

4.2 Types of Scheduling algorithms - First come first served, Shortest Job First, Shortest Remaining Time, Round Robin Priority scheduling, multilevel queue scheduling.

4.2 Types of Scheduling Algorithms

1. First Come First Served (FCFS)

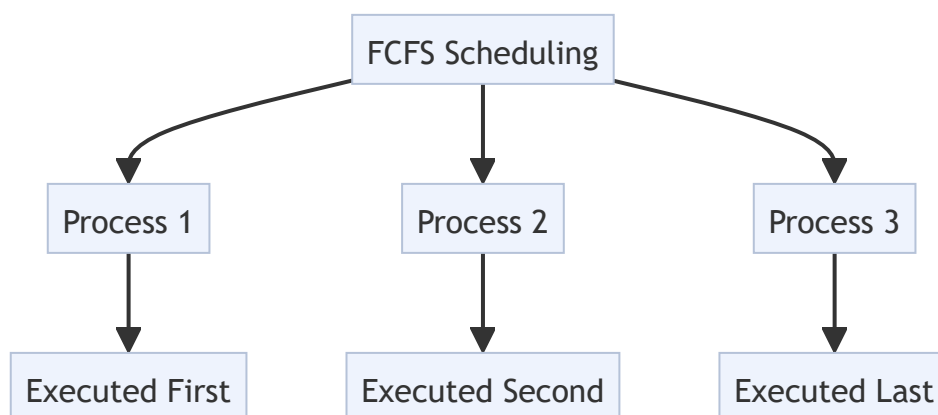
Explanation:

FCFS is the simplest scheduling algorithm where processes are executed in the order they arrive in the ready queue. It is non-preemptive, meaning once a process starts executing, it runs to completion.

Advantages and Disadvantages

Advantages	Disadvantages
Simple and easy to implement	Can cause the "convoy effect"
Fair in terms of process order	May lead to long waiting times

Mermaid Diagram



2. Shortest Job First (SJF)

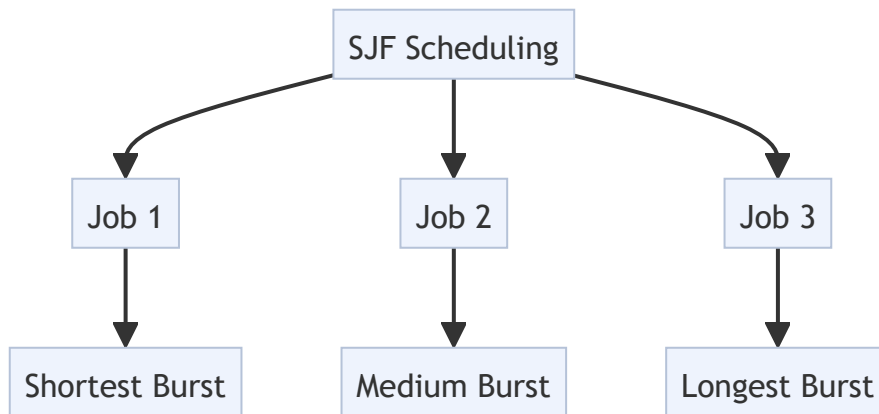
Explanation:

SJF schedules processes based on the shortest burst time first. It is non-preemptive and aims to minimize the average waiting time. Processes with the shortest execution time are selected first.

Advantages and Disadvantages

Advantages	Disadvantages
Minimizes average waiting time	May cause "starvation" for long jobs
Efficient in terms of turnaround time	Requires accurate burst time estimation

Mermaid Diagram



3. Shortest Remaining Time Next (SRTN)

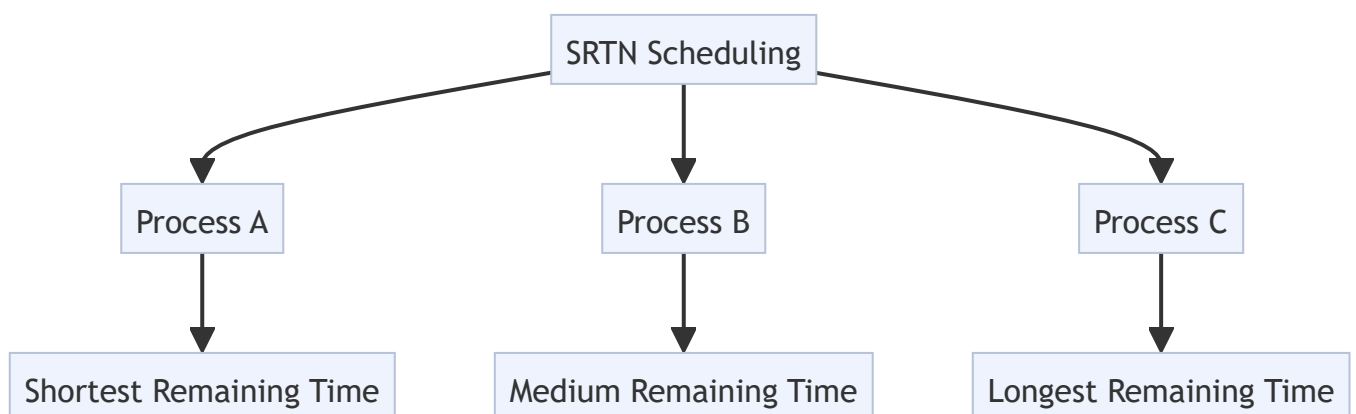
Explanation:

SRTN is the preemptive version of SJF. It selects the process with the shortest remaining time and can preempt currently running processes if a new process with a shorter remaining time arrives.

Advantages and Disadvantages

Advantages	Disadvantages
Provides better response times	Can lead to frequent context switching
Reduces average waiting time	Complex to implement and manage

Mermaid Diagram



4. Round Robin (RR)

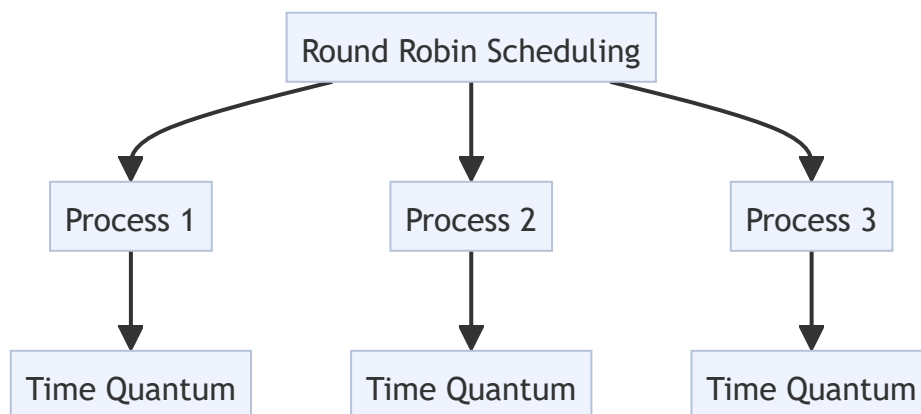
Explanation:

Round Robin scheduling allocates a fixed time slice (quantum) to each process in a cyclic order. If a process's time quantum expires, it is placed at the end of the queue.

Advantages and Disadvantages

Advantages	Disadvantages
Ensures fairness among processes	Can lead to high turnaround time if quantum is too large
Simple to implement	Context switching overhead

Mermaid Diagram



5. Priority Scheduling

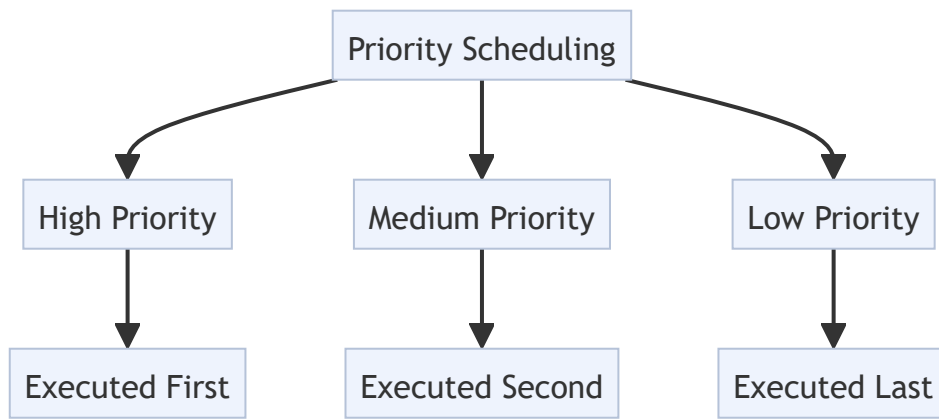
Explanation:

Priority Scheduling assigns priority levels to processes and executes the process with the highest priority first. It can be preemptive or non-preemptive.

Advantages and Disadvantages

Advantages	Disadvantages
Efficient for time-critical tasks	May lead to "starvation" of lower priority tasks
Can be easily customized	Requires careful priority assignment

Mermaid Diagram



6. Multilevel Queue Scheduling

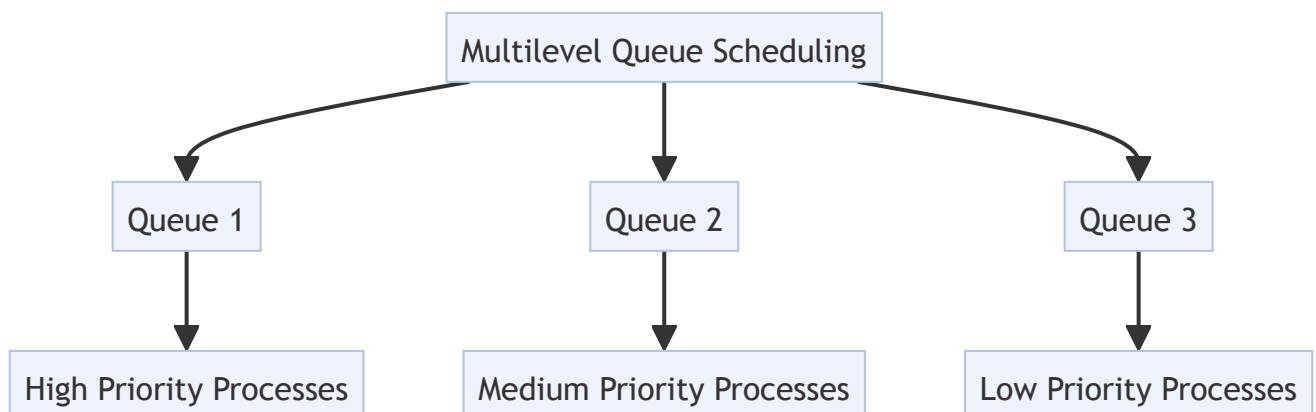
Explanation:

Multilevel Queue Scheduling divides processes into multiple queues based on priority or type. Each queue can have its own scheduling algorithm, and processes can move between queues.

Advantages and Disadvantages

Advantages	Disadvantages
Flexible and efficient	Complexity in managing multiple queues
Supports diverse process types	Requires more overhead

Mermaid Diagram



Summary Table

Algorithm	Description	Advantages	Disadvantages
FCFS	Processes executed in arrival order	Simple, Fair	Convoy effect, Long waiting times
SJF	Shortest burst time processes first	Minimizes average waiting time	Starvation for long jobs

Algorithm	Description	Advantages	Disadvantages
SRTN	Preemptive version of SJF, shortest remaining time first	Better response times	Frequent context switching
Round Robin	Fixed time slice for each process	Fair, Simple to implement	High turnaround time if quantum is large
Priority Scheduling	Processes executed based on priority levels	Efficient for time-critical tasks	Starvation of lower priority tasks
Multilevel Queue	Processes in multiple queues based on type	Flexible, Supports diverse types	Complex management