

## Write a C program to stimulate Producer-Consumer problem using semaphores

```
#include <stdio.h>
#include <stdlib.h>
#include <pthread.h>
#include <semaphore.h>
#include <unistd.h>

#define SIZE 5

int buffer[SIZE];
int in = 0, out = 0;

sem_t empty, full;
pthread_mutex_t mutex;

void* producer(void* arg)
{
    int item;
    while (1) {
        item = rand() % 100;
        sem_wait(&empty);
        pthread_mutex_lock(&mutex);

        buffer[in] = item;
        printf("Producer produced: %d\n", item);
        in = (in + 1) % SIZE;

        pthread_mutex_unlock(&mutex);
        sem_post(&full);

        sleep(1);
    }
}

void* consumer(void* arg) {
    int item;
    while (1) {
        sem_wait(&full);
        pthread_mutex_lock(&mutex);

        item = buffer[out];
        printf("Consumer consumed: %d\n", item);
        out = (out + 1) % SIZE;

        pthread_mutex_unlock(&mutex);
        sem_post(&empty);
    }
}
```

```

        sleep(1);
    }
}

int main() {    pthread_t
prod, cons;

    sem_init(&empty, 0, SIZE);
sem_init(&full, 0, 0);
    pthread_mutex_init(&mutex, NULL);

    pthread_create(&prod, NULL, producer, NULL);
    pthread_create(&cons, NULL, consumer, NULL);

    pthread_join(prod, NULL);
    pthread_join(cons, NULL);

    sem_destroy(&empty);
sem_destroy(&full);
    pthread_mutex_destroy(&mutex);

    return 0;
}

```

## OUTPUT:

```

Producer produced: 41
Consumer consumed: 41
Producer produced: 67
Consumer consumed: 67
Producer produced: 34
Consumer consumed: 34
Producer produced: 0
Consumer consumed: 0
Producer produced: 69
Consumer consumed: 69
Producer produced: 24
Consumer consumed: 24
Producer produced: 78
Consumer consumed: 78
Producer produced: 58
Consumer consumed: 58
Producer produced: 62
Consumer consumed: 62
Producer produced: 64
Consumer consumed: 64
Producer produced: 5
Consumer consumed: 5
Producer produced: 45
Consumer consumed: 45
Producer produced: 81
Consumer consumed: 81
Producer produced: 27
Consumer consumed: 27
Producer produced: 61
Consumer consumed: 61
Producer produced: 91
Consumer consumed: 91
Producer produced: 95
Consumer consumed: 95
Producer produced: 42
Consumer consumed: 42
Producer produced: 27
Consumer consumed: 27
Producer produced: 36
Consumer consumed: 36
Producer produced: 91
Consumer consumed: 91
Producer produced: 4
Consumer consumed: 4

```