**Write a program to solve Classical Problems of Synchronization using Mutex and Semaphore**

**Producer and Consumer Test :**

public class ProducerAndConsumerTest {  
 public static void main(String[] args) {  
 MyQueue myQueue = new MyQueue();  
 Producer producer = new Producer(myQueue);  
 Consumer consumer = new Consumer(myQueue);  
  
 Thread producerThread = new Thread(producer);  
 producerThread.start();  
 Thread consumerThread = new Thread(consumer);  
 consumerThread.start();  
 }  
}

**MyQueue:**

import java.util.concurrent.Semaphore;  
  
public class MyQueue {  
 private int item;  
 private Semaphore consumerSemaphore = new Semaphore(0);  
 private Semaphore producerSemaphore = new Semaphore(1);  
  
 public void get(){  
 try {  
 consumerSemaphore.acquire();  
 }catch (InterruptedException exception){  
 System.*out*.println("Interrupted Exception Occur");  
 }  
 System.*out*.println("Consumer Consume Item: "+item);  
 producerSemaphore.release();  
 }  
  
 public void put(int item){  
 try{  
 producerSemaphore.acquire();  
 }catch (InterruptedException exception){  
 System.*out*.println("Interrupted Exception Occur");  
 }  
 this.item = item;  
 System.*out*.println("Producer Produce Item: "+item);  
 consumerSemaphore.release();  
 }  
}

**Consumer:**

public class Consumer implements Runnable {  
 private MyQueue myQueue;  
  
 public Consumer(MyQueue myQueue){  
 this.myQueue= myQueue;  
 }  
 @Override  
 public void run() {  
 while (true){  
 myQueue.get();  
 try {  
 Thread.*sleep*(2000);  
 }catch (InterruptedException exception){  
 exception.printStackTrace();  
 }  
 }  
 }  
}

**Producer:**

import java.util.Random;  
  
public class Producer implements Runnable {  
 private MyQueue myQueue;  
 public Producer(MyQueue myQueue){  
 this.myQueue = myQueue;  
 }  
 @Override  
 public void run() {  
 while (true){  
 Random random = new Random();  
 int data = random.nextInt(100);  
 myQueue.put(data);  
 try {  
 Thread.*sleep*(2000);  
 }catch (InterruptedException exception){  
 exception.printStackTrace();  
 }  
 }  
 }  
}

**Output:**

**"C:\Program Files\Java\jdk-14.0.1\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2022.2\lib\idea\_rt.jar=56010:C:\Program Files\JetBrains\IntelliJ IDEA 2022.2\bin" -Dfile.encoding=UTF-8 -classpath "C:\Users\Rushikesh Bhusal\IdeaProjects\LP1\_LAB\out\production\LP1\_LAB" ProducerAndConsumerTest**

**Producer Produce Item: 26**

**Consumer Consume Item: 26**

**Producer Produce Item: 38**

**Consumer Consume Item: 38**

**Producer Produce Item: 21**

**Consumer Consume Item: 21**

**Producer Produce Item: 21**

**Consumer Consume Item: 21**

**Process finished with exit code 130**