2 C 3035

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TEST-1

Q.1 Module-1

a)

a) An Operating System is defined as an interface between

Q-1

b) Distinguish between:

ii)

| Multitasking | Multiprogramming |
|---|---|
| → More user-centric, allowing multiple tasks to run concurrently to enhance user experience. | → Primarily focused on efficient utilization of CPU time by keeping multiple programs ready to execute. |
| → Focuses on providing responsiveness and interactivity by quickly switching between tasks. | → It aims to maximise processor utilization by overlapping CPU and I/O operations to different programs. |
| → Involves dynamic and rapid switching between tasks based on user input and priority, or other scheduling criteria. | → Switching between programs is usually done after the completion of a predefined time slice or when the program enters the I/O wait state. |
| → Geared towards interactive systems, allowing users to run multiple applications simultaneously. | → Primarily designed for batch processing without much emphasis on user interaction during program execution. |

| i) | Multi-processor Systems | Clustered Systems |
|---|---|---|
| → | Multiple processors share a common memory and is tightly coupled. All processors can access the shared memory and they communicate with each other through this shared memory. | → It is composed of multiple independent systems connected through a network. Each node has its own memory and processors, and communication between nodes is done through the network. |
| → | It has a single shared memory space that all processors can access. | → Each node has its own local memory, and memory is not shared across the nodes. |
| → | Communication between processors is typically faster and has lower overhead since they have a common memory space. | → Network communication is involved which may have higher latency and overhead compared to direct memory access. |
| → | Scalability may be limited on adding more processors as many in the shared memory space could lead to contention and increased complexity. | → Can achieve better scalability by adding more nodes to the cluster since each node operates independently. |

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Q-1

a) An operating system is a system software that acts as an interface between the computer hardware and the user of the system. It is a software that manages computer hardware. OS allows the user to execute programs in a convenient and efficient manner.

Services of Operating system:

Services for the user of the system include

- User Interface: Means by which users can issue commands to the system. Depending on the operation, the user operating system there may be a command line interface. A graphical user interface (GUI), or a batch command system. In batch - interface, commands and directives to control these commands are put in a file and then the file is executed. Similarly, in In GUI system, window with use pointing device to get inputs on and keyboard to enter the text.
- Program Execution: The OS must be able to load a program into RAM, run the program and terminate the program, either normally or abnormally.
- I/O Operation: The OS is responsible for transferring data to and from I/O devices, including keyboards, terminals, printers and files.

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- File - System manipulation: Programs need to read and write files or directories. The services required to create and delete files, search for a file, list the contents of a file and change the file permissions are provided by the Operating System.
- Error detection: Both software and hardware errors must be detected and handled appropriately by the OS.

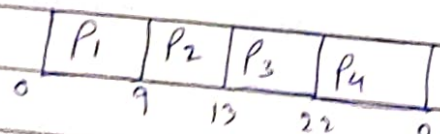
## Module - 2

Q-4

a)

| Process | Arrival Time | Burst Time | Priority | C.T. | T.A.T |
|---|---|---|---|---|---|
| P1 | 0 | 9 | 3 | 9 | 9 |
| P2 | 1 | 4 | 2 | 13 | 12 |
| P3 | 2 | 9 | 1 | 22 | 20 |
| P4 | 3 | 5 | 4 | 27 | 24 |

i) FCFS:



← Gantt Chart.

Average turnaround time: $\frac{9+12+20+24}{4} = \frac{65}{4} = 16.25$ ms

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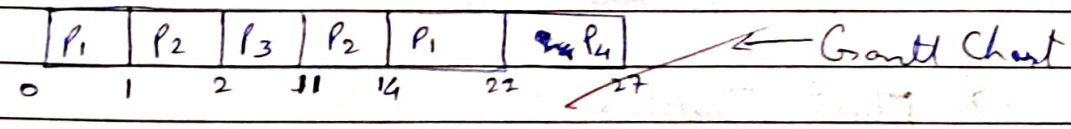
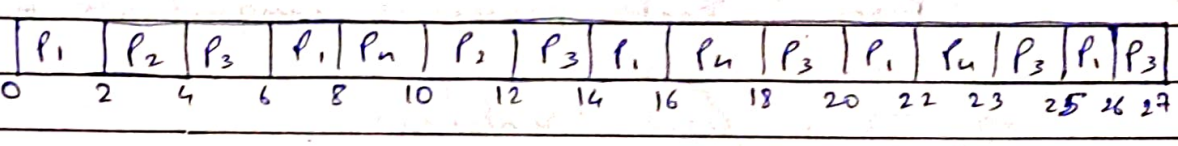
Average Waiting Time = $\frac{0+8+11+19}{4} = \frac{38}{4} = \frac{19}{2} = 9.5$

iii) SRTF


ii) Priority (Pre-emptive):



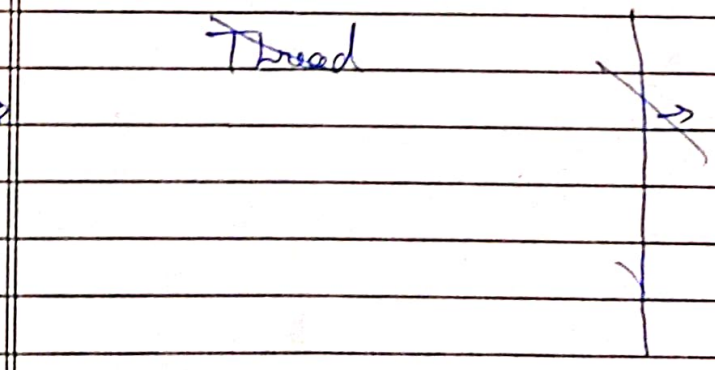

iii) RR ($q = 2ms$)




W.T.
0
8
11
19

Q4

b)



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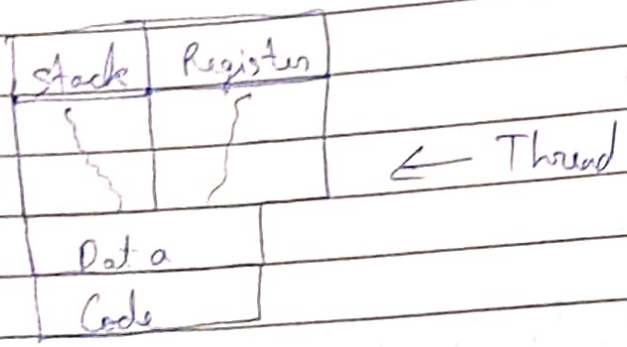
Ques

1-4

b) Thread :




→ Multi-Tasking

→ It is ~~highly~~, scalable

Prem: Each prem is assigned its own processor.

→ It is less scalable.

→ It performs slowly as compared to thread.

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Quiz:

1) b ✗

2) c ✗

3) b ✓

4) a ✗

5) b ~~✗~~ ✓