

Department of Computer Science and Engineering

**FACULTY OF ENGINEERING AND TECHNOLOGY
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CS-501

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MULTILEVEL QUEUE CONCEPT

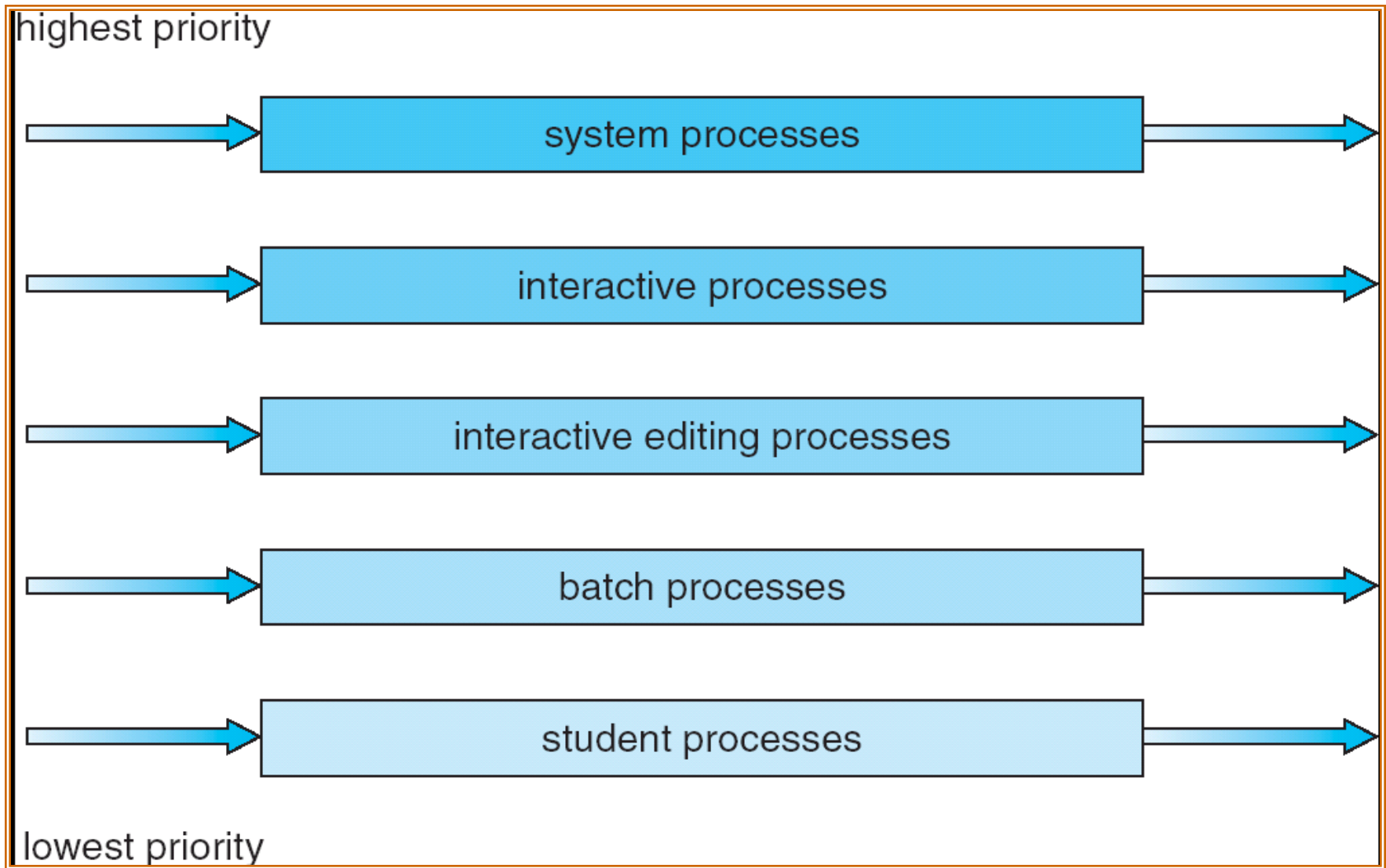
Multilevel Queue^{1/3}

- Ready queue is partitioned into separate queues:
 - foreground (interactive)
 - background (batch)
- Each queue has its own scheduling algorithm
 - foreground – RR
 - background – FCFS
- Scheduling must be done between the queues

Multilevel Queue^{2/3}

- Fixed priority scheduling
 - Serve all from foreground, then from background
 - Possibility of **starvation**.
- Time slice
 - Each queue gets a certain amount of **CPU time** which it can schedule amongst its processes
 - ✓ 80% to **foreground** in RR
 - ✓ 20% to **background** in FCFS

Multilevel Queue^{3/3}

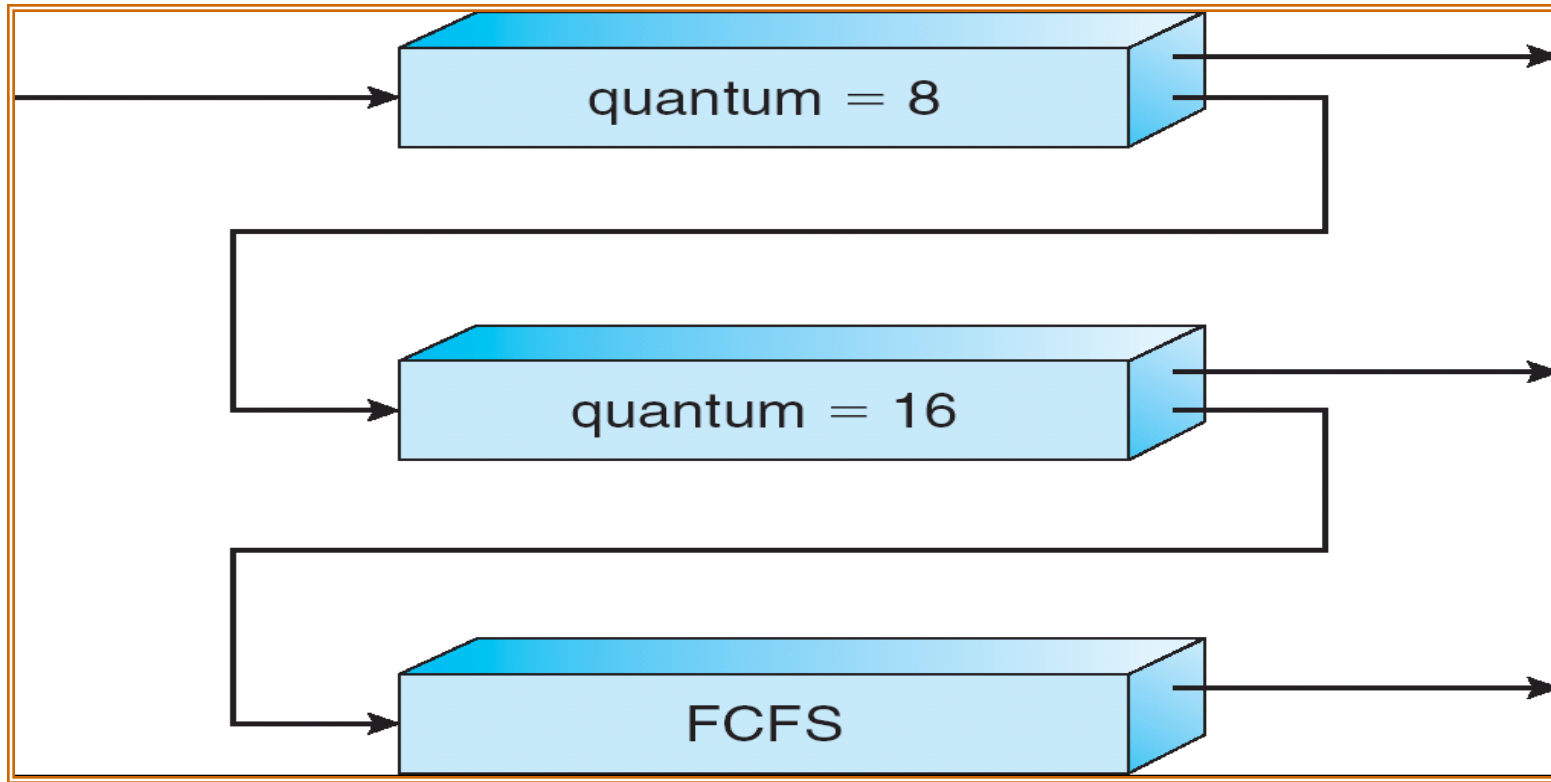


MULTILEVEL FEEDBACK QUEUE CONCEPT

Multilevel Feedback Queue

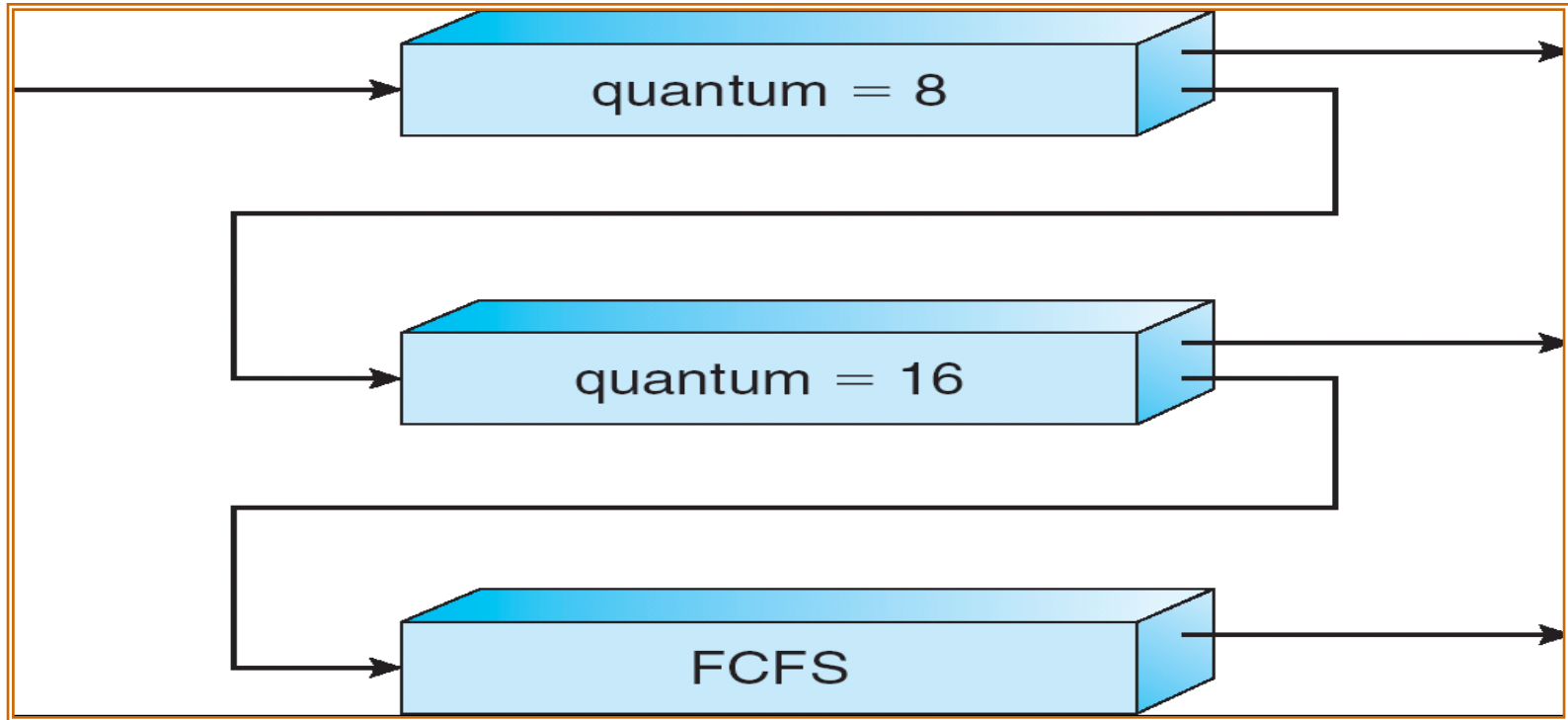
- A process can move between the various queues; **aging** can be implemented this way
- *Multilevel-feedback-queue scheduler* defined by the following parameters:
 - number of **queues**
 - scheduling **algorithms** for each queue
 - method used to determine when to **upgrade** a process
 - method used to determine when to **demote** a process
 - method used to determine which **queue** a process will enter when that process needs service

Multilevel Feedback Queue: Example^{1/2}



- Three queues:
 - Q0 – RR with time quantum 8 milliseconds
 - Q1 – RR time quantum 16 milliseconds
 - Q2 – FCFS

Multilevel Feedback Queue: Example^{2/2}



- Scheduling

- The scheduler first executes all processes in queue 0.
- Processes in queue 1 will be executed only if queue 0 is empty.
- Similarly, processes in queue 2 will be executed only if queues 0 and 1 are empty.
 - ✓ A process that arrives for queue 1 will preempt a process in queue 2.
 - ✓ A process that arrives for queue 0 will preempt a process in queue 1.

References

1. Silberschatz, Galvin and Gagne, “Operating Systems Concepts”, Wiley.
2. William Stallings, “Operating Systems: Internals and Design Principles”, 6th Edition, Pearson Education.
3. D M Dhamdhere, “Operating Systems: A Concept based Approach”, 2nd Edition, TMH.

Thank You.

