Exp – 8)

AIM: to write a program to implement solution to producer consumer problem using semaphores

PROGRAM:

```c
#include <stdio.h>
#include <semaphore.h>
#include <stdlib.h>
#define SIZE 3

int buffer[SIZE];
int in = 0, out = 0;
sem_t empty, full, mutex;

void producer() {
    if (sem_trywait(&empty) != 0) {
        printf("Buffer is full!!\n");
        return;
    }

    sem_wait(&mutex);
    int item = in + 1;
    buffer[in] = item;
    printf("Producer produces the item %d\n", item);
    in = (in + 1) % SIZE;
    sem_post(&mutex);
    sem_post(&full);
}

void consumer() {
    if (sem_trywait(&full) != 0) {
        printf("Buffer is empty!!\n");
        return;
    }

    sem_wait(&mutex);
    int item = buffer[out];
    printf("Consumer consumes item %d\n", item);
    out = (out + 1) % SIZE;
    sem_post(&mutex);
    sem_post(&empty);
}

int main() {
    int choice;
    sem_init(&empty, 0, SIZE);
    sem_init(&full, 0, 0);
    sem_init(&mutex, 0, 1);

    while (1) {
        printf("\n1. Producer\n2. Consumer\n3. Exit\n");
        printf("Enter your choice:");
        scanf("%d", &choice);

        switch (choice) {
            case 1:
                producer();
                break;
            case 2:
                consumer();
                break;
            case 3:
                printf("Exiting...\n");
                exit(0);
            default:
                printf("Invalid choice\n");
        }
    }

    return 0;
}
```

OUTPUT:

```
jagadesh@LAPTOP-33VRBQ67:/mnt/c/Users/Parthiban/OS Exps/shell/C programs$ ./semaphore

1. Producer
2. Consumer
3. Exit
Enter your choice:1
Producer produces the item 1

1. Producer
2. Consumer
3. Exit
Enter your choice:2
Consumer consumes item 1

1. Producer
2. Consumer
3. Exit
Enter your choice:3
Exiting...
```