

R18

Code No: 156AM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, February/March – 2022

CONCURRENT PROGRAMMING

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Describe the properties of program correctness.
- b) Illustrate the concept of shared objects and synchronization between concurrent threads for prime number generation modules. [5+10]
- 2.a) What is parallelism? State the need for parallelism.
- b) Explain the Filter-Lock algorithm for implementing mutual exclusion among n-threads. [5+10]
- 3.a) Recall a simple lock-based concurrent FIFO queue. Write enq() and deq() methods and examine how these methods results in correctness property with a brief illustrations.
- b) What are sequential objects? Discuss briefly. [10+5]
- 4.a) Explain how sequential consistency is non-blocking with relevant example.
- b) Give a detail note on a dependent non-blocking progress condition. [8+7]
- 5.a) “Any nontrivial RMW register has consensus number at least 2”. Prove the theorem.
- b) Explain the following operations with brief illustrations: [7+8]
 - i) compareAndSet()
 - ii) getAndSet()
6. Write down the lock-free universal algorithm and explain the execution of the lock-free universal construction with a brief illustration. [15]
- 7.a) State the merits and demerits of hand-over-hand locking mechanism.
- b) How to implement Optimistic synchronization mechanism on a linked list by concurrent threads? Write the complete pseudo code for add and remove methods of it and explain. [5+10]
8. What do you mean by lock-free stack? Explain how to implement lock-free stack operations with an example program code. [15]

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