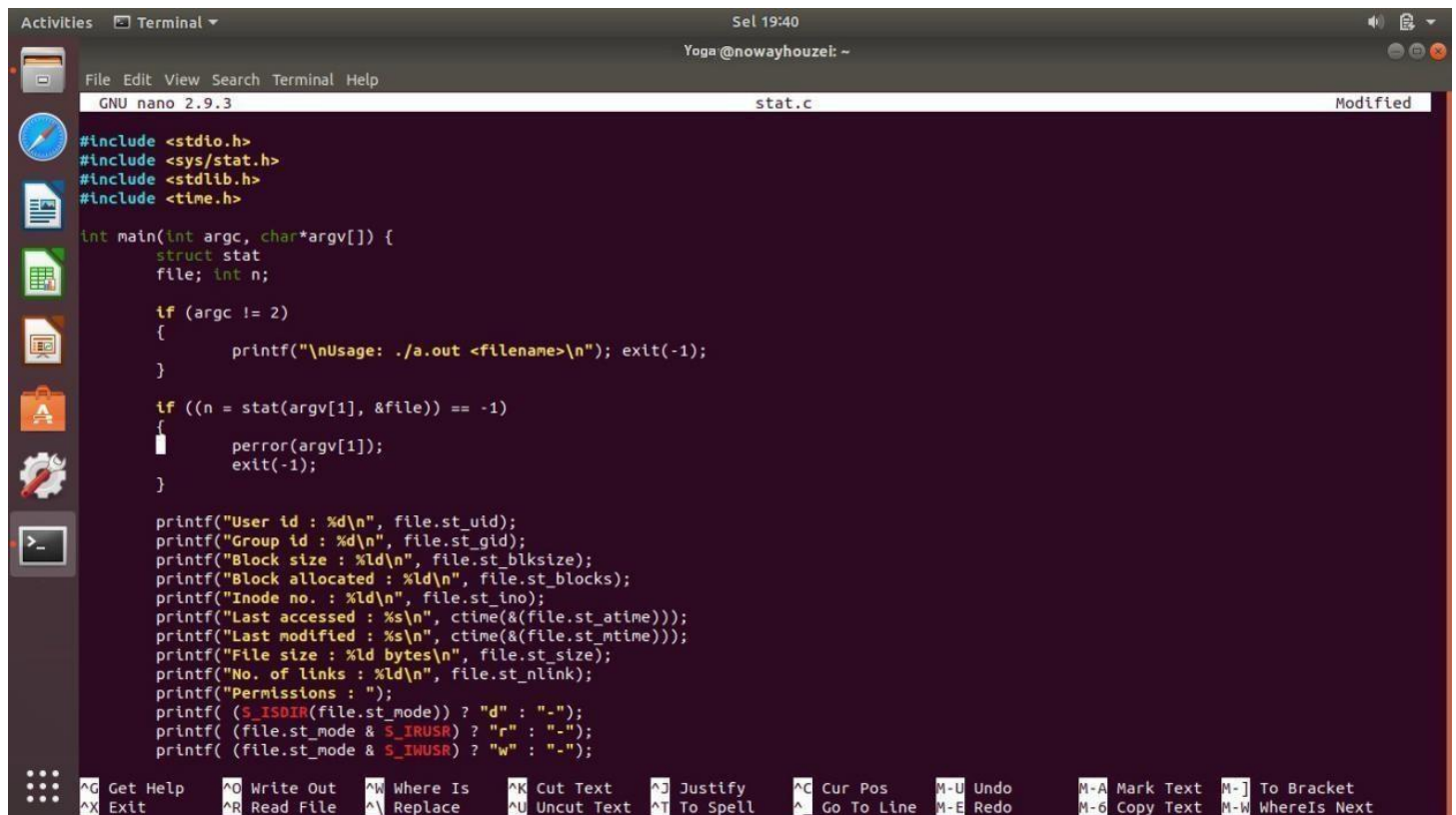
kayon-pc25@kayon-pc25:~$ gcc exec.c
exec.c:5:1: warning: return type defaults to 'int' [-Wimplicit-int]
main(int argc, char*argv[]) {
^
exec.c: In function 'main':
exec.c:23:3: warning: missing sentinel in function call [-Wformat=]
    i = execl(argv[1], argv[2], 0);
    ^
exec.c:30:3: warning: implicit 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:15:10: fatal error: sys/wait.h: No such file or directory
#include <sys/wait.h>
         ^
compilation 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[]) {
^
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:~$
```

```
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("\nProgram not loaded using exec system call\n", argv[2]);
                exit(-1);
            }
        default:
            wait(NULL);
            printf("Child Terminated\n");
            exit(-1);
    }
}
```

4. Menambahkan status file menggunakan perintha system call “stat”



```
GNU nano 2.9.3 stat.c Modified

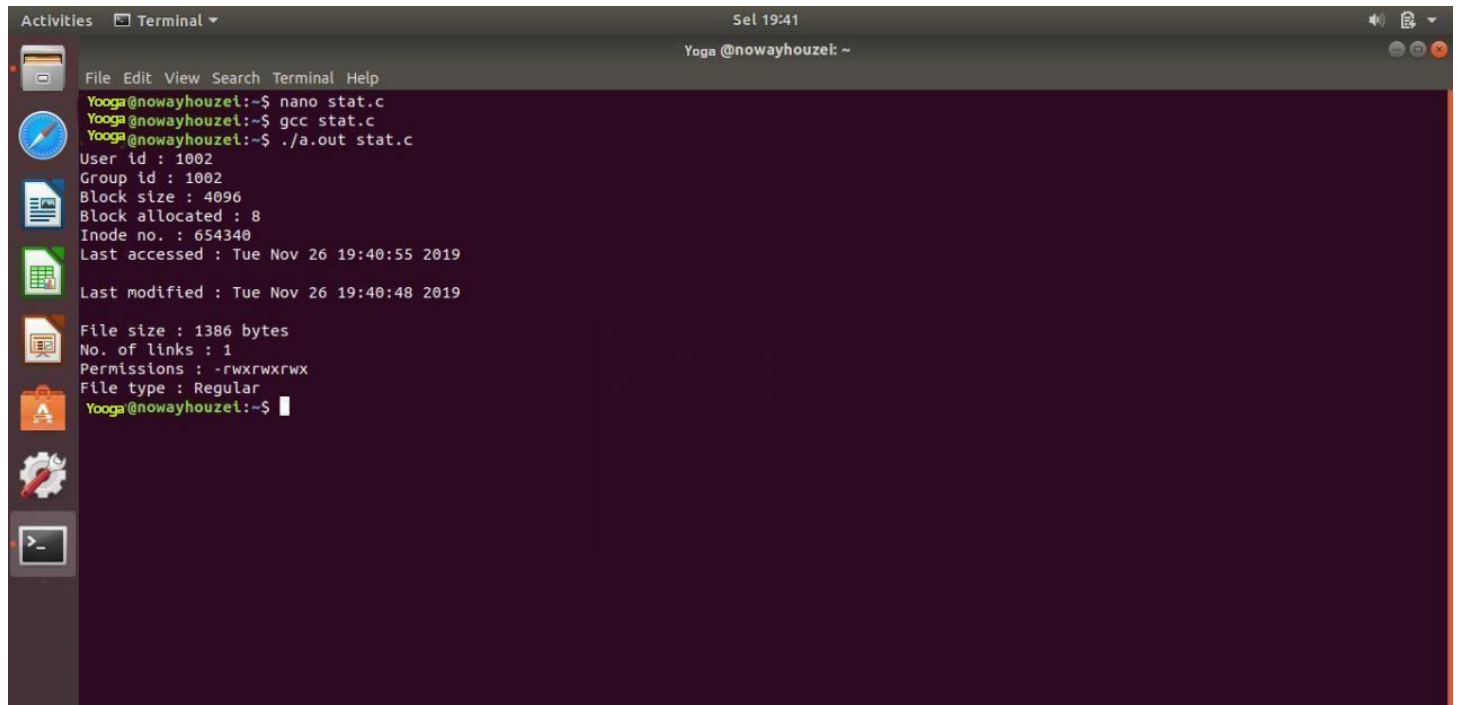
#include <stdio.h>
#include <sys/stat.h>
#include <stdlib.h>
#include <time.h>

int main(int argc, char*argv[]) {
    struct stat
    file; int n;

    if (argc != 2)
    {
        printf("\nUsage: ./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("Block allocated : %ld\n", file.st_blocks);
    printf("Inode no. : %ld\n", file.st_ino);
    printf("Last accessed : %s\n", ctime(&(file.st_atime)));
    printf("Last modified : %s\n", ctime(&(file.st_mtime)));
    printf("File size : %ld bytes\n", file.st_size);
    printf("No. of links : %ld\n", file.st_nlink);
    printf("Permissions : ");
    printf( ($_ISDIR(file.st_mode)) ? "d" : "-");
    printf( (file.st_mode & $_IUSR) ? "r" : "-");
    printf( (file.st_mode & $_IWUSR) ? "w" : "-");
}
```



```
Activities Terminal Sel 19:41
Yoga @nowayhouzel: ~

Yoga@nowayhouzel:~$ nano stat.c
Yoga@nowayhouzel:~$ gcc stat.c
Yoga@nowayhouzel:~$ ./a.out stat.c
User id : 1002
Group id : 1002
Block size : 4096
Block allocated : 8
Inode no. : 654340
Last accessed : Tue Nov 26 19:40:55 2019
Last modified : Tue Nov 26 19:40:48 2019
File size : 1386 bytes
No. of links : 1
Permissions : -rwxrwxrwx
File type : Regular
Yoga@nowayhouzel:~$
```

Activities Terminal Sel 19:40 Yooga @nowayhouzel: ~

File Edit View Search Terminal Help GNU nano 2.9.3 stat.c Modified

```
    exit(-1);
}

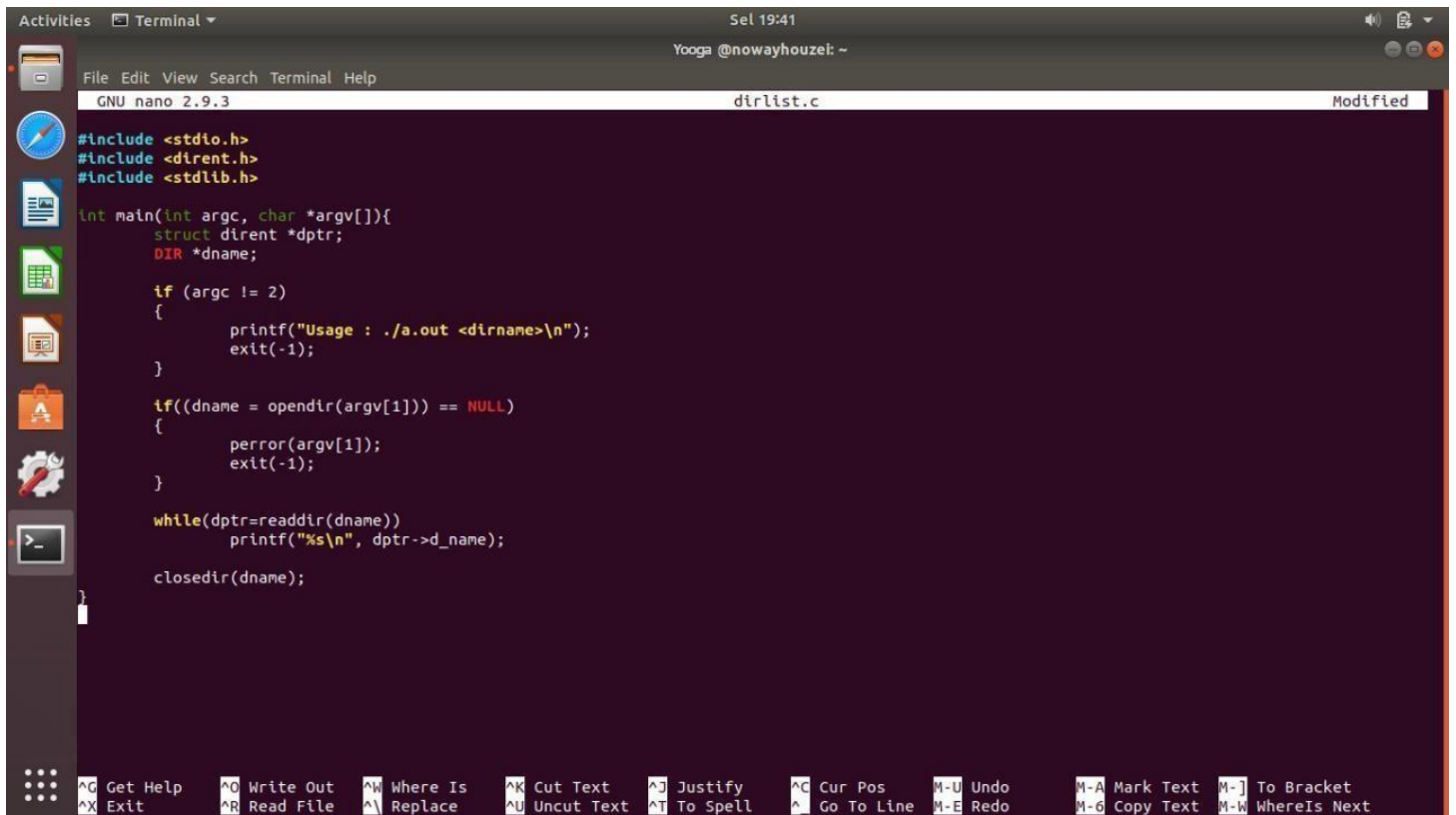
printf("User id : %d\n", file.st_uid);
printf("Group id : %d\n", file.st_gid);
printf("Block size : %ld\n", file.st_blksize);
printf("Block allocated : %ld\n", file.st_blocks);
printf("Inode no. : %ld\n", file.st_ino);
printf("Last accessed : %s\n", ctime(&(file.st_atime)));
printf("Last modified : %s\n", ctime(&(file.st_mtime)));
printf("File size : %ld bytes\n", file.st_size);
printf("No. of links : %ld\n", file.st_nlink);
printf("Permissions : ");
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_IRUSR) ? "r" : "-");
printf( (file.st_mode & S_IWUSR) ? "w" : "-");
printf( (file.st_mode & S_IXUSR) ? "x" : "-");
printf( (file.st_mode & S_IRUSR) ? "r" : "-");
printf( (file.st_mode & S_IWUSR) ? "w" : "-");
printf( (file.st_mode & S_IXUSR) ? "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 Undo M-A Mark Text M-] To Bracket
Exit Read File Replace Uncut Text To Spell Go To Line M-E Redo M-6 Copy Text M-W WhereIs Next

5. Menampilkan isi direktori menggunakan perintah system call “readdir”



```
GNU nano 2.9.3 dirlist.c Modified

#include <stdio.h>
#include <dirent.h>
#include <stdlib.h>

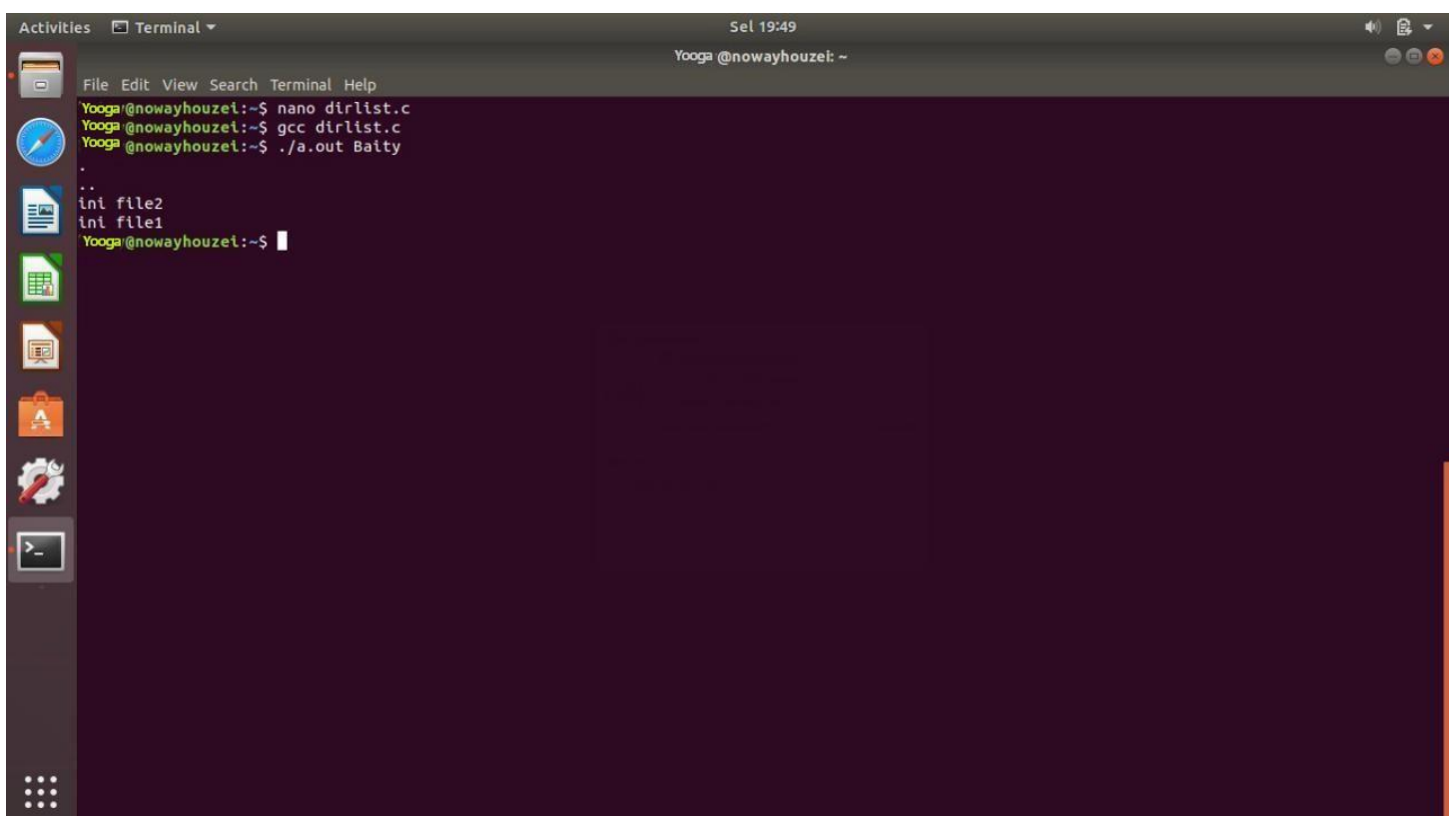
int main(int argc, char *argv[]){
    struct dirent *dptr;
    DIR *dname;

    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);
}
```



```
Yooga @nowayhouzel: ~
Yooga @nowayhouzel:~$ nano dirlist.c
Yooga @nowayhouzel:~$ gcc dirlist.c
Yooga @nowayhouzel:~$ ./a.out Baity
.
..
ini file2
ini file1
Yooga @nowayhouzel:~$
```

