Student's Copy

Professional Course Examination (Odd), 2023

(3rd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Course No. : BCA/3/CC/13

(Operating Systems)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(PART : A—OBJECTIVE)

(*Marks* : 25)

SECTION—I

(*Marks* : 15)

I. Tick (✓) the correct answer in the brackets provided : 1×10=10

1. BIOS is used by

   (a) operating system ( )

   (b) compiler ( )

   (c) interpreter ( )

   (d) application software ( )

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2. Which of the following types of OS reads and reacts in terms of actual time?

   (a) Quick sharing OS   ( )

   (b) Real-time OS   ( )

   (c) Time sharing OS   ( )

   (d) Batch OS   ( )

3. FIFO scheduling is a type of

   (a) preemptive scheduling   ( )

   (b) non-preemptive scheduling ( )

   (c) deadline scheduling   ( )

   (d) None of the above   ( )

4. OS classifies the threads as

   (a) security and memory level ( )

   (b) OS and CPU level   ( )

   (c) kernel and user level   ( )

   (d) motherboard level   ( )

5. The priority of a process will _____ if the scheduler assigns it a static priority.

   (a) depend on the operating system ( )

   (b) change   ( )

   (c) remain unchanged   ( )

   (d) None of the above   ( )

6. A problem encountered in multitasking when a process is perpetually denied necessary resources is called

   (a) deadlock   ( )

   (b) starvation   ( )

   (c) inversion   ( )

   (d) aging   ( )

7. For non-sharable resources like a printer, mutual exclusion

(a) must exist   (   )

(b) must not exist   (   )

(c) may exist   (   )

(d) None of the above (   )

8. With relocation and limit registers, each logical address must be ____ the limit register.

(a) less than   (   )

(b) equal to   (   )

(c) greater than   (   )

(d) None of the above (   )

9. Every address generated by the CPU is divided into two parts, which are

(a) frame bit and page number   (   )

(b) page number and page offset   (   )

(c) page offset and frame bit   (   )

(d) frame offset and page offset   (   )

10. Which of the following are the two parts of the file name?

(a) Name and identifier   (   )

(b) Identifier and type   (   )

(c) Extension and name   (   )

(d) Type and extension   (   )

II. State whether the following statements are *True (T)* or *False (F)* by putting a Tick (✓) mark in the brackets provided :   1×5=5

1. The operating system will always record the generated bugs or errors on a log file when an operating system finds any kinds of errors.

(T / F)

2. The address of the next instruction to be executed by the current process is provided by piping.

(T / F)

3. All unsafe states are not deadlocks.

(T / F)

4. Swap space exists in secondary memory.

(T / F)

5. The first fit and best fit algorithms suffer from starvation.

(T / F)

SECTION—II

(*Marks* : 10)

III. Answer the following questions :   2×5=10

1. Define operating system. What is the primary objective of operating system?

OR

What are multiprocessor systems? Mention two advantages.

2. How does the CPU scheduler prevent the higher priority processes from indefinite running?

OR

What resources are used when a thread is created? How do they differ from those used when a process is created?

3. What are the requirements that a solution to the critical section problem must satisfy?

OR

Define deadlock.

4. Compare and contrast logical address space and physical address space.

OR

What is external fragmentation? How will you reduce it?

5. Define seek time and latency time.

OR

What are the purposes of the open( ) and close( ) operations?

(PART : B—DESCRIPTIVE)

(Marks : 50)

IV. Answer the following questions : 10×5=50

1. (a) Explain operating system functions and services in detail. 10

OR

(b) Discuss the different types of operating system in detail. 10

2. (a) Define process. Explain process states with a neat and labelled diagram. 1+5=6

(b) Write a short note on the properties and characteristics of semaphore. 4

OR

(c) Explain round-robin scheduling with an example diagram. 5

(d) Describe the different multithreading models. 5

3. (a) What are the necessary conditions for deadlock to occur in the system? 5

(b) Explain the banker's algorithm with example. 5

OR

(c) Discuss the algorithm for deadlock detection and methods for deadlock recovery. 6

(d) Write a short note on deadlock prevention. 4

4. (a) Discuss LRU approximation page replacement. 5

(b) How does segmentation differ from paging? Explain the paged segmentation with an example. 5

OR

(c) Discuss FIFO page replacement algorithm. Using FIFO algorithm, determine the number of page fault occurrences for the following reference string with three page frames : 3+3=6

4, 3, 0, 3, 2, 1, 4, 9, 2, 0, 4

(d) Write a short note on swapping. 4

5. (a) Explain file concept, file attributes and file structure. 5

(b) Discuss contiguous and linked file allocation methods with suitable diagrams. 5

OR

(c) Describe how access control list can be useful for managing file access. 4

(d) Name four file operations. 2

(e) Explain single-level and two-level directory structure. 4

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