

A screenshot of the Visual Studio Code (VS Code) interface. The title bar shows "File Edit Selection View Go Run Terminal Help" and "Lab4". The left sidebar has icons for Explorer, Search, Open, and Outline. The Explorer panel shows a project structure with a folder "LAB4" containing ".vscode", "random", and "random.cpp". The "random.cpp" file is selected and shown in the main editor area. The code implements a fork operation to demonstrate process creation and identification.

```
1 #include <stdio.h>
2 #include <unistd.h>
3 #include <sys/types.h>
4 #include <sys/wait.h>
5 #include <stdlib.h>
6
7 int main()
8 {
9     system("date");
10    pid_t pid = fork();
11
12    if(pid < 0)
13    {
14        printf("Fork failed\n");
15        return 1;
16    }
17    else if(pid == 0)
18    {
19        // Child Process
20        printf("Child Process\n");
21        printf("Child PID: %d\n", getpid());
22        printf("Child Parent PID: %d\n", getppid());
23        exit(0);
24    }
25    else
26    {
27        // Parent Process
28        wait(NULL); // wait for child
29
30        printf("\nParent Process\n");
31        printf("Parent PID: %d\n", getpid());
32        printf("Parent Parent PID: %d\n", getppid());
33    }
34
35    return 0;

```

The terminal below the editor shows the execution output:

```
Thu Feb  5 15:07:17 IST 2026
Child Process
Child PID: 232713
Child Parent PID: 232702

Parent Process
Parent PID: 232702
Parent Parent PID: 232665
[1] + Done          "/usr/bin/gdb" --interpreter=mi --tty=${DbgTerm} 0<"/tmp/Microsoft-MIEngine-In-yv4wltmw.4fj" 1>"/tmp/Microsoft-MIEngine-Out-re5gad5f.y3j"
```

The status bar at the bottom indicates "Ln 11, Col 1 Spaces: 4 UTF-8 LF {} C++ Linux".

File Edit Selection View Go Run Terminal Help Q Lab4

EXPLORER ... q1.c q2.c X

LAB4 .vscode q1 q1.c q2 q2.c

C q2.c > main()

```
1 #include <stdio.h>
2 #include <unistd.h>
3 #include <sys/wait.h>
4 #include <stdlib.h>
5
6 int main()
7 {
8     system("date");
9     pid_t pid = fork();
10    if(pid == 0)
11    {
12        // child runs previous program
13        execl("./q1", "q1", NULL);
14
15        // runs only if exec fails
16        perror("Exec failed");
17        exit(1);
18    }
19    else
20    {
21        wait(NULL);
22        printf("Parent finished\n");
23    }
24
25    return 0;
26 }
27
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

Thu Feb 5 15:22:26 IST 2026

Child Process

Child PID: 285482

Child Parent PID: 285479

Parent Process

Parent PID: 285479

Parent Parent PID: 285472

Parent finished

[1] + Done "/usr/bin/gdb" --interpreter=mi --tty=\${DbgTerm} 0<"/tmp/Microsoft-MIEngine-In-c0agkrsq.0w0" 1>"/tmp/Microsoft-MIEngine-Out-m4xvuw2w.dfk"

4ITA2@debian:~/krtin_240911550/Lab4\$

Tab Moves Focus Ln 8, Col 20 Spaces: 4 UTF-8 LF () C Linux

C/C++: ... cppdbg: ra... cppdbg: q1 cppdbg: q2

The screenshot shows a Visual Studio Code (VS Code) interface with the following details:

- File Menu:** File, Edit, Selection, View, Go, Run, Terminal, Help.
- Search Bar:** Q Lab4
- Explorer Bar:** Shows a project structure under LAB4 with files .vscode, q1.c, q2.c, and q3.c. q3.c is currently selected.
- Code Editor:** Displays the content of q3.c. The code is as follows:

```
1 #include <stdio.h>
2 #include <unistd.h>
3 #include <stdlib.h>
4 #include <sys/wait.h>
5
6 int main()
7 {
8     system("date");
9     pid_t pid = fork();
10
11    if(pid == 0)
12    {
13        printf("Child exiting...\n");
14        exit(0);
15    }
16    else
17    {
18        printf("Parent sleeping...\n");
19        sleep(30); // gives time to check zombie
20    }
21
22    return 0;
23}
24
```

- Terminal:** Shows the output of the program execution. The terminal tab is selected.

```
Thu Feb  5 15:27:00 IST 2026
Parent sleeping...
Child exiting...
^C
4ITA2@debian:~/krtin_240911550/Lab4$
```

- Bottom Status Bar:** Tab Moves Focus, Ln 24, Col 1, Spaces: 4, UTF-8, LF, (1) C, Linux.

File Edit Selection View Go Run Terminal Help Q Lab4

EXPLORER ... q1.c q2.c q3.c q4.c

LAB4 .vscode a.out q1 q1.c q2 q2.c q3 q3.c q4 q4.c

C q4.c > main()

```
31 void* selection(void* arg)
32 {
33     int n;
34     for(int i=0;i<n-1;i++)
35     {
36         int min=i;
37         for(int j=i+1;j<n;j++)
38             if(arr2[j] < arr2[min])
39                 min=j;
40
41         int t=arr2[i];
42         arr2[i]=arr2[min];
43         arr2[min]=t;
44     }
45
46
47     clock_t end = clock();
48     printf("Selection Sort Time: %lf\n",
49           (double)(end-start)/CLOCKS_PER_SEC);
50
51     pthread_exit(NULL);
52 }
53
54 int main()
55 {
56     pthread_t t1,t2;
57     system("date");
58     printf("Enter number of elements: ");
59     scanf("%d",&n);
60
61     for(int i=0;i<n;i++)
62     {
63         scanf("%d",&arr1[i]);
64         arr2[i]=arr1[i];
65     }
66 }
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS + ... C/C++: ...

Thu Feb 5 15:50:26 IST 2026
Enter number of elements: 4
9 8 7 6
Bubble Sort Time: 0.000001
Selection Sort Time: 0.000002
Final Sorted Array:
6 7 8 9 [1] + Done

/usr/bin/gdb --interpreter=mi --tty=\${DbgTerm} 0</tmp/Microsoft-MIEngine-In-gwf0unk.qkg" 1>/tmp/Microsoft-MIEngine-Out-p5wzhyww.z2f

4ITA2@debian:~/krtin_240911550/Lab4\$

OUTLINE TIMELINE

Tab Moves Focus Ln 57, Col 20 Spaces: 4 UTF-8 LF () C Linux

File Edit Selection View Go Run Terminal Help ← → Q Lab4

EXPLORER ... C q1.c C q2.c C q3.c C q4.c C q5.c X

LAB4 > .vscode > a.out > q1 > q1.c > q2 > q2.c > q3 > q3.c > q4 > q4.c > q5 > q5.c

```
C q5.c > main()
1 #include <stdio.h>
2 #include <pthread.h>
3 #include <stdlib.h>
4
5 int fib[100];
6 int n;
7
8 void* generate(void* arg)
{
9     fib[0]=0;
10    fib[1]=1;
11
12    for(int i=2;i<n;i++)
13        fib[i]=fib[i-1]+fib[i-2];
14
15    pthread_exit(NULL);
16 }
17
18 int main()
19 {
20     pthread_t t;
21     system("date");
22     printf("Enter number of terms: ");
23     scanf("%d",&n);
24
25     pthread_create(&t,NULL,generate,NULL);
26     pthread_join(t,NULL);
27
28     printf("Fibonacci Series:\n");
29     for(int i=0;i<n;i++)
30         printf("%d ",fib[i]);
31
32     return 0;
33 }
34
35
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS + - X

Thu Feb 5 15:54:26 IST 2026
Enter number of terms: 6
Fibonacci Series:
0 1 1 2 3 5 [1] + Done

/usr/bin/gdb --interpreter=mi --tty=\${DbgTerm} 0</tmp/Microsoft-MIEngine-In-ghmrs3go.wxl" 1>/tmp/Microsoft-MIEngine-Out-q3dxgrov.erf

4ITA2@debian:~/krtin_240911550/Lab4\$

C/C++: ... Cppdbg: ra... Cppdbg: q1 Cppdbg: q2 Cppdbg: q3 Cppdbg: q4 Cppdbg: q5

OUTLINE TIMELINE Tab Moves Focus Ln 22, Col 5 Spaces: 4 UTF-8 LF () C Linux