

B. Tech. Third Semester (Artificial Intelligence and Data Science) /
21-22_SOE_ADS_203.1 Examination

Course Code : AIDS 2207

Course Name : Operating Systems

Time : 3 Hours]

[Max. Marks : 50

Instructions to Candidates :—

- (1) Do not write anything on question paper except your exam seat number.
- (2) Write the accurate question number in left margin of answer book along with answers.
- (3) All questions are compulsory.
- (4) All questions carry marks as indicated.
- (5) Due credit will be given to neatness and adequate dimensions.
- (6) Assume suitable data wherever necessary and mention at the beginning of answer.
- (7) Retain the construction Lines.
- (8) Illustrate your answers wherever necessary with the help of neat sketches.

1. (A) Discuss the following types of operating systems with respect to process management, memory management :

(i) Batch OS.

(ii) Time sharing OS.

(iii) Real time OS.

3 x 2 = 6(CO1)

(B) Distinguish between :

(I) Multitasking and Multiprogramming.

(II) User level and Kernel level threads.

1.5 x 2 = 3(CO1)

2. (A) Consider the 4 processes P1, P2, P3, P4 with the length of CPU burst time are :

Process	Arrival Time	Burst Time	Priority
P1	0	8	3
P2	1	4	4
P3	2	2	2
P4	3	5	1

- (a) For each of the following algorithms, compute average waiting time, average turn-around time :

(I) ~~SRTF~~

(II) ~~RR(T.S = 2 ms)~~

(III) Priority (Preemptive).

- (b) Which of the scheduling algorithm results in the minimal average waiting time ? $1 + 2 + 2 + 1 = 6$ (CO2)

- (B) Explain how improper implementation of a semaphore can lead to a deadlock. (3)(CO2)

3. (A) A computer system uses the Bankers algorithm to deal with deadlocks. Its current state is shown in tables below, where P0, P1, P2 are processes and R1, R2, R3 are resource types :

(I) What is the content of need matrix ?

(II) Show that the system can be in safe state.

Maximum need			
	R0	R1	R2
P0	4	1	2
P1	1	5	1
P2	1	2	3

Current ALLOCATION			
	R0	R1	R2
P0	1	0	2
P1	0	3	1
P2	1	0	2

Available		
R0	R1	R2
2	2	0

$1 + 5 = 6$ (CO3)

- (B) What is deadlock ? Differentiate between deadlock prevention and deadlock avoidance. 0.5 + 1.5 = 2(CO3)

4. (A) (i) Explain the concept of segmentation.
- (ii) Consider a machine with 64 MB physical memory and a 32 bit virtual address space. If the page size is 4 KB, what is the approximate size of the page table. 2 + 3 = 5(CO4)

- (B) Explain in detail about the following dynamic memory allocation schemes with suitable example :

(1) Best Fit.

(2) Worst Fit.

(3) First Fit.

3(CO4)

5. (A) Consider the page of reference string :

1 2 3 4 5 3 4 1 6 7 8 7 8 9 7 8 9 5 4 5 9 2

Assume page frame size = 4, Find out the algorithm having minimum page fault rate :

(i) FIFO

(ii) LRU

(iii) Optimal

3 x 2 = 6(CO4)

- (B) Explain the concept of locality of reference.

2(CO4)

6. (A) Suppose that a disk drive has 2000 cylinders. The drive is currently serving a request at cylinder 190 and the previous request was at cylinder 145. The queue of pending request, in FIFO order is :

86, 1890, 913, 1679, 945, 1500, 1020, 1745, 180.

Starting from the current head position, what is the total distance (in cylinder)

that disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms ?

(i) ✓ FCFS

(ii) ✓ SSTF

(iii) ✓ LOOK

(iv) ✓ C-LOOK

(v) ✓ SCAN

(vi) ✓ C-SCAN

(6(CO5)

(B) Differentiate between linked and indexed file allocation methods.

2(CO5)

