National Institute of Technology Calicut
Department of Computer Science and Engineering

Monsoon Semester – 2020
CS3003D: Operating Systems

Assignment – 3

1. Consider the scenario where there are five students (ID: 1-5), a Teaching Assistant (TA) [ID: 10], and a Course Instructor (CI) [ID: 100] in a class. The CI sends the marks scored (out of 50) by the five students via a message queue so that only the particular student can read his/her marks from the message queue. However, the TA can read the marks of all the individual students also. The TA calculates the class average and assigns a grade for each student and send it back to the CI. The students cannot read the class average and their grades[*].

   Design and Implement the above scenario using Message Queue.

2. Design and implement the Banker's algorithm. The algorithm should receive as input the AllocTable, MaxTable, and the total number of instances per resource type.
   a. The program should output the sequence of process that is SAFE STATE.
   b. Given the set of sequence of processes, the program should output whether the given sequence is in a SAFE STATE or not.
   c. Given the resource request of a process, the program should check whether the request can be granted or not.

3. Design and implement Dining Philosopher's problem using semaphore.

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Instructions:

- Submit the programs in a separate folder and submit it as a rar file (with FirstName_RollNo.rar)
  - Should be submitted individually
  - Source code and Readme file should also be submitted
  - Include screenshots wherever necessary

Submission Deadline : 01, Dec.'20 (11:59 pm)
Submission Mode : Online (upload to Eduserver Coursepage of CS3003D)

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[*] Grading: 40-50: S; 30-39: A; 20-29: B; ≤ 19: E