

**PSG COLLEGE OF TECHNOLOGY, COIMBATORE**  
**DEPARTMENT OF APPLIED MATHEMATICS AND COMPUTATIONAL SCIENCES**  
**15XT56 – JAVA PROGRAMMING LAB**  
**PROBLEM SHEET IV - MULTITHREADING**

1. Write a Java program to create inter-thread communication of integer values between two threads using shared variable and binary semaphore.

2. Write a Java program to create inter-thread communication using queue with 5 elements. First thread should create integer data and insert it into the queue and Second thread should remove the data from queue and display it. Use a counting semaphore to check the availability of space in the queue. Create the following classes and perform inter-thread communication.

- class First - First thread should create the data and insert into the queue according to the semaphore value (if semaphore value is less than five)
- class Second - Second thread should remove the data from the queue and display it according to the semaphore value (if semaphore value is greater than zero)
- class Queue - Queue class is the common shared data between two threads. This class should have an integer array with five elements and front, rear to point first and last element in the queue and a counting semaphore( which is an integer variable) to specify number of data in the queue

3. Write a Java program to create bidirectional (two-way) inter-thread communications. First thread creates a data which should be passed to the second thread through a shared variable and the second thread creates a data which should be passed to the first thread using another shared variable. Create the following classes and perform inter-thread communication.

- class First - First thread create data which should be sent to second thread by using SharedData1. Also this receives data from second thread using SharedData2
- class Second - Second thread creates data which should be sent to first thread by using SharedData2. Also this receives data from first thread using SharedData1.
- class SharedData1 - Common variable for communication from first thread to second thread.
- class SharedData2 - Common variable for communication from second thread to first thread.

4. Write a Java program to create bidirectional (two-way) inter-thread communications using queues. First thread creates a data which should be passed to the second thread through a Queue object and the second thread creates a data which should be passed to the first thread using another Queue object. Create the following classes and perform inter-thread communication.

- class First - First thread create data which should be sent to second thread by using a Queue object. Also this receives data from second thread using another Queue object
- class Second - Second thread creates data which should be sent to first thread by using a Queue object. Also this receives data from first thread using another Queue object.
- class Queue - Create two objects for this class, one for communication from First thread to Second thread and another for Second thread to First thread.