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Question Paper Code : 51344

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Fourth Semester

Computer Science and Engineering

CS 2254/CS 45/CS 1253/080250012/10144 CS 405 — OPERATING SYSTEMS

(Common to Information Technology)

(Regulation 2008/2010)

(Also Common to PTCS 2254 – Operating Systems for B.E. (Part-Time)
Fourth Semester Computer Science and Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Can multiple user level threads achieve better performance on a multiprocessor system than a single processor system? Justify your answer.
2. Mention the circumstances that would a user be better off using a time-sharing system rather than a PC or a single user workstation?
3. Write the four situations under which CPU scheduling decisions take place.
4. Show that mutual exclusion may be violated if the signal and wait operations are not executed atomically.
5. Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames. Find the number of bits in the logical address and the physical address.
6. Define virtual memory.
7. List the attributes of a file.
8. What are the information contained in a boot control block and partition control block?

9. What is meant by polling?
10. State any three disadvantages of placing functionality in a device controller, rather than in the kernel.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the purpose of system calls and discuss the calls related to device management and communications in brief. (8)
- (ii) Discuss the different multithreading models along with their issues. (8)

Or

- (b) (i) Explain the concept of virtual machines, their implementation and benefits in detail. (8)
- (ii) Discuss the execution of remote procedure call and remote method invocation with supporting diagrams. (8)
12. (a) Discuss how scheduling algorithms are selected for a system. What are the criteria considered? Explain the different evaluation methods. (16)

Or

- (b) Consider the following snapshot of a system:

P0 — P4 are 5 processes present and A, B, C, D are the resources. The maximum need of a process and the allocated resources details are given in the table.

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following based on banker's algorithm

- (i) What is the content of NEED matrix? (6)
- (ii) Is the system in a safe state? (2)
- (iii) Which processes may cause deadlock if the system is not safe. (3)
- (iv) If a request from process P1 arrives for (0,4,3,1) can the request be granted immediately? Justify. (5)

13. (a) (i) Why are translation look-aside buffers important? Explain the details stored in a TLB table entry. (8)
- (ii) Explain the concept of demand paging in detail with neat diagrams. (8)

Or

- (b) (i) Explain any two structures of the page table with neat diagrams. (8)
- (ii) Consider the following page reference string:
1, 2, 3, 4, 2, 1, 5, 6, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for the LRU, FIFO, LFU and Optimal page replacement algorithms, assuming two and five frames? (8)
14. (a) (i) Explain the common schemes for defining the logical structure of a directory. (8)
- (ii) Explain how file system management is done in Linux. (8)

Or

- (b) (i) Explain the different file access methods in detail. (8)
- (ii) Discuss how file system is implemented in Windows XP. (8)
15. (a) (i) Write a brief note on the steps involved in DMA transfer. (8)
- (ii) Explain the data structures supported by kernel I/O subsystem? (8)

Or

- (b) (i) Describe any three disk scheduling algorithms with suitable illustrations. (12)
- (ii) Write a brief note on tertiary storage devices. (4)
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