July-22-00274

B. Tech. EXAMINATION, 2022

Semester IV (CBCS)

OPERATING SYSTEM

CS-402

Time : 3 Hours
Maximum Marks : 60

The candidates shall limit their answers 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 Sections A, B, C and D. Q. No. **9** is compulsory.

Section A

1. (i) With a suitable diagram, explain Multi-programming and Multi-processing. **5**

   (ii) What is a virtual machine ? Explain its various modes. **5**

2. Explain in detail the modular and microkernel based architecture of an operating system. **10**

Section B

3. Consider the following snapshot of a system : **10**

	Allocation	Max	Available
	A B C D	A B C D	A B C D
P0	1 0 1 2	0 0 1 2	1 6 2 0
P1	0 0 0 0	1 7 5 0	
P2	1 3 3 4	2 3 5 6	
P3	0 6 3 2	0 7 5 2	
P4	0 0 1 4	0 7 5 6	

   (i) Is the system in a safe state ? Explain with reason.

   (ii) If a request from process P1 arrives for (0, 4, 2, 1), can the request be granted immediately ?

4. Consider the following table (assume non-preemptive scheduling) : **10**

Process	Arrival Time	Burst Time
P1	0.0	8
P2	0.4	4
P3	1.0	1

Give the Gantt chart and calculate average turnaround time using :

(i) FCFS scheduling

(ii) SJF scheduling

(iii) Considering the scenario given above, give the Gantt Chart and compute average turnaround time if the CPU is left idle for the first 1 unit then SJF scheduling is used. (Remember that processes P1 and P2 are waiting during this idle time, so their waiting time may increase).

Section C

5. (a) Consider the following segment table : 10

Segment	Base	Length
0	319	600
1	1300	14
2	80	100
3	1427	580
4	2052	96

What are the physical addresses for the following logical addresses ?

(i) 0,628

(ii) 1,1

(iii) 2,445

(iv) 3,120

(b) With a suitable diagram, explain internal and external fragmentation.

6. (a) Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames. 10

(i) How many bits are there in the logical address ?

(ii) How many bits are there in the physical address ?

(b) Given a system using un-spanned blocking (two or more records can reside in same block) and 100-byte blocks. A file contains records of 20, 50, 35, 70, 40, 20. What percentage of space will be wasted in the blocks allocated for the file ?

(c) Categorize the files into various groups on the basis of extension :

.c, .bat, .txt, .rtf, .dll, .java, .sh, doc, .lib.

Section D

7. Explain in detail the various ways for implementing Access matrix in the system. **10**

8. (a) What are the various breaches through which the Security of the system can be compromised ? **5**

   (b) Explain Crytography in detail. **5**

(Compulsory Question)

9. (i) What is the main function of the command interpreter ? **2**

   (ii) What is the difference between Time Sharing and Real Time systems ? **2**

   (iii) What type of kernel does OS X have ? **2**

   (iv) Draw a diagram representing various states of a process. **2**

   (v) Where is the operating system placed in the memory ? **2**

   (vi) What is Concurrency ? **2**

   (vii) What is the difference between Kernel and Microkernel ? **2**

   (viii) What is Cascading termination ? **2**

   (ix) When FCFS CPU scheduling is considered as troublesome ? **2**

   (x) Why the layered approach of designing an operating system is considered good ? **2**