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Ex.No.8:Producer Consumer using Semaphores

Aim:

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

Code:

```
#include <stdio.h>
#include <pthread.h>
#include <semaphore.h>
#include <unistd.h>
#define SIZE 5
int buffer[SIZE];
int count = 0;
sem_t empty, full, mutex;
void* producer(void* arg) {
   for (int i = 1; i <= 10; i++) {
      sem_wait(&empty);
      sem_wait(&mutex);
      buffer[count] = i;
      printf("Produced: %d\n", i);
      count++;
      sem_post(&mutex);
      sem_post(&full);
      sleep(1);  // small delay
   }
   return NULL;
}
void* consumer(void* arg) {
   for (int i = 1; i <= 10; i++) {
```

```
        sem_wait(&full);
        sem_wait(&mutex);
        int item = buffer[count - 1];
        printf("Consumed: %d\n", item);
        count--;
        sem_post(&mutex);
        sem_post(&empty);
        sleep(1);  // small delay
    }
    return NULL;
}
int main() {
    pthread_t p, c;
    sem_init(&empty, 0, SIZE);
    sem_init(&full, 0, 0);
    sem_init(&mutex, 0, 1);
    pthread_create(&p, NULL, producer, NULL);
    pthread_create(&c, NULL, consumer, NULL);
    pthread_join(p, NULL);
    pthread_join(c, NULL);
    sem_destroy(&empty);
    sem_destroy(&full);
    sem_destroy(&mutex);
    return 0;
}
```

Output:

```
Produced: 1
Consumed: 1
Produced: 2
```

Consumed: 2

Produced: 3

Consumed: 3

Produced: 4

Consumed: 4

Produced: 5

Consumed: 5

Produced: 6

Consumed: 6

Produced: 7

Consumed: 7

Produced: 8

Consumed: 8

Produced: 9

Consumed: 9

Produced: 10

Consumed: 10