

# CS 6301: Special Topics in Computer Science—Introduction to Multicore Programming Section 001 Programming Assignment 2

Instructor: Neeraj Mittal

Assigned on: Tuesday, October 3, 2017

Due date: Tuesday October 24, 2017 (at midnight)

This is a group assignment. Code sharing among groups is strictly prohibited and will result in disciplinary action being taken. A group can contain at most two students. The program must be written in Java. Each group is expected to demonstrate the operation of this programming assignment to the TA.

## 1 Project Description

A bridge on a busy highway is damaged by a flood. One-way traffic is to be instituted on the bridge by permitting vehicles traveling in opposite directions to use the bridge alternately. The following rules are formulated for use of the bridge:

- (a) At any time, the bridge is used by vehicle(s) traveling in one direction only.
- (b) If vehicles are waiting to cross the bridge at both ends, only one vehicle from one end is allowed to cross the bridge before a vehicle from the other end starts crossing the bridge.
- (c) If no vehicles are waiting at one end, then any number of vehicles from the other end are permitted to cross the bridge.
- (d) Every vehicle waiting to cross the bridge is able to cross the bridge eventually.

Develop and implement solution that satisfies these rules using (i) semaphores, and (ii) monitors. Note that, in each solution, you will have to implement two functions `arriveBridge` and `leaveBridge` that take `direction` as an argument. Design a mechanism to test the correctness of your implementation.

## 2 Submission Information

You will have to submit your project using eLearning. Submit all the source files necessary to compile the program and run it. Also submit a README file that contains instructions to compile and run your program.