

Question 9 [6 Points]

Write a C program to demonstrate zombie process prevention.

- Create multiple child processes
- Ensure terminated child processes do not remain zombies
- Parent process should print the PID of each child it cleans upUse fork(), wait(), or waitpid().

Script:

```
$ bg_move.sh      file3.txt    C zombie_prevention.c ×

Question9 > C zombie_prevention.c

1 #include <stdio.h>
2 #include <stdlib.h>
3 #include <unistd.h>
4 #include <sys/wait.h>
5
6 int main() {
7     int i;
8     pid_t pid;
9     int status;
10
11     printf("Parent process started. PID = %d\n", getpid());
12
13     // Create multiple child processes
14     for (i = 0; i < 3; i++) {
15         pid = fork();
16
17         if (pid < 0) {
18             // Fork failed
19             perror("fork failed");
20             exit(1);
21         }
22
23         if (pid == 0) {
24             // Child process
25             printf("Child %d created. PID = %d, Parent PID = %d\n",
26                   i + 1, getpid(), getppid());
27             sleep(2); // Simulate some work
28             exit(0); // Child terminates
29         }
30     }
31
32     // Parent process waits for all children
33     while ((pid = wait(&status)) > 0) {
34         printf("Parent cleaned up child with PID = %d\n", pid);
35     }
36
37     printf("All child processes cleaned up. No zombies remain.\n");
38     return 0;
39 }
40
```

Outcome:

```
● sudhanshu@Sudhanshus-MacVati Graded Lab Assignment – (Modules 5–10) % cd Question9
● sudhanshu@Sudhanshus-MacVati Question9 % ls
  ~$estion 9.docx      Question 9.docx      zombie_prevention.c
● sudhanshu@Sudhanshus-MacVati Question9 % gcc zombie_prevention.c -o zombie_prevention
● sudhanshu@Sudhanshus-MacVati Question9 % ./zombie_prevention
Parent process started. PID = 4872
Child 1 created. PID = 4873, Parent PID = 4872
Child 2 created. PID = 4874, Parent PID = 4872
Child 3 created. PID = 4875, Parent PID = 4872
Parent cleaned up child with PID = 4874
Parent cleaned up child with PID = 4875
Parent cleaned up child with PID = 4873
All child processes cleaned up. No zombies remain.
○ sudhanshu@Sudhanshus-MacVati Question9 %
```