

```
#include <stdio.h>

#include <pthread.h>

#include <semaphore.h>

#include <unistd.h>


#define MAX_READERS 5


sem_t mutex, writeBlock;

int data = 0, readers = 0;


void *reader(void *arg) {
    int reader_id = *((int *)arg);

    while (1) {
        sem_wait(&mutex);
        readers++;
        if (readers == 1)
            sem_wait(&writeBlock);
        sem_post(&mutex);

        printf("Reader %d reads data: %d\n", reader_id, data);
        sleep(1); // Simulating reading time

        sem_wait(&mutex);
        readers--;
        if (readers == 0)
            sem_post(&writeBlock);
        sem_post(&mutex);

        sleep(2); // Reader waiting for re-access
    }
}
```

```
}
```

```
void *writer(void *arg) {  
    int writer_id = *((int *)arg);  
  
    while (1) {  
        sem_wait(&writeBlock);  
        data++;  
        printf("Writer %d writes data: %d\n", writer_id, data);  
        sem_post(&writeBlock);  
  
        sleep(2); // Simulating writing time  
    }  
}
```

```
int main() {  
    pthread_t readers_threads[MAX_READERS], writer_thread;  
    int reader_ids[MAX_READERS], writer_id = 1;  
  
    sem_init(&mutex, 0, 1);  
    sem_init(&writeBlock, 0, 1);  
  
    for (int i = 0; i < MAX_READERS; i++) {  
        reader_ids[i] = i + 1;  
        pthread_create(&readers_threads[i], NULL, reader, &reader_ids[i]);  
    }  
  
    pthread_create(&writer_thread, NULL, writer, &writer_id);  
  
    for (int i = 0; i < MAX_READERS; i++) {  
        pthread_join(readers_threads[i], NULL);  
    }
```

```
}
```

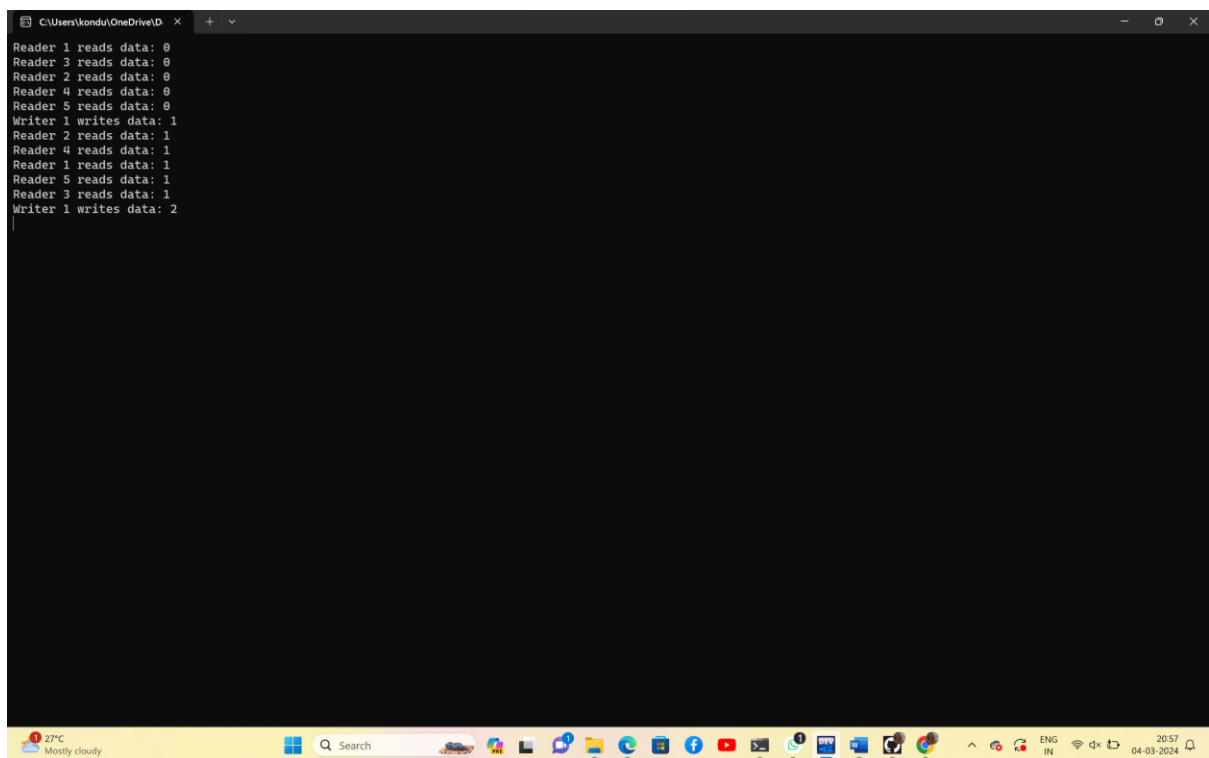
```
pthread_join(writer_thread, NULL);
```

```
sem_destroy(&mutex);
```

```
sem_destroy(&writeBlock);
```

```
return 0;
```

```
}
```



```
C:\Users\kondur\OneDrive\D x + - x
Reader 1 reads data: 0
Reader 3 reads data: 0
Reader 2 reads data: 0
Reader 4 reads data: 0
Reader 5 reads data: 0
Writer 1 writes data: 1
Reader 2 reads data: 1
Reader 4 reads data: 1
Reader 1 reads data: 1
Reader 5 reads data: 1
Reader 3 reads data: 1
Writer 1 writes data: 2
```

The screenshot shows a Windows terminal window with a black background and white text. The window title bar indicates the path 'C:\Users\kondur\OneDrive\D'. The output of the program is as follows:

```
Reader 1 reads data: 0
Reader 3 reads data: 0
Reader 2 reads data: 0
Reader 4 reads data: 0
Reader 5 reads data: 0
Writer 1 writes data: 1
Reader 2 reads data: 1
Reader 4 reads data: 1
Reader 1 reads data: 1
Reader 5 reads data: 1
Reader 3 reads data: 1
Writer 1 writes data: 2
```

The Windows taskbar is visible at the bottom, showing the search bar, task view, and various application icons. The system tray on the right shows the temperature (27°C), network status, and the date and time (20:57, 04-03-2024).