Write you solutions on the exam sheet (front and back)

Student Name: _____ ID:_____

COMP 303

Class Test 1

October 16, 2015

Question 1: Thread Synchronization

For this question you will do two things: (1) provide a written OO explanation of your algorithm, and (2) provide the correct method and instantiation signatures for all thread related and well-formed related activities (in Java) as you describe your algorithm. Your solution must be minimal and well-formed. Provide a solution for the following problem: a front-end application must communicate with a back-end application. The front-end application sends commands to the back-end application as strings. The front-end's sending operation is time critical and can only be blocked for very tiny durations. The back-end application executes the command and returns a result, as a string, to the front-end application. There is only one back-end application, but there are many front-end applications. Assume there is a library that provides two commands send(string,IP) and "string+IP"=receive() that provides communication between the front-end and the back-end. These two methods just send and receive data. There is also a library that provides a method string=system(string) that executes the string provided as the argument and stores the result of the execution in the returned string. The front and back end applications run infinitely. The returned result to the front-end application is printed to the screen.

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Question 2: Domain Model

Create a well-formed Domain Model using well-formed OO techniques (like inheritance, interfaces, abstract, overriding, overloading, constructor state modification, etc.) for the following problem:

A ferryboat can carry up to 100 human passengers, exactly 50 crew members, up to 25 cars and up to 5 buses. A ferryboat can be empty: no passengers and/or no vehicles, but a crew must always be present. Every passenger must have a ticket. Every vehicle must belong to exactly 1 passenger. A car can carry at least 1 passenger and at most 6 passengers. A bus can carry at most 50 passengers, plus one mandatory driver (who is a passenger). Company "Mighty Boats" owns exactly 5 ferryboats, as described above. Vehicles can be added to and removed from a ferryboat, but to be added they must have a passenger with a ticket. Passengers can be added to and removed from a ferryboat, but to be added they must have a ticket. Crew members can be added to and removed from a ferryboat. "Might Boats" has a single data structure (database), in RAM, of all the active people and vehicles for all of its boats. Crew members want to be able to access passenger and vehicle information from within the ferryboat they are currently on without seeing information from other boats. "Might Boat" staff on shore want to be able to access passenger and vehicle information from any boat.