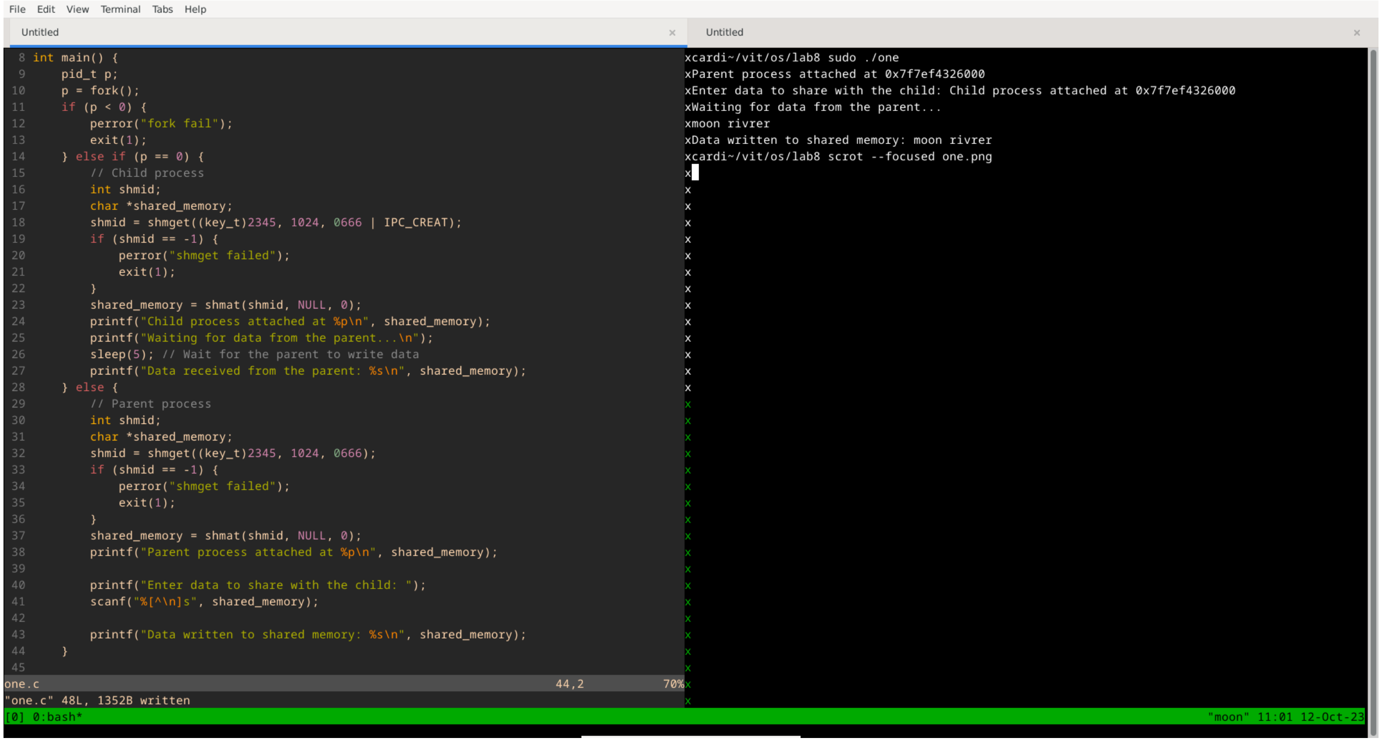
$22bps1059$

$first$

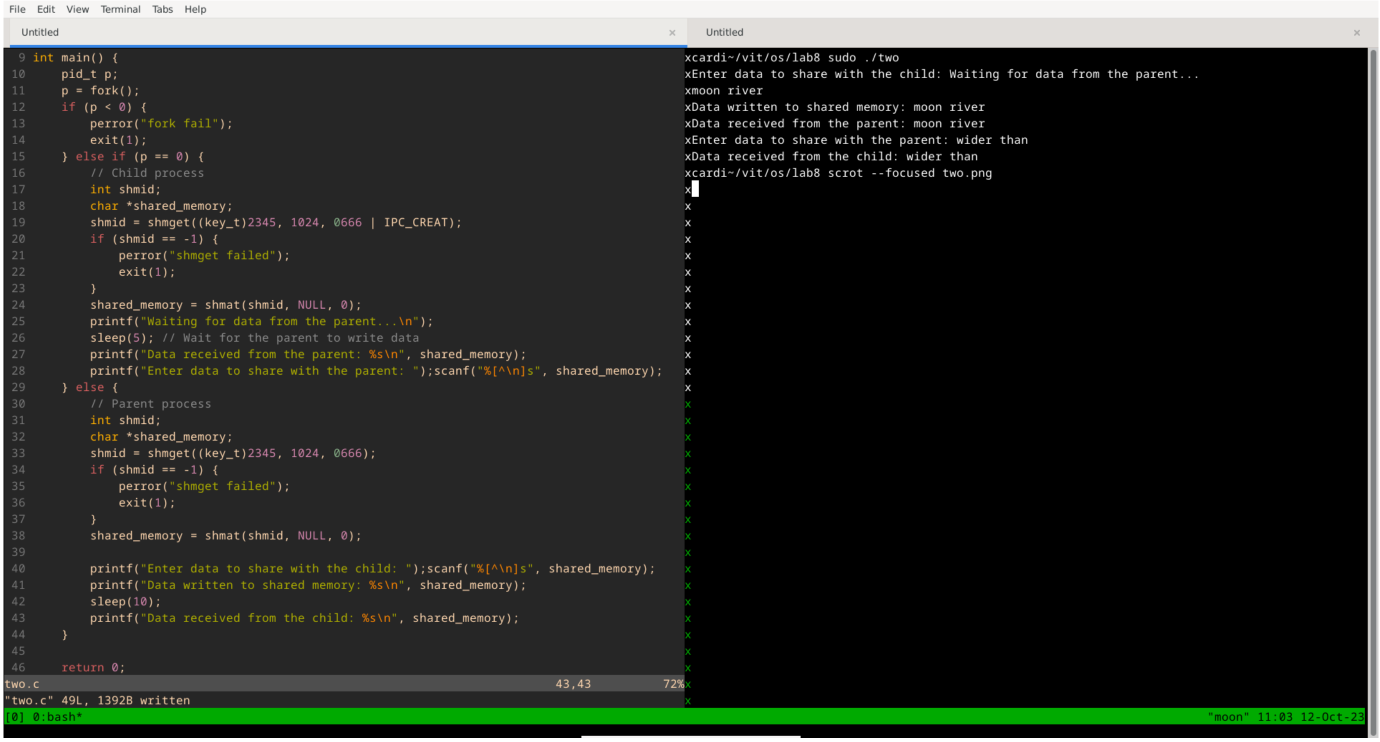


```
int main() {
    pid_t p;
    p = fork();
    if (p < 0) {
        perror("fork fail");
        exit(1);
    } else if (p == 0) {
        // Child process
        int shmid;
        char *shared_memory;
        shmid = shmget((key_t)2345, 1024, 0666 | IPC_CREAT);
        if (shmid == -1) {
            perror("shmget failed");
            exit(1);
        }
        shared_memory = shmat(shmid, NULL, 0);
        printf("Child process attached at %p\n", shared_memory);
        printf("Waiting for data from the parent...\n");
        sleep(5); // Wait for the parent to write data
        printf("Data received from the parent: %s\n", shared_memory);
    } else {
        // Parent process
        int shmid;
        char *shared_memory;
        shmid = shmget((key_t)2345, 1024, 0666);
        if (shmid == -1) {
            perror("shmget failed");
            exit(1);
        }
        shared_memory = shmat(shmid, NULL, 0);
        printf("Parent process attached at %p\n", shared_memory);

        printf("Enter data to share with the child: ");
        scanf("%[^\n]s", shared_memory);

        printf("Data written to shared memory: %s\n", shared_memory);
    }

one.c                                                   44,2          70%
"one.c" 48L, 1352B written
```

```
xcardi~/vit/os/lab8 sudo ./one
xParent process attached at 0x7f7ef4326000
xEnter data to share with the child: Child process attached at 0x7f7ef4326000
xWaiting for data from the parent...
xmoon rivrer
xData written to shared memory: moon rivrer
xcardi~/vit/os/lab8 scrot --focused one.png
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
```

```
[0] 0:bash*                                                                          "moon" 11:01 12-Oct-23
```

second

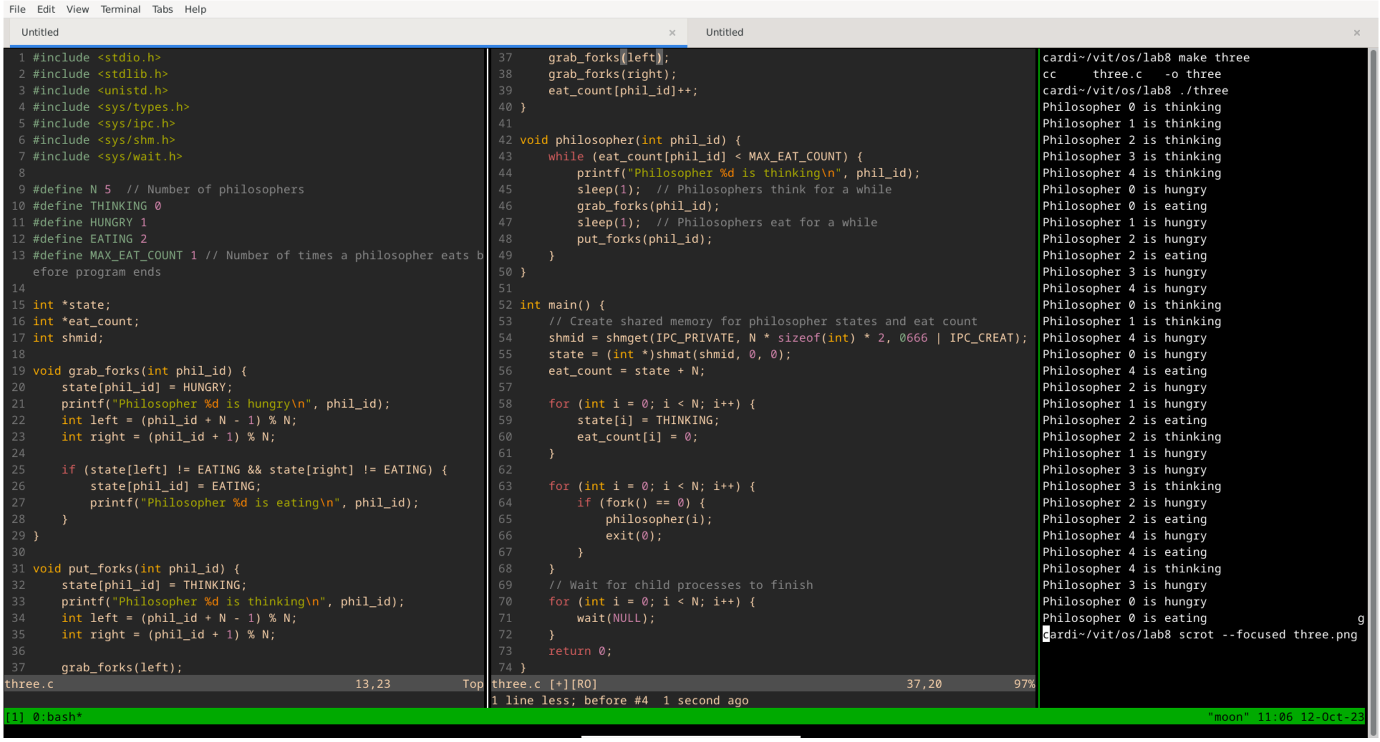


```c
int main() {
    pid_t p;
    p = fork();
    if (p < 0) {
        perror("fork fail");
        exit(1);
    } else if (p == 0) {
        // Child process
        int shmid;
        char *shared_memory;
        shmid = shmget((key_t)2345, 1024, 0666 | IPC_CREAT);
        if (shmid == -1) {
            perror("shmget failed");
            exit(1);
        }
        shared_memory = shmat(shmid, NULL, 0);
        printf("Waiting for data from the parent...\n");
        sleep(5); // Wait for the parent to write data
        printf("Data received from the parent: %s\n", shared_memory);
        printf("Enter data to share with the parent: ");scanf("%[^\n]s", shared_memory);
    } else {
        // Parent process
        int shmid;
        char *shared_memory;
        shmid = shmget((key_t)2345, 1024, 0666);
        if (shmid == -1) {
            perror("shmget failed");
            exit(1);
        }
        shared_memory = shmat(shmid, NULL, 0);

        printf("Enter data to share with the child: ");scanf("%[^\n]s", shared_memory);
        printf("Data written to shared memory: %s\n", shared_memory);
        sleep(10);
        printf("Data received from the child: %s\n", shared_memory);
    }

    return 0;
two.c                                                                          43,43          72%
"two.c" 49L, 1392B written
```

```
xcardi~/vit/os/lab8 sudo ./two
xEnter data to share with the child: Waiting for data from the parent...
xmoon river
xData written to shared memory: moon river
xData received from the parent: moon river
xEnter data to share with the parent: wider than
xData received from the child: wider than
xcardi~/vit/os/lab8 scrot --focused two.png
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
x
```

```
[0] 0:bash*                                                              "moon" 11:03 12-Oct-23
```

third



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

#define N 5  // Number of philosophers
#define THINKING 0
#define HUNGRY 1
#define EATING 2
#define MAX_EAT_COUNT 1 // Number of times a philosopher eats before program ends

int *state;
int *eat_count;
int shmid;

void grab_forks(int phil_id) {
    state[phil_id] = HUNGRY;
    printf("Philosopher %d is hungry\n", phil_id);
    int left = (phil_id + N - 1) % N;
    int right = (phil_id + 1) % N;

    if (state[left] != EATING && state[right] != EATING) {
        state[phil_id] = EATING;
        printf("Philosopher %d is eating\n", phil_id);
    }
}

void put_forks(int phil_id) {
    state[phil_id] = THINKING;
    printf("Philosopher %d is thinking\n", phil_id);
    int left = (phil_id + N - 1) % N;
    int right = (phil_id + 1) % N;

    grab_forks(left);
    grab_forks(right);
    eat_count[phil_id]++;
}

void philosopher(int phil_id) {
    while (eat_count[phil_id] < MAX_EAT_COUNT) {
        printf("Philosopher %d is thinking\n", phil_id);
        sleep(1);  // Philosophers think for a while
        grab_forks(phil_id);
        sleep(1);  // Philosophers eat for a while
        put_forks(phil_id);
    }
}

int main() {
    // Create shared memory for philosopher states and eat count
    shmid = shmget(IPC_PRIVATE, N * sizeof(int) * 2, 0666 | IPC_CREAT);
    state = (int *)shmat(shmid, 0, 0);
    eat_count = state + N;

    for (int i = 0; i < N; i++) {
        state[i] = THINKING;
        eat_count[i] = 0;
    }

    for (int i = 0; i < N; i++) {
        if (fork() == 0) {
            philosopher(i);
            exit(0);
        }
    }
    // Wait for child processes to finish
    for (int i = 0; i < N; i++) {
        wait(NULL);
    }
    return 0;
}
```

```
three.c                                13,23         Top
three.c [+][RO]                        37,20         97%
1 line less; before #4  1 second ago
```

```
cardi~/vit/os/lab8 make three
cc     three.c   -o three
cardi~/vit/os/lab8 ./three
Philosopher 0 is thinking
Philosopher 1 is thinking
Philosopher 2 is thinking
Philosopher 3 is thinking
Philosopher 4 is thinking
Philosopher 0 is hungry
Philosopher 0 is eating
Philosopher 1 is hungry
Philosopher 2 is hungry
Philosopher 2 is eating
Philosopher 3 is hungry
Philosopher 4 is hungry
Philosopher 0 is thinking
Philosopher 1 is thinking
Philosopher 4 is hungry
Philosopher 0 is hungry
Philosopher 4 is eating
Philosopher 2 is hungry
Philosopher 1 is hungry
Philosopher 2 is eating
Philosopher 2 is thinking
Philosopher 1 is hungry
Philosopher 3 is hungry
Philosopher 3 is thinking
Philosopher 2 is hungry
Philosopher 2 is eating
Philosopher 4 is hungry
Philosopher 4 is eating
Philosopher 4 is thinking
Philosopher 3 is hungry
Philosopher 0 is hungry
Philosopher 0 is eating                       g
cardi~/vit/os/lab8 scrot --focused three.png
```

```
[1] 0:bash*                                   "moon" 11:06 12-Oct-23
```