

NETWORK PROGRAMMING

Assignment – 2

Due: 20 March 2014

This assignment tests your knowledge of synchronization primitives. Write a program using threads for the following scenario. There is a railway reservation complex containing c counters at which a customer can purchase tickets. Each customer must take his/her token from any of the t token issuing machines before entering the reservation hall. Once the customer gets a token, he/she awaits his/her turn in the hall. Customers are served in strict order of their token numbers and may be called to any free counter. There is also a verification process that checks the following:

- (a) tokens are strictly issued in sequence
- (b) customers are strictly called according to sequence
- (c) no issued token is remaining without being called by a counter
- (d) no customer is left uncalled by any counter
- (e) no customer is called more than once

Use appropriate synchronization primitives to achieve the above conditions. You may use `mutex`, `condvar` or `semaphore` primitives.

The inputs are: (a) number of users, (b) number of counters and (c) number of token issuing machines. These values have to be read from the *command line*. An example call of your program could be:

```
./reservation -c 8 -i 3 -u 76000
```

which means that there are 8 counters, 3 token issuing machines and 76000 users.

The output should display: any errors as detected by the verification process (there should be no output if everything is fine), the number of tokens issued by each machine, the total number of tokens issued, the number of customers served by each counter and the total number of customers served.

Output for the above example is:

```
-----  
Token Machine No. 1 issued 38562 tokens  
Token Machine No. 2 issued 17551 tokens  
Token Machine No. 3 issued 19887 tokens  
TOTAL NO. OF TOKENS ISSUED: 76000  
-----
```

```
Counter No. 1 served 10470 customers  
Counter No. 2 served 2393 customers
```

Counter No. 3 served 11738 customers
Counter No. 4 served 3020 customers
Counter No. 5 served 13165 customers
Counter No. 6 served 11823 customers
Counter No. 7 served 9526 customers
Counter No. 8 served 13865 customers
TOTAL NO. OF CUSTOMERS SERVED: 76000
