OS Lab 3

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

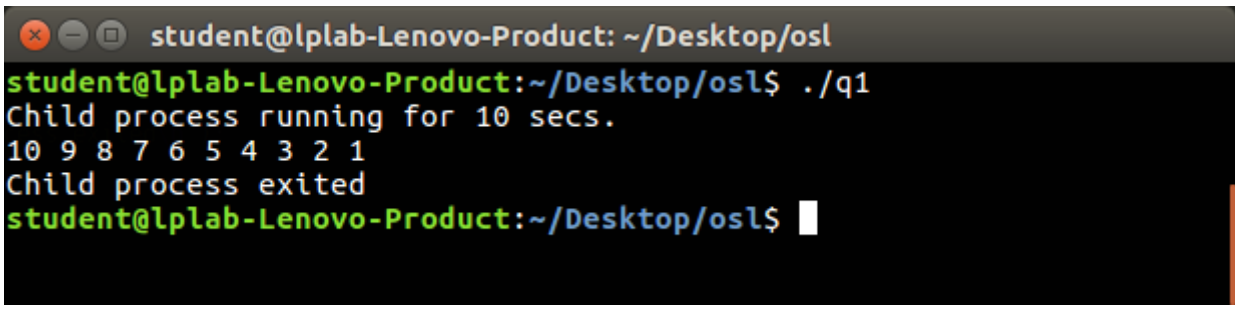
```
#include <unistd.h> // unix std lib
#include <sys/types.h> // for pid_t
#include <sys/wait.h> // for wait(int*)
#include <stdio.h>
#include <stdlib.h>

void main () {
      pid_t pid = fork();

      if (pid < 0) {
            printf("Fork failed\n");
            exit(-1);
      } else if (pid == 0) {
            int secs = 10;
            printf("Child process running for %d secs.\n", secs);

            for (int i = secs; i > 0 ; i--) {
                  printf("%d ", i); fflush(stdout);
                  sleep(1);
            }

            printf("\n");
            exit(0);
      } else {
            wait(NULL);
            printf("Child process exited\n");
            exit(0);
      }
}
```

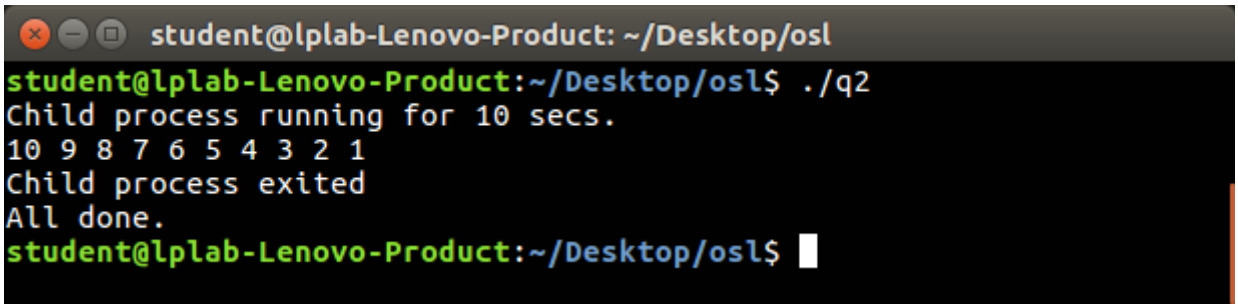


Q2. Write a C program to load the binary executable of the previous program in a child process using the exec system call.

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

void main() {
      pid_t pid = fork();

      if (pid < 0) {
            printf("Fork failed\n");
            exit(-1);
      } else if (pid == 0) {
            execvp("./q1", NULL);
            exit(0);
      } else {
            wait(NULL);
            printf("All done.\n");
            exit(0);
      }
}
```



Q3. Write a program to create a chiled process. Display the process IDs of the process, parent and child (if any) in both parent and child processes.

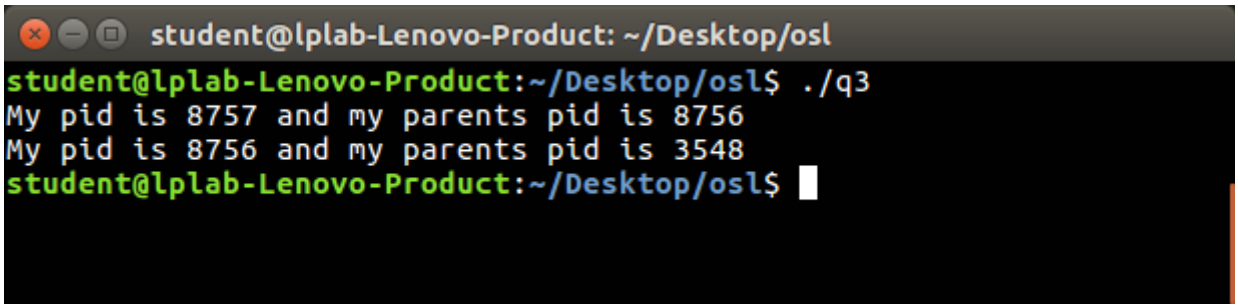
```
#include <unistd.h>
#include <sys/types.h>
#include <sys/wait.h>
#include <stdio.h>
#include <stdlib.h>

void main() {

      pid_t pid = fork();

      if (pid < 0) {
            printf("Fork failed\n");
            exit(-1);
      }

      // no need of if condition as only the parent will wait
      // the child will call printf before the parent always
      wait(NULL);
      printf("My pid is %d and my parents pid is %d\n", getpid(), getppid());
      exit(0);
}
```



Q4. Create a orphan child process and allow init process to adopt it (after parent terminates).

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

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

      if (pid < 0) {
            printf("Fork failed\n");
            exit(-1);
      } else if (pid == 0) {
            printf("Old Parent ID: %d\n", getppid());
            sleep(2);
            printf("New Parent ID: %d\n", getppid());
            exit(0);
      } else {
            sleep(1);
      }
}
```