RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

BSc. in Information Technology
First Year - Semester I/ Examination – January / February 2023

ICT 1308-OPERATING SYSTEMS

Time: THREE (03) hours

- There are **FIVE (05)** questions in **TWO (02)** pages.
- Answer **ALL** questions.

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1. a) What is the purpose of system software? Briefly explain with examples.

    (05 marks)

   b) Mention 2 situations where real time operating systems are used. Explain what kind of functionalities are expected from the real time operating systems over the operating systems installed in personal computers.

    (06 marks)

   c) What is the concept of multiprogramming in operating systems?   (04 marks)

   d) What are the advantages of layered architecture?   (05 marks)

2. a) What is the purpose of program counter?   (04 marks)

   b) Briefly explain pipelining and super scalar techniques in processor.   (06 marks)

   c) What are the two modes of execution in CPU and explain each mode?   (06 marks)

   d) Briefly explain the different ways input output operations can be initiated.

    (04 marks)

3. a) Explain the states of processes using a diagram.   (05 marks)

   b) What are the advantages of threads?   (05 marks)

c) What are the differences between thread and process? (05 marks)

d) What is busy waiting? Why is it not good to achieve mutual exclusion? (05 marks)

4. a) Consider a system having *m* resources of the same type. These resources are shared by 3 processes A, B and C which have peak demands of 3, 4 and 6 respectively. Apply the following values for m and determine which values will not result in the deadlock.
   i.   7
   ii. 9
   iii. 10
   iv. 13
   (06 marks)

b) What is the function of Direct Memory Access? (04 marks)

c) Justify how the Level 01 and Level 02 Redundant Array of Independent Disks (RAID) share the files (06 marks)

d) Discuss the progress of virtual memory systems over systems with no memory abstraction. (04 marks)

5. a) Briefly explain concept of memory swapping. (04 marks)

b) Discuss the advantages of memory management with linked list over using bitmap. (04 marks)

c) What are the regular files in a file system? Explain with two examples. (04 marks)

d) Consider page reference string 1, 2, 0, 2, 4, 6, 4 with 3-page frames.Find the number of page faults using First in First Out (FIFO) page replacement algorithm. (04 marks)

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