

# SIMULATION OF A REAL WORLD UTILITY STORE

SEMESTER PROJECT-REQUIREMENTS/GUIDELINES

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## 1 Objective

Write a program to simulate the working of a utility store. The utility store has three counters for gents and one for ladies. At any given time if all the counters are free, then the customer entering the utility store can go to any of the counters. If ladies counter is empty then the gents can use it and similarly if any of the gents counter is empty then the ladies can also use it provided the queues allocated for their gender is occupied. Lets say, the time required to serve any customer is  $t^1$  seconds. If a customer enters the store at time  $t1$  then he should be out of the store at  $t + t1$  provided that there are no queues in front of the counters. In case there are customers being served at all the counters then queues will be maintained in front of each counter and the new customer will go to the shortest queue. In the case of queues, a customer will be out of the store after  $t + t1 +$  *the time he spent waiting in the queue*.

Our goal is to calculate the average time spent by each customer in the utility store.

### 1.1 Extra Credit (only for BIT-9C/D)

Initially, the processing time required by each customer at the counter was fixed to some pre-specified number. You can get extra credits for using random function to generate the processing time randomly for each customer. I shall encourage all of you to go for it. **For BICSE-4B, this is a MUST feature.** Detail of the extra credit is given in the marking section 4.1.

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<sup>1</sup>This time should not be greater than 5 seconds

## 2 Inputs to the program

User will only press  $m/f/e$  (without pressing enter) at any time to tell the program that a male or a female customer has entered the store or to exit the program in case of  $e$ .

### 2.1 Revision

In the original statement, the program was expected to timeout if user does not enter any thing for some pre-specified time and work on updating queues and managing them. After talking to different students it seems a very difficult, if not an impossible, task for you. Therefore, I have decided to make it simple. Now, instead of three inputs the program will ask for four inputs, they are  $m/f/e/c$ . In case of  $c$  input, program will continue its work by assuming that the user is not interested in entering anything. Rest of the symbols have same meanings as explained earlier.

## 3 Outputs

Program should output the following

- Periodically update the status of the queues and display them
- Number of male and female customers in each queue should be displayed
- The remaining time of the top-of-the-queue-customer to leave the queue should also be displayed and updated periodically
- When user exits the program, it should print the total number of the customers served and the average time spent by the customers in the store

### 3.1 Extra Credits

Students can earn extra credit by incorporating the following in his program.

- Detailed status of each queue, which means to display **M** at different positions of the queue for each male customer in a queue and similarly, **F** for the female customer. For example, if status of **Queue-1** is **F M M M M**, it means that it has five customers in total and first customer (currently served) is female followed by four male customers.

## 4 Marking

- Each student has to give demo, in which he/she will be asked questions
- Non-compiling code will get zero mark. This time there will be no relaxation on silly mistakes. **It is your responsibility to ensure the correct submission**
- Copying is not allowed and will be heavily penalized

### 4.1 Breakdown

Table 1: Marks distribution

Item	Marks
Full Functionality	20
Code Comments	10
Error Checking	10
Output Formatting	10
<b>Total Marks</b>	<b>50</b>
Extra credit for using random function(see Section 1.1)	5
Extra credit for detailed output (see Section 3.1)	5

## 5 Submission

- Submission deadline is 18<sup>th</sup> June, 1700 hrs for BIT-9C/D and 30<sup>th</sup> June, 1700 hrs for BICSE-4B
- A folder containing the source code and all its related files should be uploaded on moodle
- Following naming convention will be used for the submitted folder Project-Course-(your section)-(your name)-(your registration number) for example, Project-BIT-9C-Ahmad Bhatti-550 or Project-BICSE-4B-Ahmad Bhatti-550