University of Westminster
Department of Computer Science

7SENG007C Concurrent and Distributed Systems 2022/2023	
Module leader	Mr. Guhanathan Poravi.
Unit	Coursework
Weighting:	50%
Qualifying mark	40%
Description	Report
Learning Outcomes Covered in this Assignment:	LO1, LO2
Handed Out:	25th April 2023
Due Date	20th May 2023 by 1:00pm
Expected deliverables	Java Source code and any other resources
Method of Submission:	Electronic submission on BB via a provided link close to the submission time. The file you upload should have the following naming format: wNNNNNNNN.zip (where wNNNNNNN is your university ID login name)
Type of Feedback and Due Date:	Written feedback and marks 15 working days (3 weeks) after the submission deadline, the week starting Monday 1st of June 2023. Oral feedback will also be offered upon appointment with the module leader. **All marks will remain provisional until formally agreed upon by an Assessment Board.**

Copying and plagiarism

Any external sources utilized should be correctly referenced using a common referencing technique (e.g., the Harvard technique). For more details on referencing please visit **https://www.westminster.ac.uk/current-students/studies/study-skills-and-training/research-skills/referencing-your-work** .

Copying and plagiarism carry severe penalties. Please note that the University offers an online learning tutorial designed to help students understand and avoid plagiarism. This can be accessed by any student under My Organisation on Blackboard. The tab is labelled 'Avoiding Plagiarism'.

Penalty for Late Submission

If you submit your coursework late but within 24 hours or one working day of the specified deadline, 10 marks will be deducted from the final mark, to minimum of the pass mark (50%), as a penalty for late submission,. If you submit your coursework more than 24 hours or more than one working day after the specified deadline you will be given a mark of zero for the work in question unless a claim of Mitigating Circumstances has been submitted and accepted as valid.

It is recognised that on occasion, illness or a personal crisis can mean that you fail to submit a piece of work on time. In such cases you must inform the Faculty Registry Office in writing on a mitigating circumstances form, giving the reason for your late or non-submission. You must provide relevant documentary evidence with the form. This information will be reported to the relevant Assessment Board that will decide whether the mark of zero shall stand. For more detailed information regarding University Assessment Regulations, please refer to the following website: http://www.westminster.ac.uk/study/current-students/resources/academic-regulations**.**

Coursework Description

Introduction:

Online retail shops allow users to do online shopping by browsing through catalogues of goods, adding them to a virtual shopping cart, and finally buying the goods by checking out the items in the shopping cart.

Consider the following scenarios and you need to create simulation with multithreaded application (Command Line Interface to check the logic is thread safe) with monitor concept learned in the lecture and must be test if the system will be thread safe that is accessed by a large number of users.

These are operations and users performing the operation:

- The system administrators must be able to update the quantities of the goods when a new shipment arrives.
- Multiple shoppers can log into the system and place different items in the shopping carts that they wish to purchase
- Multiple shoppers try to check out the shopping carts which has the same item with limited quantity, and the system should allocate/block items based on the first come first serve basis based who checking out first not who added the item first to the cart.
- The system should be able to handle multiple checkouts made at the same time requiring the same item. So, the same item should not be assigned for two purchases.

In this assignment, you are expected to design and build this simulation that applies concurrent features and ensure the system is thread safe.

Systems Requirements:

- **The system should be thread safe.**
- **Proper completion of the program logic without any major or showstopper error**
- **Proper implementation of concurrency concepts (Ensure critical section is protected through proper mutual exclusion, race conditions are avoided, and synchronisation is handled correctly)**
- **No deadlock**
- **Safety, liveness, and fairness are achieved.**
- **Proper achievement of priority in case of limited quantity and multiple users are trying to check out.**
- **Code Quality**

Assumptions:

In case you make any assumptions please indicate them clearly in the main class as comment.

Deliverables:

Java Source code and any other resources

Coursework Marking scheme:

The Coursework will be marked based on the following marking criteria:

Mark Allocation:

Proper completion of the program logic without any major or showstopper error	**20**
Proper implementation of concurrency concepts (Ensure critical section is protected through proper mutual exclusion, race conditions are avoided, and synchronisation is handled correctly) in Monitor implementation	**20**
No deadlock and safety, liveness and fairness are achieved in implementation of multiple threads.	**10**
Proper achievement of priority in case of multiple checkouts at same time with limited quantity	**25**
Proper achievement of handling multiple checkouts made at the same time requiring the same item. So, the same item should not be assigned for two purchases	**15**
Code Quality	**10**

Submission Instructions

Files to submit: all your source code files (the files with extension .java files NOT the .class files). This should include test classes, i.e. classes which were implemented for the sole purpose of testing other classes.

You should NOT copy and paste your code into notepad, Word or other applications but simply submit in a zip file all your Java source, i.e. the files with extension .java for assignment submission.

Referencing code: You are allowed to take code from other resources (i.e. a textbook or internet) but any code taken from other resources should be referenced in comments within your code (full textbook details or full web URL).

You should submit via BlackBoard's Assignment functionality (do NOT use email, as email submissions will be ignored.), all the files described above. A single zip file with the name wNNNNNNNN (where wNNNNNNN is your university ID login name) containing all the above files could be submitted.

Note that Blackboard will allow to make a submission multiple time. Make sure before submitting (i.e. before pressing the Submit button), that all the files you want to submit are contained there (or in the zip file you submit).

In the case of more than one submission, only your last submission before the deadline given to you will be marked, so make sure that all the files are included in the last submission attempt and the last attempt is before the coursework deadline.

Request to mark submissions which are earlier than the last submission before the given deadline will be ignored as it is your responsibility to make sure everything is included in your last submission.

The following describes how to submit your work via Blackboard:

1. Access https://learning.westminster.ac.uk and login using your username and password [if either of those is not known to you, contact the IIT Registry (Ms. Luxmy)]

2. Click on the module's name, MODULE: 7SENG007C.2.2022 CONCURRENT AND DISTRIBUTED SYSTEMS (IIT Sri Lanka) found under My Modules & Courses.

3. Click on the Assessment->Submit Coursework->Coursework.

4. Click on View Assignment.

5. Attach your zip file containing all the Java source code files, by using the Browse button and upload and submit to assignment submission

If Blackboard is unavailable before the deadline, you must email the Registry at com_submission@iit.ac.lk with cc: to myself before the deadline with a copy of the assignment, following the naming, title and comments conventions as given above and stating the time that you tried to access Blackboard. You are still expected to submit your assignment

via Blackboard. Please keep checking Blackboard's availability at regular intervals up to and after the deadline for submission. You must submit your coursework through Blackboard as soon as you can after Blackboard becomes available again even if you have also emailed the coursework to the above recipients. This must be within 5 days.

If you have a finance hold, please try to get it removed and submit within 5 working days to BB. In the event you cannot fix it in 5 days please submit a mitigation to registry immediately and do the assignment during refer/defer time.

Same regulations are applicable for viva voce too.