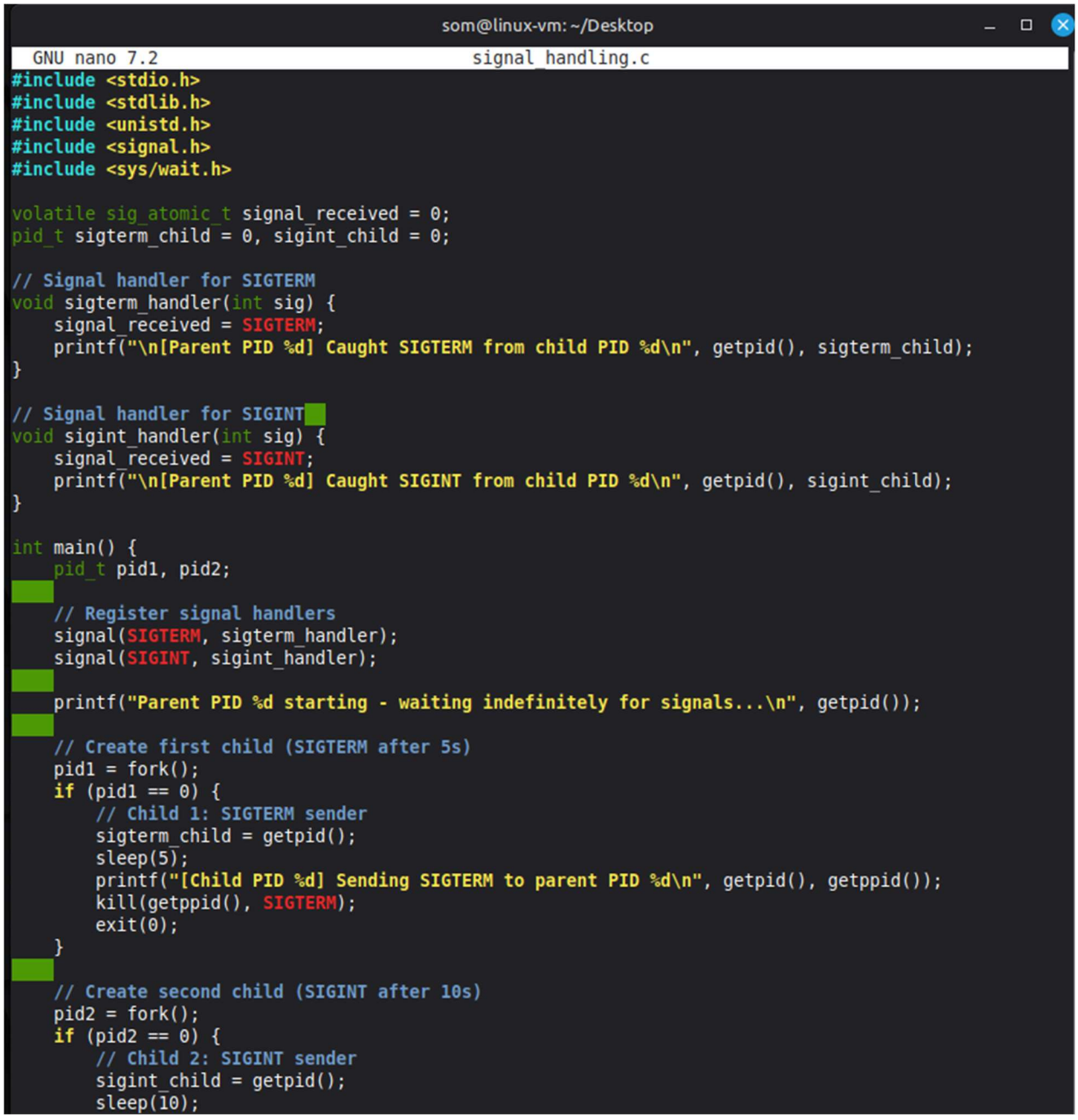
**Question 10 (2024eb03003):**

Please find screenshot of C program below and attaching **signal_handling.c** code to GitHub repository:



```
        printf("[Child PID %d] Sending SIGINT to parent PID %d\n", getpid(), getppid());
        kill(getppid(), SIGINT);
        exit(0);
    }

    // Parent runs indefinitely, handling signals
    while (1) {
        pause();  // Wait for signals

        if (signal_received == SIGTERM) {
            printf("[Parent] Handling SIGTERM: cleaning up child %d\n", pid2);
            kill(pid2, SIGTERM);  // Terminate remaining child
            break;
        }
        else if (signal_received == SIGINT) {
            printf("[Parent] Handling SIGINT: cleaning up child %d\n", pid1);
            kill(pid1, SIGTERM);  // Terminate remaining child
            break;
        }
    }

    // Cleanup: wait for children
    int status;
    waitpid(pid1, &status, 0);
    waitpid(pid2, &status, 0);

    printf("[Parent PID %d] Exiting gracefully after signal handling\n", getpid());
    return 0;
}

^G Help       ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo
^X Exit       ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^/ Go To Line M-E Redo
```

**Testing the signal_handling.c code**

**<u>Test Case:</u>**

Compile the c program by running below command

gcc signal_handling.c -o signal_handling

./signal_handling

```
som@linux-vm: ~/Desktop
som@linux-vm:~/Desktop$ gcc signal_handling.c -o signal_handling
som@linux-vm:~/Desktop$ ./signal_handling
Parent PID 8090 starting - waiting indefinitely for signals...
[Child PID 8091] Sending SIGTERM to parent PID 8090

[Parent PID 8090] Caught SIGTERM from child PID 8091
[Parent] Handling SIGTERM - cleaning up SIGINT child 8092

[Parent PID 8092] Caught SIGTERM from child PID 8091
[Child PID 8092] Sending SIGINT to parent PID 8090

[Parent PID 8090] Caught SIGINT from child PID 8092
[Parent PID 8090] Exited gracefully after signal handling
som@linux-vm:~/Desktop$
```

Validation Complete: The C program successfully:

The program demonstrates:

- Indefinite parent execution (pause())
- Timed child signal transmission (sleep() + kill())
- Correct PID tracking in handlers (fixed from 0 → actual PIDs)
- Distinct SIGTERM/SIGINT handling
- Graceful termination with child cleanup (waitpid())