LAB-3 Operating System

Name : Sagnik Chatterjee

SEC : D

ROLL No : 61

Sem : 5

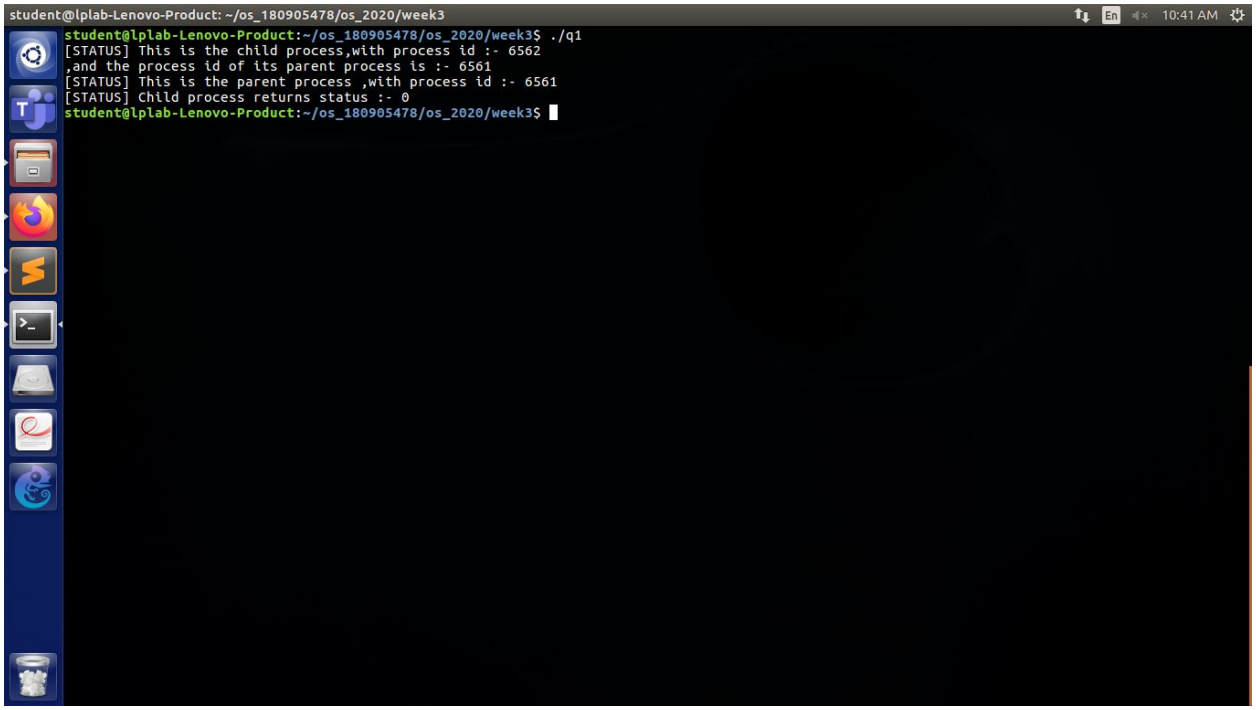
Q1. C program to block a parent process until the child completes using a wait system call .

Code :

```
/*
AUTHOR: SAGNIK CHATTERJEE
DATE : DEC 11,2020
Usage : ./q1

*/

#include <stdio.h>
#include <stdlib.h>
#include <sys/wait.h>
#include <unistd.h>

int main(){
   int status;
   pid_t pid;
   pid=fork();

   //printf("The process id of the parent process is %d",getpid());
   //printf("The process id of the child process is %d",pid);

   if(pid==-1){
         printf("[ERROR] Couldn't create child process !!\n");
   }
   else if(pid==0){
         printf("[STATUS] This is the child process,with process id :- %d\n,and the
process id of its parent process is :- %d\n",getpid(),getppid());
         exit(0);
   }
   else {
         wait(&status);
         printf("[STATUS] This is the parent process ,with process id :- %d\n",getpid());
         printf("[STATUS] Child process returns status :- %d\n",status);
   }
```

```
    return 0;
    }
```

Screenshot :



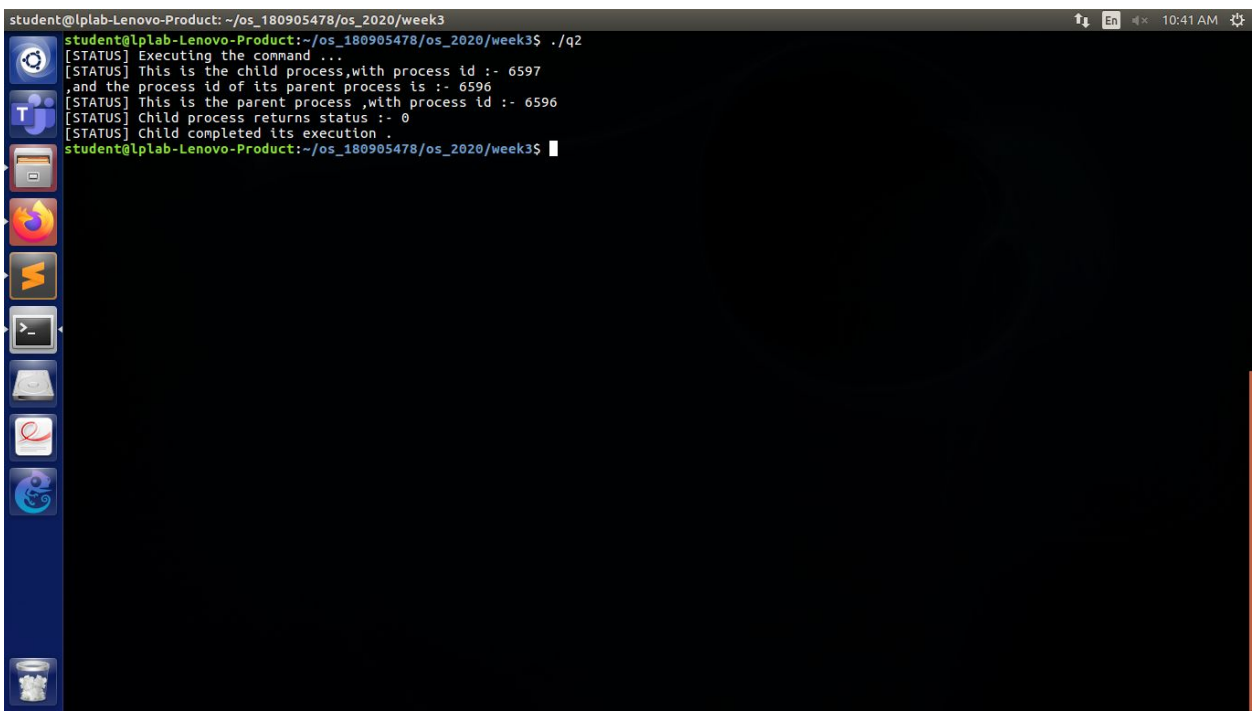
Q2. C program to load the binary executable of the previous program in a child process using exec system call.

Code:

```
/*
AUTHOR :SAGNIK CHATTERJEE
DATE : DEC 11 ,2020
USAGE : ./q2
*/

#include <stdio.h>
#include <stdlib.h>
#include <sys/wait.h>

int main(){
    int status;
    pid_t pid;
    pid=fork();
```

```
    if(pid<0){
       printf("[ERROR] Child could not be created!\n ");
       exit(-1);
    }

    else if(pid==0){
       printf("[STATUS] Executing the command ...\n");
       execlp("./q1","q1",NULL);
    }
    else{
       wait(NULL);
       printf("[STATUS] Child completed its execution .\n");
       exit(0);
    }
}
```

Screenshot:



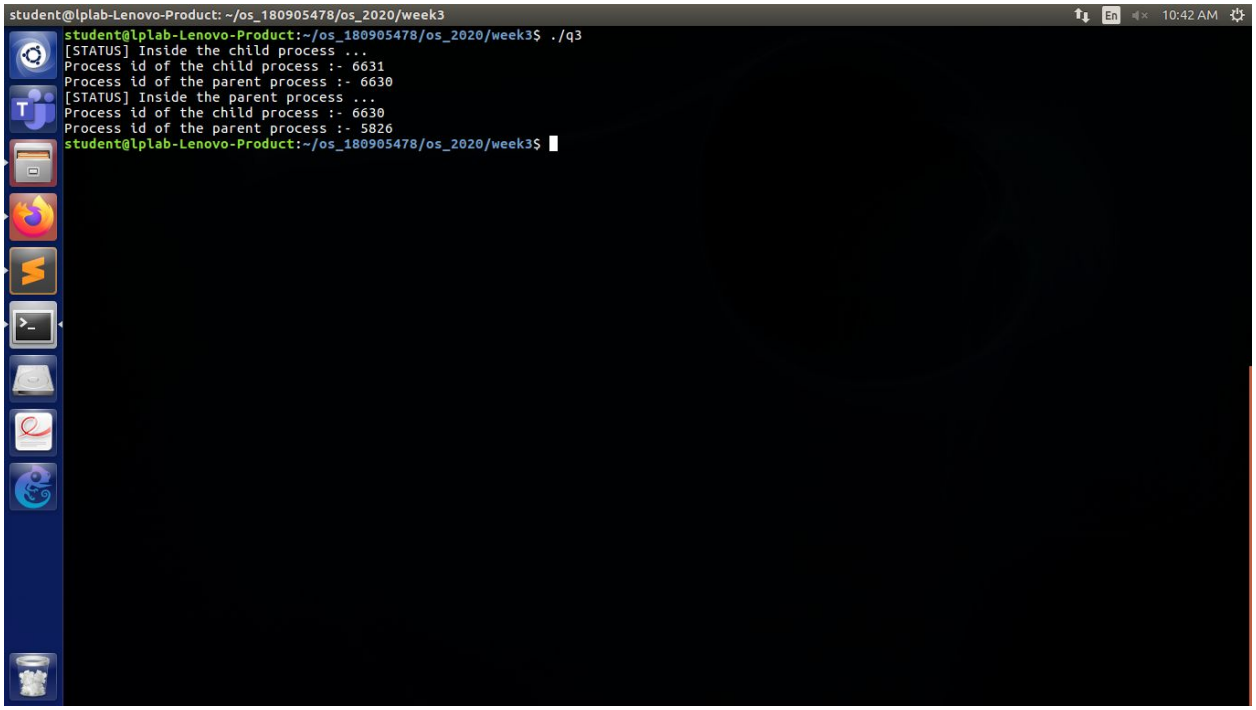
Q3. Program to create a child process.Display the process ids of the process , the parent and the child in both the parent and the child processes.

Code:

```
/*
```

```
AUTHOR : SAGNIK CHATTERJEE
DATE   : DEC 11,2020
USAGE  : ./q3

*/
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
#include <stdlib.h>

int main(){
    pid_t pid;

    pid=fork();
    if(pid==-1){
      printf("[ERROR] Child could not be created!\n");
      exit(-1);
    }
    else if(pid==0){
      //process ids of both parent and child when pid==0 i.e child
process
      printf("[STATUS] Inside the child process ...\n");
      printf("Process id of the child process :- %d\n",getpid());
      printf("Process id of the parent process :- %d\n",getppid());

    }
    else {
      wait(NULL);//wait for child process to finish
      //process ids of both parent and child when pid >0 i.e parent
process
      printf("[STATUS] Inside the parent process ...\n");
      printf("Process id of the child process :- %d\n",getpid());
      printf("Process id of the parent process :- %d\n",getppid());

    }
    return 0;
}
```

Screenshot:



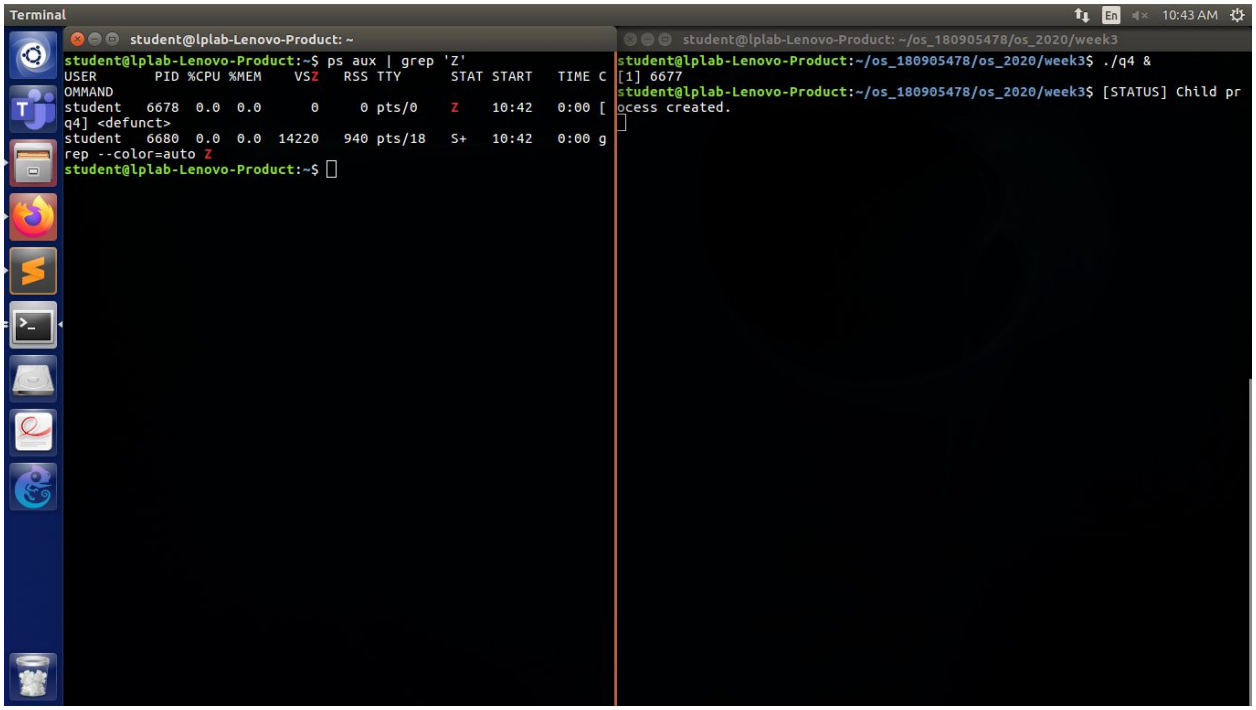
Q4. Create a zombie process and then show the output using ps command .(for showing the defunct process)

Code :

```
/*
AUTHOR : SAGNIK CHATTERJEE
DATE : DEC 11,2020
USAGE : ./q4 & in one terminal to start the defunct process in the background
and in anohter terminal check using
ps aux | grep 'Z'


*/


#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/types.h>
#include <sys/wait.h>
```

```
//creating a zombie process

int main(){
    pid_t pid;
    int status;

    pid=fork();
    if(pid<0){
      perror("[STATUS] Child process could not be created .\n");
      exit(-1);
    }
    //creating a child process
    if(pid==0){
      printf("[STATUS] Child process created.\n");
      exit(0);
    }
    //since for this pid >0 so parent process
    sleep(100);
    //parent sleeps for 70s hence cant call the wait process
    //child already exited but its process id is still in the process
table

    //pid=wait(&status);
    if(WIFEXITED(status)){//to know the exit status of the child
      fprintf(stderr,"[STATUS] [%d] Process %d exited with status
%d.\n",
           getpid(),pid,WEXITSTATUS(status));
      //wexitstatus is fot obtaining the exit  status of the child
process.
    }
    return 0;
}
```

Screenshot :


Terminal
10:43 AM
student@lplab-Lenovo-Product: ~
student@lplab-Lenovo-Product:~$ ps aux | grep 'Z'
USER PID %CPU %MEM VSZ RSS TTY STAT START TIME C
OMMAND
student 6678 0.0 0.0 0 0 pts/0 Z 10:42 0:00 [
q4] <defunct>
student 6680 0.0 0.0 14220 940 pts/18 S+ 10:42 0:00 g
rep --color=auto Z
student@lplab-Lenovo-Product:~$
student@lplab-Lenovo-Product: ~/os_180905478/os_2020/week3
student@lplab-Lenovo-Product:~/os_180905478/os_2020/week3$ ./q4 &
[1] 6677
student@lplab-Lenovo-Product:~/os_180905478/os_2020/week3$ [STATUS] Child pr
ocess created.