BCA (Sem–4)

OPERATING SYSTEMS

Subject Code : UGCA-1923

M.Code : 79727

Date of Examination : 09-06-2024

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.
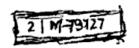
SECTION-A

1. Write briefly :

   a. What is Multiprocessor System? What are the advantages of Multiprocessors?

   b. If a process is executing in its critical section, then no other processes can be executing in their critical section. What is this condition called? Explain with the help of a diagram.

   c. What is Process Control Block in OS? Explain with the help of a diagram.

   d. What are the differences between Page table and segment table?

   e. State and explain page replacement algorithms.

   f. What are the different Accessing Methods of a File?

   g. What is Directory? What are the operations that can be performed on a Directory?

   h. How does a distributed system work? Give some examples of a distributed system?

   i. What is mobile and ubiquitous computing in distributed systems?

   j. What are basic elements or components of Linux? What is Kernel? Explain its functions.

SECTION-B

2. Consider three process, all arriving at time zero, with total execution time of 10, 20 and 30 units respectively. Each process spends the first 20% of execution time doing I/O, the next 70% of time doing computation, and the last 10% of time doing I/O again. The operating system uses a shortest remaining compute time first scheduling algorithm and schedules a new process either when the running process gets blocked on I/O or when the running process finishes its compute burst. Assume that all I/O operations can be overlapped as much as possible. Find with the help of Gantt chart for what percentage of does the CPU remain idle?

3. Draw the process state transition diagram of an OS in which (a) each process is in one of the five states and (b) only non-preemptive scheduling is used by the OS. Label the transitions appropriately.

4. Let the page fault service time be 10 ms in a computer with average memory access time being 20 ns. If one page fault is generated for every 106 memory accesses, what is the effective access time for the memory? https://www.ptustudy.com

5. A certain computer system has the segmented paging architecture for virtual memory. The memory is byte addressable. Both virtual and physical address spaces contain 216 bytes each. The virtual address space is divided into 8 non-overlapping equal size segments. The Memory Management Unit (MMU) has a hardware segment table, each entry of which contains the physical address of the page table for the segment. Page tables are stored in the main memory and consists of 2 byte page table entries. Assume that each page table entry contains (besides other information) 1 valid bit, 3 bits for page protection and 1 dirty bit. How many bits are available in page table entry for storing the aging information for the page? Assume that page size is 512 bytes.

6. What is a File? List the various File Attributes. What are the various File Operations? What is the information associated with an Open File? What are the different Accessing Methods of a File? What are the operations that can be performed on a Directory?

7. What is Linux? Discuss its features. What is the difference between UNIX and Linux? What is Linux Kernel? Discuss its functions. What is the advantage of open source? What do you mean by Linux Shell? Explain its types. Name the Linux which is specially designed by the Sun Microsystems.

(S3)-670