18.Construct a C program to simulate producer-consumer problem using semaphores.

#include <stdio.h>

#include <stdlib.h>

#include <pthread.h>

#include <semaphore.h>

#define BUFFER\_SIZE 5

int buffer[BUFFER\_SIZE];

int in = 0, out = 0;

sem\_t empty, full;

void\* producer(void\* arg) {

for (int i = 0; i < 10; i++) {

sem\_wait(&empty);

buffer[in] = i;

printf("Produced: %d\n", i);

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

sem\_post(&full);

}

return NULL;

}

void\* consumer(void\* arg) {

for (int i = 0; i < 10; i++) {

sem\_wait(&full);

int item = buffer[out];

printf("Consumed: %d\n", item);

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

sem\_post(&empty);

}

return NULL;

}

int main() {

pthread\_t prod, cons;

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

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

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

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

pthread\_join(prod, NULL);

pthread\_join(cons, NULL);

sem\_destroy(&empty);

sem\_destroy(&full);

return 0;

}