73

RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Applied Sciences
First Year - Semester II Examination – February/ March 2019

ICT 1308 – OPERATING SYSTEMS

Time: Three (03) hours

Answer all Questions.

1.

a. State the two modes CPU can operate. Briefly explain the functions CPU can perform when it operates in these two modes respectively.

(05 Marks)

b. State two (02) example situations where Real time Operating Systems are used. Explain what kinds of functionalities are expected from such a system than an operating system in a normal personal computer.

(05 Marks)

c. **"Virtual machine architecture of OS facilitates platform independency".** Explain this statement with respect to Java Virtual Machine.

(04 Marks)

d. User processes invoke OS functions through system calls. Explain whether user processes can directly make such kernel calls to get the functionalities of hardware devices.

(06 Marks)

(Total: 20 marks)

2.

a. **" Parallelism you see in single CPU environment is an illusion ".** Explain how you achieve multiprogramming in such an environment.

(04 Marks)

b. **"Processes can change their state from running to blocked and running to ready".** Explain with suitable examples, how these 2 transmissions are different from each other.

(05 Marks)

c. Explain what the arguments for having threads in multiprogramming environment are.

(05 Marks)

d. State what are the issues of implementing threads in user space?

(06 Marks)

(Total: 20 marks)

3.

a. **"Priority inversion problem can occur when achieving mutual exclusion with busy waiting".** Explain what priority inversion problem is with respect to Inter Process Communication (IPC).

(05 Marks)

b. Compare and contrast **blocking system calls** and **busy waiting** techniques that are used to achieve mutual exclusion in IPC.

(06 Marks)

c. Distinguish between Input Output (IO) bound processes and Computer (CPU) bound processes.

(05 Marks)

d. Explain why the goals of scheduling algorithms are different in interactive systems and real time systems.

(04 Marks)

(Total: 20 marks)

4.

a. **"Deadlock recovery through roll back is better than recovering through preemption"** Do you agree? Justify your answer.

(05 Marks)

b. **"Deadlock prevention through attacking hold and wait condition is difficult".** State the reasons for this statement.

(04 Marks)

c. Explain how the performance of the CPU can be enhanced using a Direct Memory Access (DMA) controller.

(06 Marks)

d. Distinguish between a precise interrupt and an imprecise interrupt.

(05 Marks)

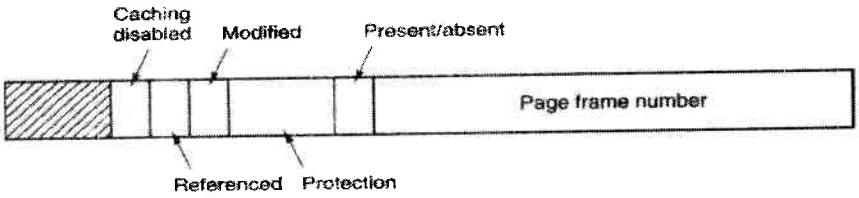
(Total: 20 marks)

5.

a. Explain the necessity of swapping and Virtual Memory (VM) techniques in multi programming environment.

(06 Marks)

b. This is the structure of a page table entry. Explain the use of modified, referenced, present/absent bits in the entry.



(06 Marks)

c. **"File can be implemented with contiguous allocation of blocks or linked list allocation".** Compare and contrast these 2 methods by explaining their advantages and disadvantages.

(05 Marks)

d. **Path name to file can be given as relative path name and absolute path name.** State how these two terms differ.

(03 Marks)

(Total: 20 marks)

- END -