

2005 Indira Gandhi National Open University (IGNOU) M.C.A Computer Applications

CS13 Operating Systems

MCA (III Yr)
Term-End Examination

December, 2005

Time: 3 hours
Maximum Marks: 75

Note : Question No. 1 is compulsory. Answer any three questions from the rest.

1. (a) Write an algorithm to explain the producer/consumer problem with an unbounded buffer in concurrent programming. (7)

(b) Explain the functional specifications for partition allocation of memory in a system with static partitioning. List the advantages and disadvantages of it. Also describe the necessary hardware support for protection. (9)

(c) When does a page fault occur? Describe the action taken by the operating system when a page fault occurs. (6)

(d) What is process migration in a distributed system? List its advantages. Write the step-by-step procedure to migrate a process to the destination node. (8)

2. (a) A file system, resident on the disk should have the following characteristic features:

(i) The file records should be read sequentially as well as randomly.

(ii) There should be a practical limit of the file size.

(iii) The file space allocated, should neither be under-utilized nor over-utilized.

Explain the most suitable file space allocation scheme keeping in mind the features above. Justify your answer. (4)

(b) Explain the Flynn's classification of parallel computer architecture. Also, give the classification of shared memory multiprocessors on the basis of memory architecture and access delays. (7)

(c) What is the data structure that records all the information about a particular process in an O/S? List the fields for recording various aspects of process execution and resource usage. (4)

3. (a) What is a process? How is it different from a program? What are the different states of a process? How does a process change from one state to another? (5)

(b) Write, and explain, the deadlock detection algorithm. (6)

(c) List at least four common responsibilities of the file management system in an O/S. (4)

4. (a) What is the primary goal of Authentication ? How can you achieve this goal through (i) the password mechanism, and (ii) artifact-based mechanism ? (7)

(b) With the help of a block diagram explain the client/server division of labour of file system in a workstation based model of distributed computing. (8)

5. (a) Write an algorithm for implementing Dining philosophers problem using semaphores. (7)

(b) Explain the principles of operation of virtual memory. Write any two distinct replacement algorithms. (8)

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