

Homework regarding the Monitor structure

Write a multi-threaded program that solves the **Producer-Consumer** problem using the **monitor** structure in Java, according to followings.

1. **Buffer Area:** capacity of the buffer area is 100. This buffer is used for data communication between producer and consumer threads.
2. **Producer Threads:** Create five producer threads. Each producer thread will generate 50 random numbers between 1 and 100. They will write these numbers to the buffer area.
3. **Consumer Threads:** Create five consumer threads. Each consumer thread will write the numbers they fetch from the buffer area to a shared file.
4. **Monitor Structure:** Using the monitor structure, ensure that producer threads and consumer threads share buffer area safely. You must ensure synchronization and data integrity between threads with the monitor structure.
5. **Inter-Thread Communication:** While the producer threads add the numbers they produce to the buffer area, the consumer threads must work synchronously using the monitor structure while pulling the numbers from the buffer area.
6. **File Naming:** Consumer threads must write the numbers they fetch from the buffer area to the **Numbers.txt** file.
7. **Code Quality:** Make sure your code is readable, organized and commented. Add comments explaining the functions of each thread and monitor structure.
8. **Delivery:** You will deliver a ZIP file containing your Java program and an executable file to Sefa Hoca via e-mail till the morning of 04.01.2024, and you will demonstrate it during the lab hour.