

Code: 9A15401

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**OPERATING SYSTEMS**

(Computer Science and Systems Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Why operating systems exist?  
(b) Explain how reasonable response time can be ensured in a time-sharing system.  
(c) "Protection can improve reliability." Explain how.
- 2 (a) Explain with a neat diagram how the CPU switches from process to process.  
(b) Write about FCFS CPU scheduling algorithm giving its merits and demerits.
- 3 (a) What is critical section? What requirements are to be satisfied while solving the critical section problem?  
(b) Explain two-phase locking protocol to ensure serialization.
- 4 (a) Explain multi step processing of a user program.  
(b) Give a note on the performance of demand paging.
- 5 How to prevent deadlocks, by constraining how requests for resources are made?
- 6 (a) Some systems automatically open a file when it is referenced for the first time and close the file when the job terminates. Discuss the advantages and disadvantages of this scheme compared with the more traditional one where the user has to open and close the file explicitly.  
(b) Give a note on virtual file systems.
- 7 Explain the physical structures of magnetic tapes and disks.
- 8 How access matrix can be used for providing protection?

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- 1 (a) Define the following:  
(i) Job pool. (ii) Job scheduling. (iii) CPU scheduling.
- (b) List five services provided by an operating system that are designed to make it more convenient for users to use the computer system. In what cases it would be impossible for user-level programs to provide these services? Explain.
- 2 (a) Which scheduler controls the degree of multiprogramming? Explain.
- (b) Explain multilevel feedback queue scheduling in detail.
- 3 (a) Explain the two general approaches used to handle critical sections in operating systems.
- (b) Explain how timestamp protocol ensures conflict serializability.
- 4 (a) Differentiate between logical and physical addresses.
- (b) What is a page fault? Explain the steps involved in handling a page fault.
- 5 (a) What is the use of protocol that allows a process to request resources only when it has none?
- (b) What are the disadvantages of hold and wait condition?
- (c) How do you ensure no preemption in deadlocks?
- 6 (a) Discuss about the information associated with an open file.
- (b) Discuss about UNIX semantics and session semantics.
- 7 (a) How reliability of disk is improved via redundancy?
- (b) How performance of disk is improved via parallelism?
- 8 Explain the capability based protection system HYDRA.

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- 1 (a) Explain the operating system functions that ensure the efficient operation of the system itself.  
(b) It is sometimes difficult to achieve a layered approach if two components of the operating system are dependent on each other. Identify a scenario in which it is unclear how to layer two system components that require tight coupling of their functionalities.
- 2 (a) Can a multithreaded solution using multiple user-level threads achieve better performance on a multiprocessor system than on a single-processor system? Explain.  
(b) Explain shortest-remaining-time-first scheduling algorithm with an example.
- 3 (a) Give a detailed note on synchronization hardware.  
(b) Explain in brief the stable storage.
- 4 Explain paging scheme for memory management, Illustrate the hardware support for paging and explain the concept of paging with an example.
- 5 (a) What is the difference between programmed I/O and DMA?  
(b) With the help of a diagram, explain DMA.
- 6 (a) Discuss in detail about the file system structure.  
(b) Explain the techniques used to improve the efficiency and performance of a secondary storage.
- 7 Explain the performance issues of tertiary storage management.
- 8 Explain how operating system provides security.

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**OPERATING SYSTEMS**

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Time: 3 hours

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- 1 (a) Explain the three general methods used to pass parameters to the operating system.  
(b) List the services provided by an operating system that are designed to make it more convenient for users to use the computer system. In what cases it would be impossible for user-level programs to provide these services? Explain.
- 2 (a) What are the benefits of multithreaded programming?  
(b) Give a note on multithreading models.
- 3 (a) Distinguish a counting semaphore from a binary semaphore.  
(b) Give a note on atomic transactions.
- 4 (a) With a neat diagram explain paging hardware with TLB.  
(b) Explain memory management in UNIX.
- 5 (a) How requesting and releasing of resources affects deadlocks?  
(b) What is resource allocation graph? How resource allocation graph can be used to handle deadlocks.
- 6 Explain in detail various disk allocation methods.
- 7 What are starvation problems in disk scheduling? Which of the disk scheduling algorithms suffer with this problems and why? Is there any exclusion. Justify your answer.
- 8 Compare different methods for implementing access matrix.

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