

L200160067
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A

Modul 8

Kode program Fork.c

```
Terminal - root@kayon-pc4: /home/kayon-pc4
File Edit View Terminal Tabs Help
root@kayon-pc4: /home/kayon-pc4 x kayon-pc4@kayon-pc4: ~
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", getppid());
    }
    else
    {
        printf("Child Process:");
        printf("\nProcess id is %d", getpid());
        printf("\nValue of x is %d", x);
        printf("\nProcess id of shell is %d\n", getppid());
    }
}
```

Hasil

```
Terminal - kayon-pc4@kayon-pc4: ~
File Edit View Terminal Tabs Help
root@kayon-pc4: /home/kayon-pc4 x kayon-pc4@kayon-pc4: ~
kayon-pc4@kayon-pc4:~$ ls -la
total 48
drwxr-xr-x 1 kayon-pc4 kayon-pc4 8472 Nov 19 14:36 a.out
drwxr-xr-x 2 kayon-pc4 kayon-pc4 4096 Sep  4 10:09 Desktop
drwxr-xr-x 2 kayon-pc4 kayon-pc4 4096 Nov 12 15:58 Documents
drwxr-xr-x 2 kayon-pc4 kayon-pc4 4096 Sep  4 10:09 Downloads
drwxr-xr-x 1 root      root      649 Nov 19 14:36 fork.c
drwxr-xr-x 1 root      root      0 Nov 12 14:52 latihan
drwxr-xr-x 2 kayon-pc4 kayon-pc4 4096 Sep  4 10:09 Music
drwxr-xr-x 2 kayon-pc4 kayon-pc4 4096 Nov  5 11:23 Pictures
drwxr-xr-x 2 kayon-pc4 kayon-pc4 4096 Sep  4 10:09 Public
drwxr-xr-x 2 kayon-pc4 kayon-pc4 4096 Sep  4 10:09 Templates
drwxr-xr-x 2 kayon-pc4 kayon-pc4 4096 Sep  4 10:09 Videos
kayon-pc4@kayon-pc4:~$ ./a.out
Child Process:
Process id is 3525
Value of x is 6
Process id of shell is 3482
Child Process:
Process id is 3526
Value of x is 6
Process id of parent is 3525
kayon-pc4@kayon-pc4:~$
```

Program Wait

```
Terminal - kayon-pc4@kayon-pc4: ~
File Edit View Terminal Tabs Help

kayon-pc4@kayon-pc4: ~
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("\nPenbuatan proses gagal\n"); exit(-1);
    }
    else if (pid > 0) {
        wait(NULL);
        printf ("\nParent starts\n\nNomor Genap:");
        for (i=2;i<=10;i+=2)
            printf("%3d",i);
        printf("\nParent ends\n");
    }
    else if (pid == 0) {
        printf ("Child starts\n\nNomor Ganjil:");
        for (i=1;i<=10;i+=2)
            printf ("%3d",i);
        printf ("\nChild ends\n");
    }
}
```

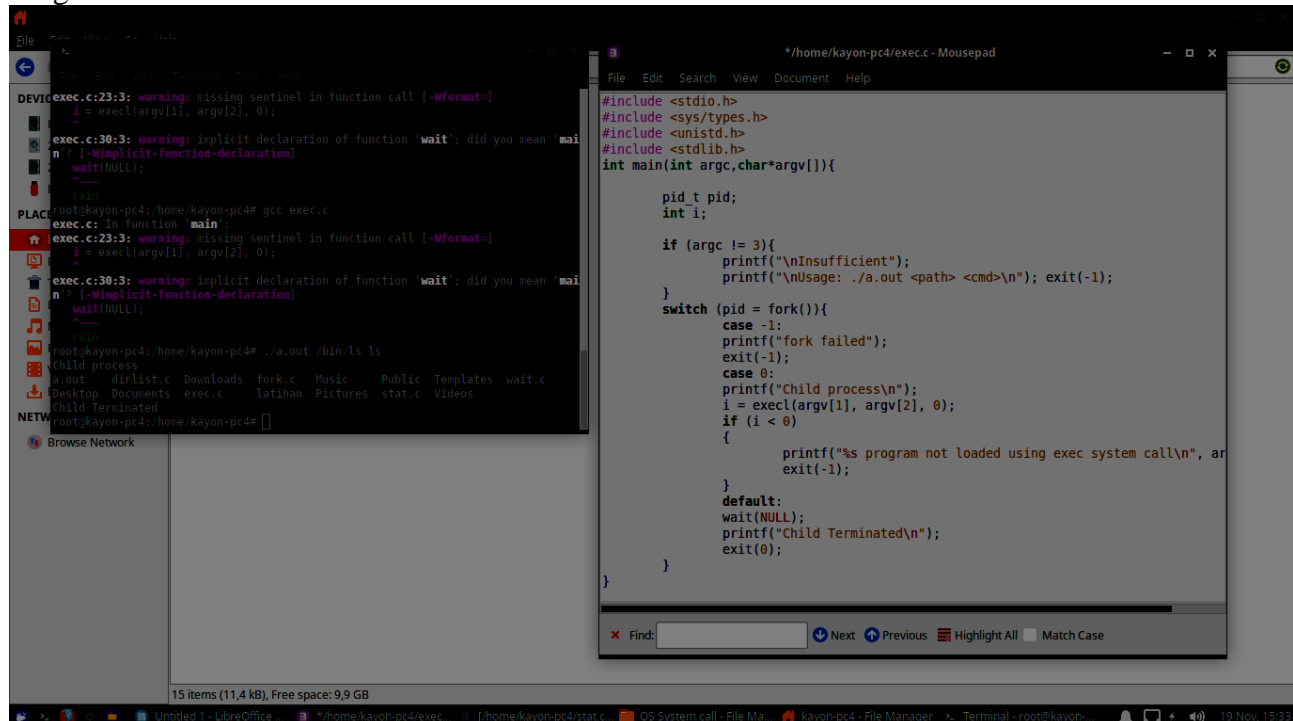
Hasil

```
Terminal - kayon-pc4@kayon-pc4: ~
File Edit View Terminal Tabs Help

kayon-pc4@kayon-pc4: ~
kayon-pc4@kayon-pc4:~$ gcc wait.c
wait.c:32:13: error: expected identifier or '(' before 'for'
    for (i=2;i<=10;i+=2)
    ~~~~~
wait.c:32:13: error: expected '=', ',', ';', 'asm' or '__attribute__' before '<=' token
    for (i=2;i<=10;i+=2)
    ~~~~~
wait.c:32:19: error: expected '=', ',', ';', 'asm' or '__attribute__' before '+=' token
    for (i=2;i<=10;i+=2)
    ~~~~~
wait.c:34:11: error: expected declaration specifiers or '...' before string constant
    printf ("\nChild ends\n");
    ~~~~~
wait.c:35:2: error: expected identifier or '(' before ')' token
    )
    ^
wait.c:36:1: error: expected identifier or '(' before ')' token
    )
    ^
kayon-pc4@kayon-pc4:~$ gcc wait.c
kayon-pc4@kayon-pc4:~$ ./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-pc4@kayon-pc4:~$
```

Program exec.c



```
File Edit Search View Document Help
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
#include <stdlib.h>
int main(int argc, char*argv[]){
    pid_t pid;
    int i;
    if (argc != 3){
        printf("\nInsufficient");
        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], 0);
            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(0);
    }
}
```

root@kayon-pc4: /home/kayon-pc4# gcc exec.c

exec.c: In function 'main':

exec.c:23:3: warning: missing sentinel in function call [-Wformat=]

exec.c:30:3: warning: implicit declaration of function 'wait'; did you mean 'main'?

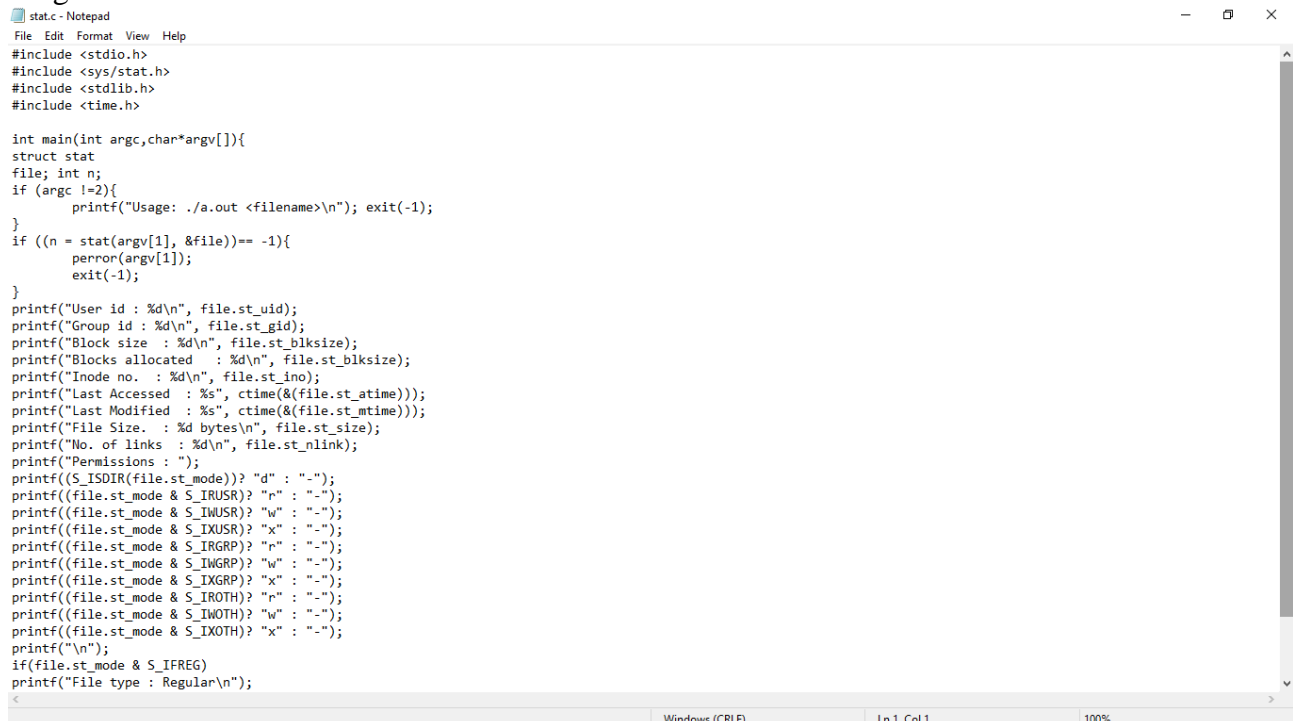
root@kayon-pc4: /home/kayon-pc4# ./a.out /bin/ls ls

Child process

Child Terminated

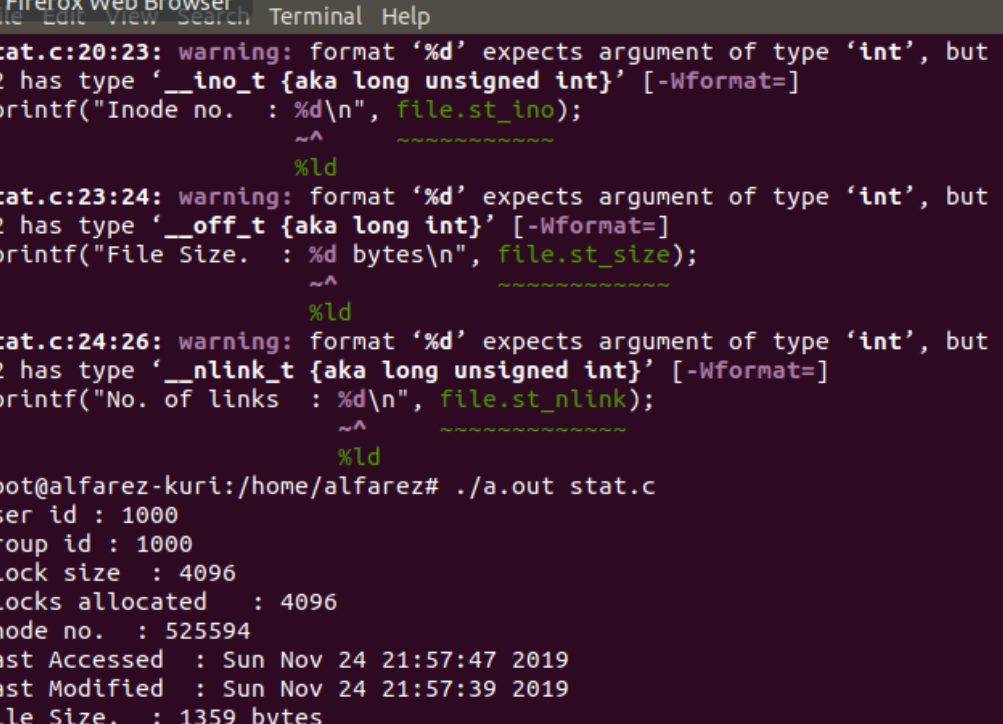
root@kayon-pc4: /home/kayon-pc4#

Program Stat.c



```
stat.c - Notepad
File Edit Format View Help
#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 : %d\n", file.st_blksize);
    printf("Blocks allocated : %d\n", file.st_blksize);
    printf("Inode no. : %d\n", file.st_ino);
    printf("Last Accessed : %s", ctime(&(file.st_atime)));
    printf("Last Modified : %s", ctime(&(file.st_mtime)));
    printf("File Size. : %d bytes\n", file.st_size);
    printf("No. of links : %d\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_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");
}
```



```
root@alfarez-kuri: /home/alfarez
stat.c:20:23: warning: format '%d' expects argument of type 'int', but argument
2 has type '__ino_t {aka long unsigned int}' [-Wformat=]
printf("Inode no.  : %d\n", file.st_ino);
                        ~^          ~~~~~
                        %ld
stat.c:23:24: warning: format '%d' expects argument of type 'int', but argument
2 has type '__off_t {aka long int}' [-Wformat=]
printf("File Size.  : %d bytes\n", file.st_size);
                        ~^          ~~~~~
                        %ld
stat.c:24:26: warning: format '%d' expects argument of type 'int', but argument
2 has type '__nlink_t {aka long unsigned int}' [-Wformat=]
printf("No. of links : %d\n", file.st_nlink);
                        ~^          ~~~~~
                        %ld
root@alfarez-kuri:/home/alfarez# ./a.out stat.c
User id : 1000
Group id : 1000
Block size : 4096
Blocks allocated : 4096
Inode no. : 525594
Last Accessed : Sun Nov 24 21:57:47 2019
Last Modified : Sun Nov 24 21:57:39 2019
File Size. : 1359 bytes
No. of links : 1
Permissions : -rw-r--r--
File type : Regular
root@alfarez-kuri:/home/alfarez#
```

The image shows a Linux desktop environment with two windows open.

The left window is a terminal with the following content:

```
root@kayon-pc4: /home/kayon-pc4# gcc exec.c
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'
n / [-Wimplicit-function-declaration]
   wait(NULL);
   ^
root@kayon-pc4: /home/kayon-pc4# ./a.out /bin/ls ls
Child process
a.out: dirlist.c Downloads fork.c Music Public Templates wait.c
Desktop Documents exec.c latihan Pictures stat.c Videos
Child Terminated
root@kayon-pc4: /home/kayon-pc4# gcc dirlist.c
root@kayon-pc4: /home/kayon-pc4# ./a.out
Usage: ./a.out <dirname>
root@kayon-pc4: /home/kayon-pc4# ./a.out /bin/ls ls
Usage: ./a.out <dirname>
root@kayon-pc4: /home/kayon-pc4#
```

The right window is a text editor (Mousepad) showing the source code for `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);
}
```

At the bottom of the terminal window, there is a status bar that reads: "dirlist.c" (360 bytes) C source code.