

OPERATING SYSTEM - CS23431

EX 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);
```

```

    }

    s e m _ p o s t ( & m u t e x ) ;

    s e m _ p o s t ( & f u l l ) ;


    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:

```
1. Producer
2. Consumer
3. Exit
Enter your choice: 1
Producer produces item: 0
Producer produces item: 1
Producer produces item: 2
Producer produces item: 3
Producer produces item: 4
Producer produces item: 5
Producer produces item: 6
Producer produces item: 7
Producer produces item: 8
Producer produces item: 9
1. Producer
2. Consumer
3. Exit
Enter your choice: 2
Consumer consumes item: 9
Consumer consumes item: 8
Consumer consumes item: 7
Consumer consumes item: 6
Consumer consumes item: 5
Consumer consumes item: 4
Consumer consumes item: 3
Consumer consumes item: 2
Consumer consumes item: 1
Consumer consumes item: 0
1. Producer
2. Consumer
3. Exit
Enter your choice: 3
Exiting...[student@localhost ~]$
```



