MILITARY COLLEGE OF SIGNALS, NUST

CPS-410 OPERATING SYSTEM LAB

FINAL LAB TEST (BESE15 - A)

Instructor: Lab Engr. Nausheen **Total:** 30 Marks **Time Allowed:** 2 Hrs

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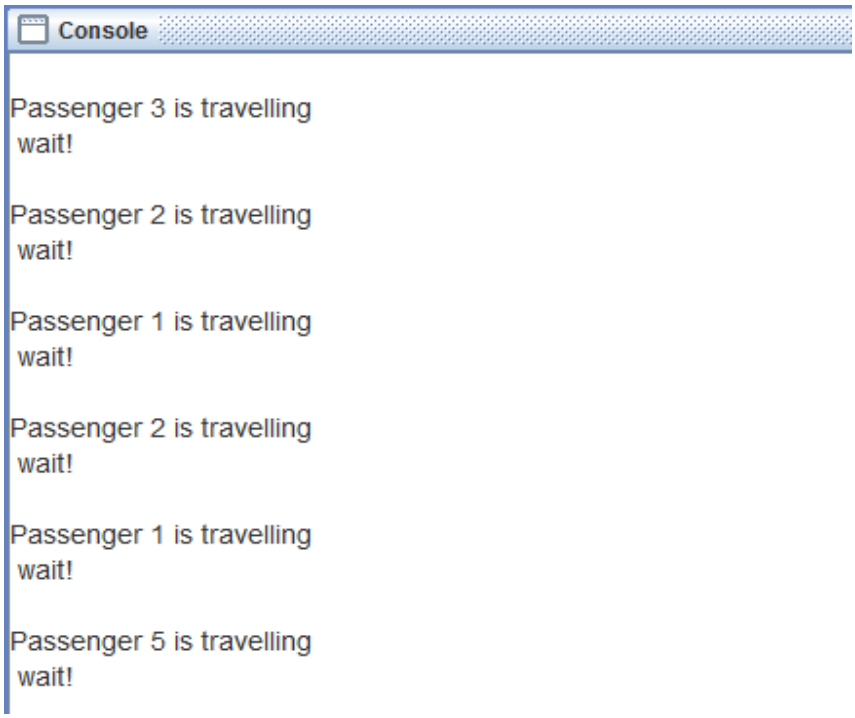
Instructions:

- Make a group of two students. Only one group of three students is allowed.
- Viva will be conducted by each group at the end of exam.
- You must submit the solution (only source code files) inside assignment folder before time is over.
- Copied solution will not be given any credit.
- Five marks are reserved for your discipline and behavior. Marks will be deducted if anyone found cheating, talking with members of some other group or not seriously working during the lab exam.

Question #1: (Marks: 10)

Jurassic Park consists of a dinosaur museum and a park for safari riding. Suppose there are 5 passengers and only one car. Passengers wander around the museum for a while, then line up to take a ride in a safari car. When a car is available, it loads only one passenger and rides around the park for some time. Each passenger can take maximum 5 turns. Use semaphores to synchronize this program. Implement the solution in BACI. Whenever passenger rides a car, display his id as an output. The sample output might look like as follows:



Question #2: (Marks: 10)

Consider a joint bank account in a banking system. During deposit operation, money is added to the balance. In withdraw operation, if the given amount is less than current balance, user can withdraw money. Otherwise, user will wait until money is deposited in the bank account. Implement this scenario in BACI. To synchronize deposit and withdraw operations, use Monitor.

Question #3: (Marks: 5)

Suppose we have a global variable **counter** initialized to zero. We have a function increment_counter which increments the counter five times. Then we have a function decrement_counter which decrements the counter two times. Synchronize increment_counter and decrement_counter functions using two semaphores. The output might look like as follows: