Lecture#08 Scheduling Algorithms

Round Robin Algorithm

Introduction to Round Robin

- A fundamental CPU scheduling algorithm
- Time-sharing system that allocates CPU time equally
- Named after the principle of "taking turns"
- Essential for modern operating systems
- Key concept in preemptive multitasking

Core Concepts

- Time quantum: Fixed time slice for each process
- Circular queue implementation
- Ready queue management
- Context switching
- Process states: Ready, Running, Waiting

How Round Robin Works

- Each process gets equal time slice
- After quantum expires:
  - Current process moves to queue end
  - Next process gets CPU
- Continues until all processes complete
- FIFO with time slicing

Time Quantum Considerations

- Typical range: (10-100) milliseconds
- Large quantum → First-Come-First-Served
- Small quantum → Excessive switching overhead
- Optimal quantum balances:
  - Response time
  - Context switching overhead
  - System performance

Performance Metrics

- Average waiting time
- Average turnaround time
- Context switching frequency
- CPU utilization
- Response time
- Throughput

Advantages

- Fair CPU distribution
- No process starvation
- Good for interactive systems
- Predictable scheduling
- Better response time for short processes

Disadvantages

- Higher context switching overhead
- Average turnaround time can be high
- Performance depends on quantum size
- Not optimal for processes with different priorities
- Memory management complexity

Real-World Applications

- Linux kernel scheduler variants
- Windows operating system
- Time-sharing systems
- Cloud computing environments
- Virtual machine scheduling
- Mobile operating systems

END OF LECTURE!