Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
400 level 1st Semester Examination – May/July 2017
IIT413-2 Operating Systems Concepts and Design

Uva Wellassa University

Instructions to candidates
Duration: Two (02) hours
Number of questions: Four (04)
Mark allocation: 100
Answer all the questions

1.
   a. Describe the essential properties of batch operating system. (4 mark)
   b. Write a short note on **system calls**. (5 mark)
   c. Briefly explain the working process of **kernel** in operating system. (4 mark)
   d. "Thread is called as light weight process". Do you agree with this statement? Justify your answer. (4 mark)
   e. Define **context switching** and explain it with necessary diagram/s. (6 mark)

2.
   a. Differentiate preemptive and non-preemptive CPU scheduling. (8 mark)
   b. List the criteria for evaluating the performance of CPU scheduling algorithms. (4 mark)
   c. Explain the **convey effect** in CPU scheduling. (4 mark)
   d. What is meant by **starvation** in an operating system? (4 mark)
   e. Briefly explain the **paging** with Translation Lookaside Buffer (TLB). (8 mark)

3. Consider a system with five (05) processes and three (03) resource types. At the time t_0 the following snapshot of the system has been taken.

	Allocated			Maximum			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	1	1	2	4	3	3	3	1	0
P2	2	1	2	3	2	2			
P3	4	0	1	9	0	1			
P4	0	2	0	7	5	3			
P5	1	1	2	11	2	3			

   a. Determine the total amount of resources of each type. (3 mark)
   b. Compute the need matrix. (2 mark)
   c. Determine whether the state is safe or not using Banker's algorithm. (8 mark)

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d. Would the following request be granted in the current state?
   i. P1 < 3, 3, 1 > (2 mark)
   ii. P2 < 2, 1, 0 > (2 mark)

e. What are the weaknesses of Banker's algorithm? (4 mark)

4.

a. Compare and contrast internal and external fragmentation in memory management. (6 mark)

b. Describe the various RAID levels in detail. (8 mark)

c. Write short notes on main three (03) file access methods. (6 mark)

d. Consider the page reference string "2 3 2 1 5 2 4 5 3 2 5 2" and find how many page faults will occur for the Least Recently Used and Optimal page replacement algorithms.
(Note: Consider frame size as three (03))
(8 mark)