International Institute of Information Technology, Hyderabad

(Deemed to be University)

CS3.301 Operating Systems and Networks – Monsoon 2023

Quiz 1

Max. Time: 40 mins **Max. Marks: 20**

Roll No: _____ **Programme: _____**

Student's Signature: _____ **Invigilator's Signature:_____**

Special Instructions to the students

1. Answers written with pencils won't be considered for evaluation
2. Please **read the descriptions** of the questions (scenarios) carefully.
3. There are a total of six questions with four MCQs and carries 20 marks. For MCQs you can select one/all that applies as answers for a given MCQ. Please refrain from writing long explanations for MCQ questions. **Keep the explanations short and to the point (4-5 lines).**
4. **Feel free to use extra page** for any calculations/rough work but **they won't be considered for evaluations**.

Marks Table (To be filled by the Evaluator)

Question No / Marks	Initial	Final	Name of the Evaluator
1			
2			
3			
4			
5			
6			

General Instructions to the students

1. Place your Permanent / Temporary Student ID card on the desk during the examination for verification by the Invigilator.
2. Reading material such as books (unless open book exam) are not allowed inside the examination hall.
3. Borrowing writing material or calculators from other students in the examination hall is prohibited.
4. If any student is found indulging in malpractice or copying in the examination hall, the student will be given 'F' grade for the course and may be debarred from writing other examinations.

Best of Luck

Welcome to the Operating Systems and Networks Design Event. A team of system designers, OSNT, are planning to build a new operating system and are looking to recruit new team members. They wanted to test you to see if you could join their team. You have 40 minutes to answer some questions that they have for you. Each question is awarded some points, and at the end of it, the final points you receive determine your entry into the team.

1. As a first step to process virtualization, the team has identified that a process at any point can be in one of the three states: ready, running or blocked. Since you know Unix OS principles, they wanted to check with you when a process should alternate between these states. Please explain briefly (with a diagram) the states and their transitions **(4 points)**

2. The team has developed two key system calls for process management, fork() and exec() but they want your opinion on whether both are needed or just one would suffice. What do you suggest? Please mark option(s) followed by explanation **(3 points)**
   A. Only fork() is needed
   B. Both exec() and fork() is needed
   C. The team also needs to introduce a wait() call
   D. Only exec() is needed

3. The team wants the OS to get control when a system call happens so that this control can be used to schedule another process. However, the team also wants some other mechanism through which OS can gain control. What do you suggest to the team? Can you briefly explain the mechanism that can be used in such a situation? **(4 points)**

4. The team is planning to implement a scheduling policy in the OS, but they are deliberating between multiple schedulers. The team is assuming that the OS will be aware of the expected completion time of each process. Given two processes, A and B, where A arrives at t = 0, and B comes at t = 2, with A requiring 10 seconds to run and B requiring 7 seconds to run. Which of the following do you recommend and why? Please mark option(s) followed by explanation **(3 points)**
    A. First come first serve
    B. Shortest time to completion first
    C. Round robin
    D. Any of the above

5. The team has built a protocol stack (for supporting networking) inside the OS, which follows this OSI model. They wanted to confirm with you what the role of the data link layer is and why? Please mark option(s) followed by explanation **(3 points)**
    A. end-to-end delivery
    B. hop-to-hop delivery
    C. service-to-service delivery
    D. application-to-application delivery

6. The team plans to ship a video streaming application along with the OS as a utility application. The goal of the streaming application will be to support online meetings, classes, etc. The team is deliberating between different protocols at the transport layer to accomplish this. What protocol would you recommend on the transport layer and why? Please mark option(s) followed by explanation **(3 points)**
    A. TCP
    B. UDP
    C. SMTP
    D. HTTP

Now that you have completed the task, it's time to wait to know your final points!!!

**********Extra Space**********

**********Extra Space**********