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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES
B.Sc. General Degree in Applied Sciences
Third Year Semester II Examination April/ May 2016

COM3306 – OPERATING SYSTEMS

Answer **any five (05)** questions Time: **3 hours**

01 a. ***"The kernel is the heart of an operating system"***. Briefly discuss the features of kernel and compare it with other system programs.

(05 Marks)

b. ***"Devices of computer systems have device controllers"***. Explain the function of these device controllers.

(05 Marks)

c. ***"The occurrence of an event is usually signaled by an interrupt from either the hardware or the software"***. Discuss what happens when the CPU is interrupted.

(10 Marks)

02 a. Explain the major differences between asynchronous and synchronous multiprocessing.

(05 Marks)

b. ***"Clustering is usually used to provide high-availability service"***. Discuss the features of clusters systems that target high-availability.

(10 Marks)

c. Briefly discuss the advantages of client-server computing.

(05 Marks)

03 a. Discuss the functions of long-term, medium-term, and short-term schedulers in scheduling processes.

(10 Marks)

b. ***"In general, most processes can be described as either I/O bound or CPU bound"***. Discuss how to distinguish a CPU bound process from an I/O bound process.

(05 Marks)

c. Briefly explain when scheduling decisions are made.

(05 Marks)

04 a. What is a race condition? Discuss possible measures to prevent a race.

(10 Marks)

b. ***"Busy-waiting is an unattractive way of achieving mutual exclusion"***. Discuss why busy-waiting is unattractive.

(05 Marks)

c. ***"A semaphore is a system implemented variable to count pending wakeups"***. Briefly discuss the use of semaphores in mutual exclusion.

(05 Marks)

05 a. Discuss how a deadlock occurs in a multiprogramming environment.

(05 Marks)

b. Discuss different approaches to deadlock prevention.

(10 Marks)

c. ***"Recovery from a deadlock through preemption usually involves rollback"***. Briefly discuss the recovery from a deadlock through preemption.

(05 Marks)

06. a. ***"Swapping of processes into and out of memory introduces multiple (unusable) holes in memory"***. Explain how these holes are created and the measures to solve this problem.

(05 Marks)

b. ***"During execution the virtual addresses have to be mapped to physical memory addresses"***. Elaborate the process of mapping virtual memory addresses on to physical memory addresses.

(10 Marks)

c. What happens when a page fault occurs?

(05 Marks)

07 a. Compare and contrast magnetic disks with solid-state disks.

(05 marks)

b. Discuss the elevator algorithm of disk arm scheduling.

(05 Marks)

c. Explain the operation of a stable storage system.

(10 Marks)

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