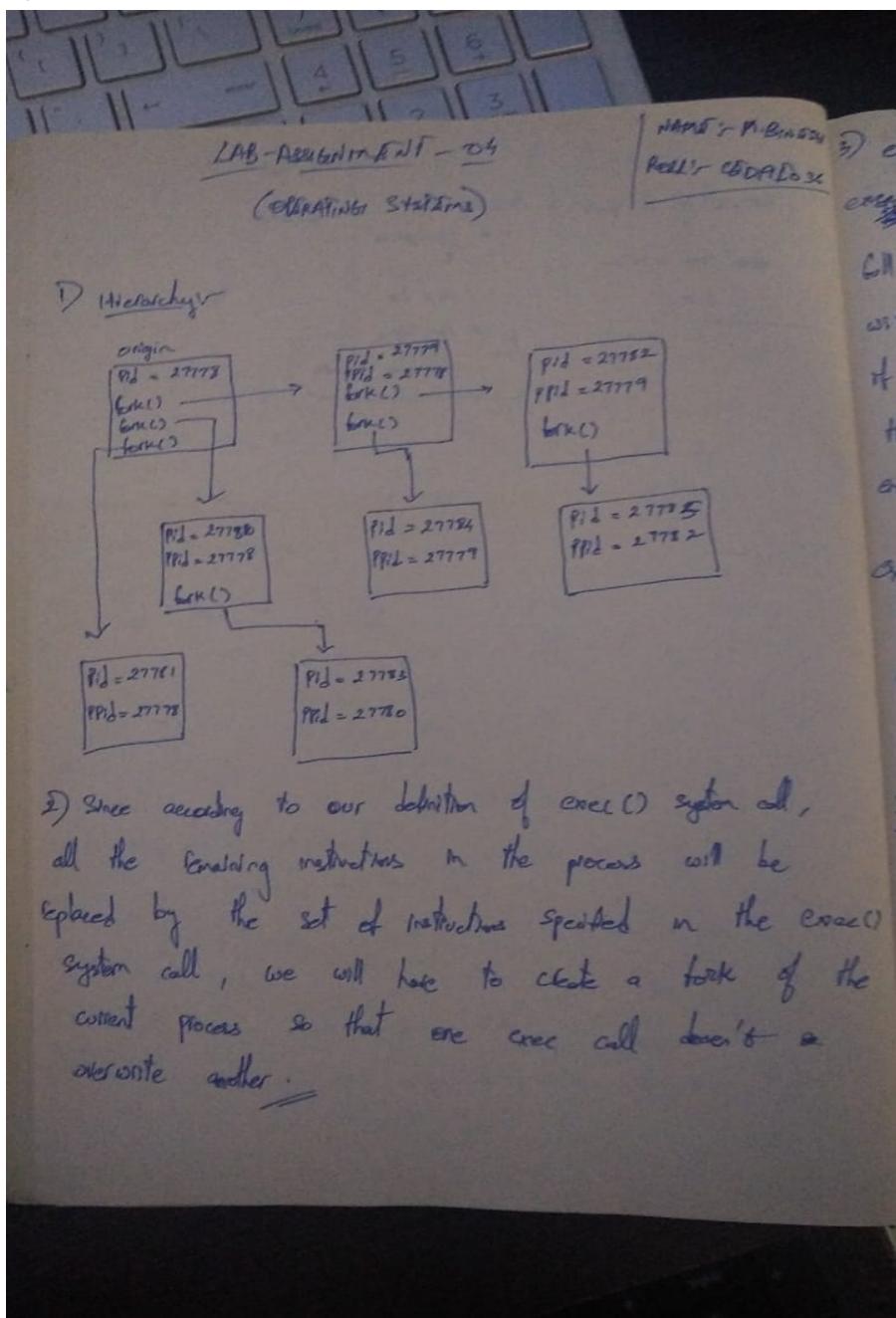


Lab Assignment - 4
(Operating Systems Practice)

Name: - M. Binesh
Roll : - CED19I036

1)



```
kurries@Beast:~/.../osp/lab4$ g++ 1.cpp && ./a.out
Origin: 27778
Parent: 27778 Child: 27780
Parent: 27778 Child: 27781
Parent: 27778 Child: 27779
Parent: 27779 Child: 27782
Parent: 27779 Child: 27784
Parent: 27782 Child: 27785
Parent: 27780 Child: 27783
kurries@Beast:~/.../osp/lab4$ 
```

2)

```
kurries@Beast:~/.../osp/lab4$ g++ CED19I036_Lab4_Q2.cpp && ./a.out
total 24
drwxrwxr-x 6 kurries kurries 4096 Aug 27 15:19 .
drwxrwxr-x 5 kurries kurries 4096 Aug 26 11:21 ..
drwxrwxr-x 3 kurries kurries 4096 Aug 11 12:24 lab1
drwxrwxr-x 2 kurries kurries 4096 Aug 15 21:00 lab2
drwxrwxr-x 2 kurries kurries 4096 Aug 24 21:28 lab3
drwxrwxr-x 2 kurries kurries 4096 Aug 29 23:12 lab4
systemd--ModemManager---2*[{ModemManager}]
  -NetworkManager---2*[{NetworkManager}]
  -accounts-daemon---2*[{accounts-daemon}]
  -acpid
  -atd
  -avahi-daemon---avahi-daemon
  -bluetoothd
  -boltld---2*[{boltld}]
  -colord---2*[{colord}]
  -cron
  -cups-browsed---2*[{cups-browsed}]
  -cupsd
  -dbus-daemon
    gdm3---gdm-session-wor---gdm-x-session---Xorg---9*[{Xorg}]
      2*[{gdm3}]
    2*[{gdm-session-wor}]
  -glances
  -gnome-keyring-d---3*[{gnome-keyring-d}]
  -irobalance---{irobalance}
  -2*[{gnome-session-b}]
    2*[{gnome-session-b}]
```

3)

execp() :-

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exec() :-
It does not use the PATH environment variable. So, the full path of the executable file is required to run it with exec(). execp() uses the PATH variable. So, if an executable file or command is available in the PATH, then the command or the filename is enough to run it.

exec() :-

In exec(), we can pass all the parameters in a null terminated array. The first element of the array should be the path of the executable file.

Syntax :- int execv(const char *path, char *const argv[]);

execvp() :-

Works the same way as exec() system call. But the PATH variable is used. So the full path is not required.

Syntax :- int execvp(const char *file, char *const argv[]);

```
osp > lab4 > CED19I036_Lab4_Q3.cpp > main()
1 #include <unistd.h>
2
3 int main()
4 {
5     char programName[] = "ls";
6     char arg1[] = "-lh";
7     char arg2[] = "/home/kurries/Desktop/sem/osp";
8
9     execlp(programName, programName, arg1, arg2, NULL);
10
11    return 0;
12 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
kurries@Beast:~/.../osp/lab4$ g++ CED19I036_Lab4_Q3.cpp && ./a.out
total 16K
drwxrwxr-x 3 kurries kurries 4.0K Aug 11 12:24 lab1
drwxrwxr-x 2 kurries kurries 4.0K Aug 15 21:00 lab2
drwxrwxr-x 2 kurries kurries 4.0K Aug 24 21:28 lab3
drwxrwxr-x 2 kurries kurries 4.0K Aug 29 23:17 lab4
kurries@Beast:~/.../osp/lab4$
```

```
osp > lab4 > CED19I036_Lab4_Q3.cpp > main(void)
1 #include <unistd.h>
2
3 int main(void) {
4     char binaryPath[] = "/bin/ls";
5     char directory[] = "/home/kurries/Desktop/sem/osp";
6     char options[] = "-lh";
7     char *args[] = {binaryPath, options, directory, NULL};
8
9     execv(binaryPath, args);
10
11    return 0;
12 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
kurries@Beast:~/.../osp/lab4$ g++ CED19I036_Lab4_Q3.cpp && ./a.out
total 16K
drwxrwxr-x 3 kurries kurries 4.0K Aug 11 12:24 lab1
drwxrwxr-x 2 kurries kurries 4.0K Aug 15 21:00 lab2
drwxrwxr-x 2 kurries kurries 4.0K Aug 24 21:28 lab3
drwxrwxr-x 2 kurries kurries 4.0K Aug 29 23:20 lab4
kurries@Beast:~/.../osp/lab4$
```

```
osp > lab4 > C CED19I036_Lab4_Q3.cpp > main(void)
1 #include <unistd.h>
2
3 int main(void) {
4     char programName[] = "ls";
5     char directory[] = "/home/kuries/Desktop/sem/osp";
6     char options[] = "-lh";
7     char *args[] = {programName, options, directory, NULL};
8
9     execvp(programName, args);
10
11     return 0;
12 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
kurries@Beast:~/.../osp/lab4$ g++ CED19I036_Lab4_Q3.cpp && ./a.out
total 16K
drwxrwxr-x 3 kurries kurries 4.0K Aug 11 12:24 lab1
drwxrwxr-x 2 kurries kurries 4.0K Aug 15 21:00 lab2
drwxrwxr-x 2 kurries kurries 4.0K Aug 24 21:28 lab3
drwxrwxr-x 2 kurries kurries 4.0K Aug 29 23:22 lab4
kurries@Beast:~/.../osp/lab4$
```

```
osp > lab4 > C CED19I036_Lab4_Q3.c > main(void)
1 #include <unistd.h>
2
3 int main(void) {
4     char *binaryPath = "/bin/bash";
5     char *const args[] = {binaryPath, "-c", "echo \"Visit $HOSTNAME:$PORT from your browser.\\"", NULL};
6     char *const env[] = {"HOSTNAME=www.google.com", "PORT=8080", NULL};
7
8     execve(binaryPath, args, env);
9
10    return 0;
11 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
kurries@Beast:~/.../osp/lab4$ gcc CED19I036_Lab4_Q3.c && ./a.out
Visit www.google.com:8080 from your browser.
```

execve():-

(NAME) → A. Binary
(ROLL) → C0195026
We can provide our own environment variables along with other arguments used in execve().

Syntax:- int execve (const char *file,

char *const argv[],
char *const envp[]);

wait():-

The wait() system call suspends execution of the current process until one of its children terminates.

The call $\# wait(8, status) \cong waitpid(1, &status, 0)$;

waitpid():-

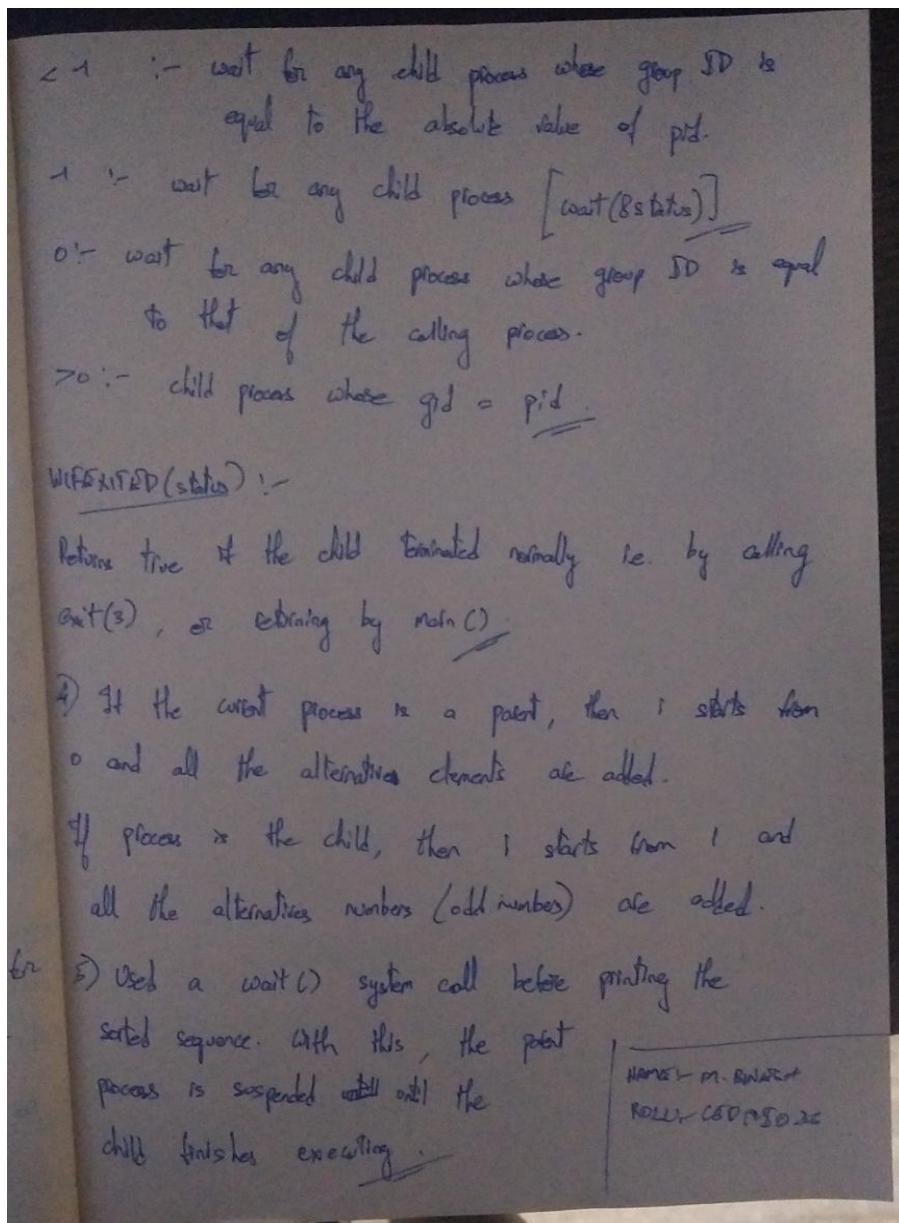
The waitpid() system call suspends the execution of the current process until a child specified by pid argument has changed state. By default, waitpid() waits only for terminated children, but this behaviour can be modified with ~~so an optional argument~~ options.

```
osp > lab4 > C CED19I036_Lab4_Q3.c > main()
1 #include<stdio.h>
2 #include <unistd.h>
3 #include<stdlib.h>
4 #include<sys/wait.h>
5
6 int main() {
7     pid_t pid;
8     int res;
9
10    pid = fork();
11
12    if (pid == 0)
13    {
14        printf("child\n");
15        exit(3);
16    }
17
18    pid = wait(&res);
19    printf("raw res=%d\n", res);
20
21    if (WIFEXITED(res))
22        printf("exit status = %d\n", WEXITSTATUS(res));
23    return 0;
24 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
kurries@Beast:~/.../osp/lab4$ gcc CED19I036_Lab4_Q3.c && ./a.out
child
raw res=768
exit status = 3
kurries@Beast:~/.../osp/lab4$
```

3, 4 and 5



4)

```
PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

kuries@Beast:~/.../osp/lab4$ g++ CED19I036_Lab4_Q4.cpp && ./a.out
Enter a number: 7
Even: 12
Odd: 16
kuries@Beast:~/.../osp/lab4$
```

5)

```
kuries@Beast:~/.../osp/lab4$ g++ CED19I036_Lab4_Q5.cpp && ./a.out
Enter Numbers:2 4 5 3 7 6 8 1 9 0
Descending: 9 8 7 6 5 4 3 2 1 0
Ascending: 0 1 2 3 4 5 6 7 8 9
kuries@Beast:~/.../osp/lab4$
```