Institute of Information & Communication Technology

University of Sindh, Jamshoro

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

ITEC-520 Operating System

December 09, 2019 Marks 100 Time: 2.5 hours

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

Q.No.1 (a) List down and discuss briefly various services offered by most Operating Systems.

(b) Differentiate between hardware interrupt and software interrupt, and list down the events that can cause software interrupt.

(b) How does the operating system serve the interrupt?

Q.No.2 (a) What method – System Calls or APIs - would you prefer to call OS routines and why?

(b) What three methods of passing parameters to OS have been proposed in the literature? Discuss weaknesses and strengths of

each of three.

(c) In what ways is the modular kernel approach similar to and different from the layered approach?

Q.No.3 (a) What information does Process Control Block (PCB) contain? What actions does Operating System take when it performs context-switching between processes?

(b) Differentiate between short-term and long-term scheduling, and why it is so important that the latter should select a good mix of I/O-bound and CPU-bound processes.

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

Q.No.4 (a) Differentiate between Message Passing and Shared memory model and discuss when will you prefer what model?

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

(c) Suppose the software system functionality involves a number of tasks which can be implemented as separate threads or separate processes. Whether will you implement tasks as threads or as processes and why?

Q.No.5 (a) Discuss, through high-level example scenarios, what is motivation behind developing applications as multithreaded rather than single-threaded.

(b) Differentiate between user threads and kernel threads. Java threads are created and managed by Java thread library but why Java threads are said to be kernel threads.

(c) Can a multithreaded solution using multiple user-level threads achieve better performance on a multiprocessor system than on a single processor system? Explain

Q.No.6 What is an idea of “Implicit Threading”? Discuss the following concepts as related to Implicit Threading

(a) Thread Pools (b) OpenMP (c) Grand Central Dispatch

Q.No.7. (a) Discuss through examples what is a critical section problem?

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

(c) What are potential drawbacks of interrupt-based implementation of mutual exclusion?

Q. No.8 (a) Demonstrate, through pseudo code, implementation of mutual exclusion using Special Machine Instructions: (1) Compare &

Swap Instruction and (2) Exchange Instruction.

(b) Discuss semaphores, Deadlock and Starvation

The End