EX. NO:5
DATE: 12.02.2025

System Calls Programming

Aim:

To experiment system calls using fork(), execlp() and pid() functions.

Algorithm:

1. Start o Include the required header files (stdio.h and stdlib.h).
2. Variable Declaration o Declare an integer variable pid to hold the process ID.
3. Create a Process o Call the fork() function to create a new process. Store the return value in the pid variable:

If fork() returns:
-1: Forking failed (child process not created).
0: Process is the child process.
Positive integer: Process is the parent process.

4. Print Statement Executed Twice o Print the statement:

scss
Copy code
THIS LINE EXECUTED TWICE
(This line is executed by both parent and child processes after fork()).

5. Check for Process Creation Failure o If pid == -1:

Print:
Copy code
CHILD PROCESS NOT CREATED
Exit the program using exit(0).

6. Child Process Execution o If pid == 0 (child process):

Print:
Process ID of the child process using getpid().
Parent process ID of the child process using getppid().

7. Parent Process Execution

o If pid > 0 (parent process):
Print:
Process ID of the parent process using getpid().
Parent's parent process ID using getppid().

8. Final Print Statement o Print the statement:
objectivec

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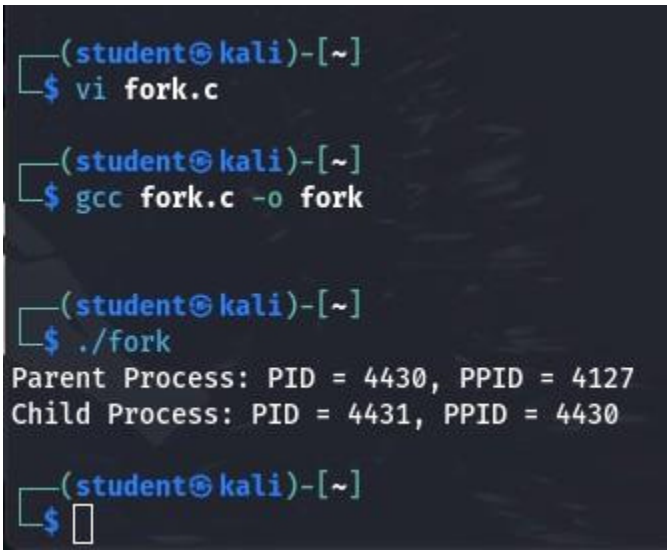
Copy code
IT CAN BE EXECUTED TWICE
(This line is executed by both parent and child processes).

9. End

Program: fork()




```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h> int
main() {
        int pid = fork();          if (pid == -1) {
printf("CHILD PROCESS NOT CREATED\n");
exit(0);
        }
        if (pid == 0) {
        printf("Child Process: PID = %d, PPID = %d\n", getpid(), getppid());
```

```
        } else {
        printf("Parent Process: PID = %d, PPID = %d\n", getpid(), getppid());
        }
        return 0;
}
```

execlp()

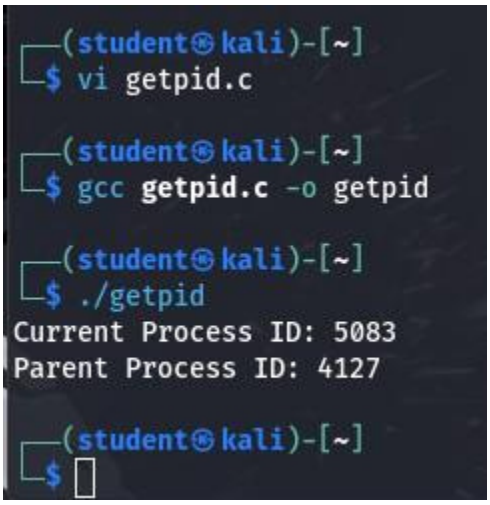
```
┌──(student㉿kali)-[~]
└─$ vi execlp.c

┌──(student㉿kali)-[~]
└─$ gcc execlp.c -o execlp

┌──(student㉿kali)-[~]
└─$ ./execlp
Before execlp()
total 184
drwxr-xr-x 2 student student  4096 Aug  6  2024 Desktop
drwxr-xr-x 2 student student  4096 Oct  1 09:18 Documents
drwxr-xr-x 3 student student  4096 Nov 12 08:52 Downloads
drwxr-xr-x 2 student student  4096 Jul 30  2024 Music
drwxr-xr-x 3 student student  4096 Oct 29 13:37 Pictures
drwxr-xr-x 2 student student  4096 Jul 30  2024 Public
drwxr-xr-x 2 student student  4096 Jul 30  2024 Templates
drwxr-xr-x 2 student student  4096 Jul 30  2024 Videos
-rw-rw-r-- 1 student student   348 Oct 29 13:28 WebScarab.properties
-rw------- 1 student student  2655 Aug  2  2024 arsath
-rw-r--r-- 1 student student   566 Aug  2  2024 arsath.pub
-rw-rw-r-- 1 student student   140 Feb  1 18:32 calc
-rw-rw-r-- 1 student student   131 Feb  1 18:37 calc.sh
-rw------- 1 student student    56 Feb  5 13:24 emp.dat.save
-rwxrwxr-x 1 student student 16008 Feb 12 08:55 execlp
-rw-rw-r-- 1 student student   354 Feb 12 08:55 execlp.c
-rwxrwxr-x 1 student student 16200 Feb 12 08:45 fork
-rw-rw-r-- 1 student student   490 Feb 12 08:45 fork.c
-rw-rw-r-- 1 student student    33 Aug 23 10:58 hashes.txt
-rw-rw-r-- 1 student student     0 Oct  1 09:03 hello.c
-rwxrwxr-x 1 student student 15960 Oct  1 09:09 helloworld
-rw-rw-r-- 1 student student    81 Oct  1 09:06 helloworld.c
-rw-r--r-- 1 student student   566 Aug  6  2024 helloworld.pub
-rw-rw-r-- 1 student student    12 Aug 13  2024 hi
-rw-rw-r-- 1 student student     0 Aug 13  2024 idrsa.hash
-rw-rw-r-- 1 student student 22727 Aug  6  2024 index.html
-rwxrwxr-x 1 student student 16400 Oct  1 09:24 injector
-rw-rw-r-- 1 student student  2063 Oct  1 09:24 injector.c
-rw-rw-r-- 1 student student     3 Aug 13  2024 rockyou.txt
-rw-rw-r-- 1 student student     7 Oct  1 09:50 shellcode.bin
```

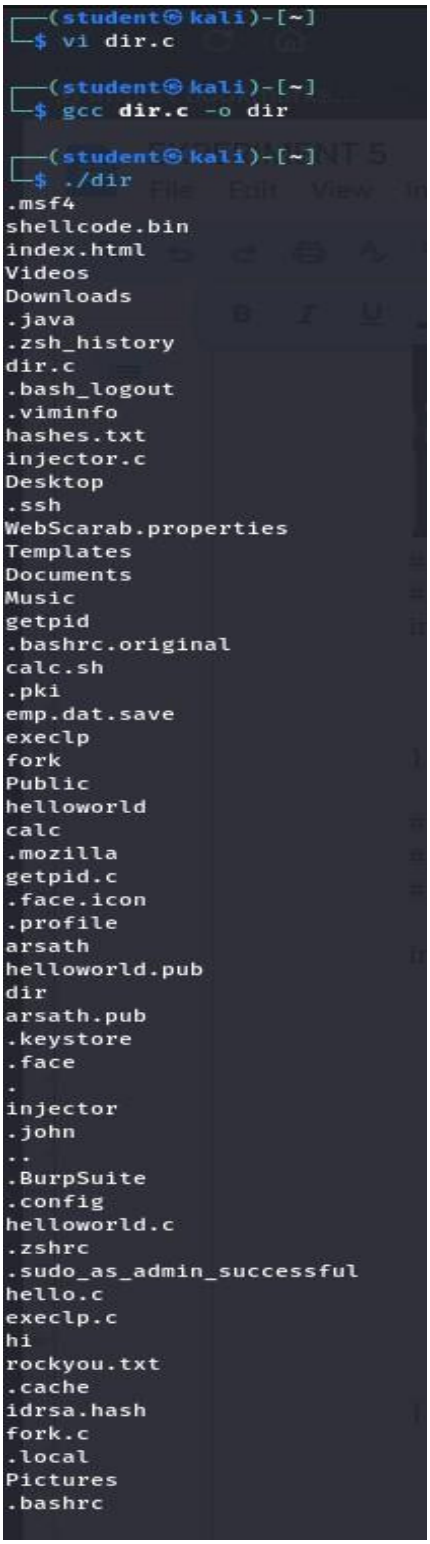
```
#include <stdio.h>
#include <stdlib.h> #include <unistd.h> int main() {            printf("Before execlp()\n"); // Step 1: Print initial message execlp("ls", "ls", "-l", NULL); // Step 2: Execute "ls -l" command        printf("This will not be printed if execlp() succeeds.\n"); // Step 3: This line is never executed if execlp() works
        return 0;
}
```

getpid()



#include <stdio.h> #include <unistd.h> int main() { printf("Current Process ID: %d\n", getpid()); // Step 1: Get current PID printf("Parent Process ID: %d\n", getppid()); // Step 2: Get parent process ID return 0;
}

opendir() and readdir()




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

```
int main() {       struct
dirent *de;
        DIR *dr = opendir("."); // Step 1: Open current
directory        if (dr == NULL) { // Step 2: Check for failure
printf("Could not open current directory\n");            return 0;
        }
        while ((de = readdir(dr)) != NULL) // Step 3: Read directory
entries            printf("%s\n", de->d_name);            closedir(dr); // Step 4:
Close directory
        return 0;
}
```

Result:

Hence, system calls are executed successfully.