2501403

UG (CBCS) (Third Year) (Annual) EXAMINATION, 2025

B.A. (COMPUTER APPLICATION)

Operating System (DSE-1A)

(Common with B.Sc. Physical Science DSE-2A)

COMP301 TH

Time : 3 Hours]   [Maximum Marks : 70

The candidates shall limit their answer precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit of Part B. Q. No. 1 (Part A) is compulsory.

Part A

(Compulsory Question)

1. (a) Answer all each the ten questions of 1 marks each :

(i) What is an operating system ?

(1) A collection of hardware components

(2) A software that manages hardware and software resources

(3) A programming language

(4) A type of application software

(ii) Which of the following is not a type of operating system ?

(1) Batch Operating System

(2) Network Operating System

(3) Distributed Operating System

(4) Multithreading Programming Language

(iii) What is a process ?

(1) A program in execution

(2) A function of the CPU

(3) A type of memory

(4) A data structure

(iv) What is a process control block (PCB) ?

(1) A program that controls processes

(2) A data structure storing process information

(3) An algorithm for scheduling

(4) A queue for processes

(v) Which scheduling algorithm uses the principle of "First Come, First Serve (FCFS)" ?

(1) Priority Scheduling

(2) Round Robin

(3) FCFS Scheduling

(4) Multilevel Queue Scheduling

(vi) In which scheduling algorithm is a time quantum used ?

    (1) Round Robin

    (2) Priority Scheduling

    (3) FCFS

    (4) Shortest Job Next

(vii) What is the main disadvantage of the FCFS scheduling algorithm ?

    (1) It is complex to implement

    (2) It leads to starvation of long processes

    (3) Longer process in front can make shorter process wait for longer duration

    (4) It is unfair

(viii) What is the purpose of segmentation in memory management ?

    (1) Divide memory into fixed-sized blocks

    (2) Divide memory into variable-sized segments

    (3) Prevent memory fragmentation

    (4) Swap data to secondary memory

(ix) What is virtual memory ?

    (1) Physical memory directly accessible by the CPU

    (2) An abstraction of memory space

    (3) The memory stored in a hard drive

    (4) A high-speed cache

(x) In which type of OS does the user interact directly with the hardware ?

(1) Real-time Operating System

(2) Graphical Operating System

(3) Embedded Operating System

(4) Bare-metal Operating System

(b) Answer the following questions in 25-50 words each : 5×4=20

(i) What is the primary purpose of an operating system ?

(ii) What is the difference between a program and a process ?

(iii) What is the key feature of the Round Robin scheduling algorithm ?

(iv) Define fragmentation in memory management.

(v) What is starvation in process scheduling ?

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Part B

Unit I

2. Explain Operating System. What is the Role of Operating system ? Discuss important functions performed by Operating system. **10**

3. Explain Operating system design strategies. Discuss kernel and types of kernel. What is Kernel mode and User mode ? Explain. **10**

Unit II

4. Explain 5 state Model of Process Management. Explain each state and how operating system moves process from one state to another. **10**

5. Calculate average waiting time using Shortest Remaining Time First Algorithm. **10**

Arrival time	Process	CPU Burst Time
0	P1	5
0	P2	6
2	P3	2
4	P4	8

Unit III

6. Explain paging scheme in detail. Discuss any 2 Page Replacement algorithms. **10**

7. Explain any *two* the following briefly : **4×2.5=10**

    (i) Page Table

    (ii) MMU

    (iii) Page Fault

    (iv) Thrashing.

Unit IV

8. Explain different types of shells in Linux/Unix system. **10**

9. Create a simple bash script that stores current working directory's file and folder names to a file. **10**

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