Ex. No.: 8 **Roll No.:230701091**

PRODUCER CONSUMER USING SEMAPHORES

Aim: To write a program to implement solution to producer consumer problem using semaphores.

Program Code:

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

#define SIZE 3

int

buffer[SIZE];
int in = 0, out = 0, count = 0;
sem_t empty, full,
mutex; void*
producer(void* arg) {
        if
    (sem_trywait(&empty)
    == 0) {
    sem_wait(&mutex);
    buffer[in] = ++count;
        printf("Producer produces the item %d\n",
    buffer[in]); in = (in + 1) % SIZE;
        sem_post(&m
    utex);
    sem_post(&full);
    } else {
        printf("Buffer is full!!\n");
    }
    return NULL;
}
void* consumer(void* arg) {
if (sem_trywait(&full)

    == 0) {
    sem_wait(&mutex);
        int item = buffer[out];
        printf("Consumer consumes item
    %d\n", item); out = (out + 1) % SIZE;
        sem_post(&m
```

```
utex);
sem_post(&empty)
;
} else {
       printf("Buffer is empty!!\n");

       }
       return NULL;
}

   int main()
   { pthread_t
   tid; 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\nEnter your
       choice: "); scanf("%d", &choice);

             if (choice == 1) {
                   pthread_create(&tid, NULL, producer,
          NULL); pthread_join(tid, NULL);
             } else if (choice == 2) {
                   pthread_create(&tid, NULL,
          consumer, NULL); pthread_join(tid, NULL);
                } else if (choice
          == 3) { break;
             } else {
                   printf("Invalid choice!\n");
             }
       }
       sem_destroy(&em

   pty);
   sem_destroy(&full);
   sem_destroy(&mute
   x);

       return 0;
}
```

OUTPUT :

```
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: 2
Buffer is empty!!

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

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

1. Producer
2. Consumer
3. Exit
Enter your choice: 1
Producer produces the item 4

1. Producer
2. Consumer
3. Exit
Enter your choice: 1
Buffer is full!!
```