hp@hp-HP-Laptop-15s-fr2xxx:~/OS\_C\_Programs$ gedit pcsemaphore.c

// Develop a C program to simulate producer-consumer problem using semaphores

//Author: Dr. Guruvammal S, Date: 16/10/2023

#include<stdio.h>

#include<stdlib.h>

#include<pthread.h>

#include<semaphore.h>

#define BUFFER\_SIZE 5

#define MAX\_ITEMS 20

int buffer[BUFFER\_SIZE];

int in=0;

int out=0;

int produced\_count=0;

int consumed\_count=0;

sem\_t mutex;

sem\_t full;

sem\_t empty;

void\* producer(void\* arg)

{

int item=1;

while(produced\_count<MAX\_ITEMS)

{

sem\_wait(&empty);

sem\_wait(&mutex);

buffer[in]=item;

printf("\nProduced:%d",item);

item++;

in=(in+1)%BUFFER\_SIZE;

produced\_count++;

sem\_post(&mutex);

sem\_post(&full);

}

/\*else

{

printf("\nBuffer is full\n"

}\*/

pthread\_exit(NULL);

}

void\* consumer(void\* arg)

{

while(consumed\_count<MAX\_ITEMS)

{

sem\_wait(&full);

sem\_wait(&mutex);

int item=buffer[out];

printf("\nConsumed: %d",item);

out=(out+1)%BUFFER\_SIZE;

consumed\_count++;

sem\_post(&mutex);

sem\_post(&empty);

}

/\*else

{

printf("\nBuffer is empty\n");

}\*/

pthread\_exit(NULL);

}

int main()

{

pthread\_t producerThread,consumerThread;

sem\_init(&mutex,0,1);

sem\_init(&full,0,0);

sem\_init(&empty,0,BUFFER\_SIZE);

pthread\_create(&producerThread,NULL,producer,NULL);

pthread\_create(&consumerThread,NULL,consumer,NULL);

pthread\_join(producerThread,NULL);

pthread\_join(consumerThread,NULL);

sem\_destroy(&mutex);

sem\_destroy(&full);

sem\_destroy(&empty);

return 0;

}

Execution:

hp@hp-HP-Laptop-15s-fr2xxx:~/OS\_C\_Programs$ gcc pcsemaphore.c -o thread -lpthread

hp@hp-HP-Laptop-15s-fr2xxx:~/OS\_C\_Programs$ ./thread

Produced:1

Produced:2

Produced:3

Produced:4

Produced:5

Consumed: 1

Consumed: 2

Consumed: 3

Consumed: 4

Consumed: 5

Produced:6

Produced:7

Produced:8

Produced:9

Produced:10

Consumed: 6

Consumed: 7

Consumed: 8

Consumed: 9

Consumed: 10

Produced:11

Produced:12

Produced:13

Produced:14

Produced:15

Consumed: 11

Consumed: 12

Consumed: 13

Consumed: 14

Consumed: 15

Produced:16

Produced:17

Produced:18

Produced:19

Produced:20

Consumed: 16

Consumed: 17

Consumed: 18

Consumed: 19

Consumed: 20