Indian Institute of Engineering Science and Technology, Shibpur

BTech (CST) 6th Semester Mid-Semester Examination, February 2024

Operating Systems (CS 3201)

Full Marks: 30

Time: 2 Hours

- Attempt all three (3) questions.

- Answers should be precise, to the point, and in your own words as far as practicable.

- Make your own assumptions, if necessary, and state them at proper places.

1. With the help of suitable diagram(s) and example(s) explain the interactions among User programs, Operating System, and IO Devices in a time-sharing multitasking system.

[10]

2. (a) Explain the motivation behind the idea of having processes (that is, the process abstraction) for execution of programs under an operating system.

(b) For a process, what are the information that a time-sharing multitasking Operating System would maintain in its process-related data structures, and for what purpose? For any two process-related system calls, state their effects on those data-structures.

[3+7]

3. Propose a working scheme for implementation of a **shared stack** data structure. which can be used (shared) by multiple concurrent processes. Propose solution for (i) **create a new stack** (ii) **get an existing stack** (iii) **push into a stack**, and (iv) **pop from a stack** operations. Please note that your scheme must include proper measures to avoid race condition.

[10]

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(2021CSB043)