OPERATING SYSTEM - CS23431

EXP 8

PRODUCER CONSUMER PROBLEM USING SEMAPHORES

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PROGRAM:

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

#define SIZE 10

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

void* producer(void* arg) {
 for (int i = 0; i < 10; i++) {
 int val;
 sem_getvalue(&empty, &val);
 if (val == 0)
 printf("Buffer is full. Producer waiting...\n");
 sem_wait(&empty);
 sem_wait(&mutex);

 if(count<SIZE)
 {
 buffer[count++]=i;
 printf("Producer produces item: %d\n", i);
 }
 sem_post(&mutex);
 sem_post(&full);

 sleep(1);
 }
 return NULL;
}
void* consumer(void* arg) {
```

```
 for (int i = 0; i < 10; i++) {
 int val;
 sem_getvalue(&full, &val);
 if (val == 0)
 printf("Buffer is empty. Consumer waiting...\n");

 sem_wait(&full);
 sem_wait(&mutex);

 if(count>0){
 printf("Consumer consumes item: %d\n", buffer[--count]);  }
 sem_post(&mutex);
 sem_post(&empty);

 sleep(1);
 }
 return NULL;
}

int main() {
 pthread_t p, c;
 int choice;
 sem_init(&empty, 0, SIZE);
 sem_init(&full, 0, 0);
 sem_init(&mutex, 0, 1);
 while(1)
 {
 printf("1. Producer\n");
 printf("2. Consumer\n");
 printf("3. Exit\n");
 printf("Enter your choice: ");
 scanf("%d", &choice);

 switch (choice) {
 case 1:
 pthread_create(&p, NULL, producer, NULL);
pthread_join(p, NULL);
 break;

 case 2:
 pthread_create(&c, NULL, consumer, NULL);
 pthread_join(c, NULL);
 break;
```

```
case 3:
printf("Exiting...");
exit(0);
default:
printf("Invalid choice!! Please try again.");
break;

}
}

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

return 0;
}
```

OUTPUT: