Institute of Information & Communication Technology

University of Sindh, Jamshoro

BSIT part – III 2nd Semester Examination (Morning / Evening) Regular

ITEC-520 Operating System

December 04, 2018 Marks 60 Time: 2 hours

***Note: Attempt any four questions, all carry equal marks.***

Q.No.1 (a) What are three general ways of passing parameters to operating system routines? Discuss each of these along with their strengths and weaknesses.

(b) What is distinction between blocking and non-blocking with regard to message passing? For what kind of applications is “Non-blocking send blocking receive” combination appropriate?

(c) In what ways does the modular kernel approach differ from the layered approach?

Q.No.2 (a) You have to develop a software system that has a number of tasks to perform, which can be implemented as separate unit of executions either as threads or processes. Which approach will you take and why?

(b) Compare between process switching and thread switching?

(c) Draw a Process State Diagram and discuss events that cause the process to change its state from one to another

(d) When a process creates a child process, what resource options and execution options are possible?

Q.No.3 (a) Describe the differences among short-term, medium-term, and long-term scheduling.

(b) Discuss any two examples in which a multithreaded application provides better performance than a single-threaded application.

(b) Differentiate between user-level threads and kernel-level threads.

Q.No.4 (a) List down and discuss some hypothetical example scenarios involving concurrent execution of multiple threads or processes which may lead to critical section problem.

(b) List down and discuss briefly mutual exclusion requirements and illustrate diagrammatically the mutual exclusion mechanism in abstract terms.

(c) List down and discuss two major drawbacks of interrupt-based implementation of mutual exclusion.

Q. No.5 (a) Demonstrate, through pseudo code, implementation of mutual exclusion using Special Machine Instructions: (1) Compare &

Swap Instruction and (2) Exchange Instruction.

(b) Do hardware-based solutions (interrupts and special machine instructions) guarantee fulfillment of one of mutual exclusion requirements: no deadlock and starvation? Justify your answer (whether yes or no) through examples.

Q.No.6 (a) List down and briefly discuss various software based mechanisms commonly used in implementing Mutual Exclusion (e.g., semaphores, mutex, monitors)

(b) Show, through pseudocode, implementation of mutual exclusion using semaphores. What are your thoughts on if the semaphore-based implementation of mutual exclusion guarantees fulfillment of “no deadlock and starvation” mutual exclusion requirement?

The End