



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35.

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COURSE NAME : 19CST201 – OPERATING SYSTEMS

II YEAR/ IV SEMESTER

UNIT – II PROCESS SCHEDULING AND SYNCHRONIZATION

Topic: CPU Scheduling

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CPU Scheduling



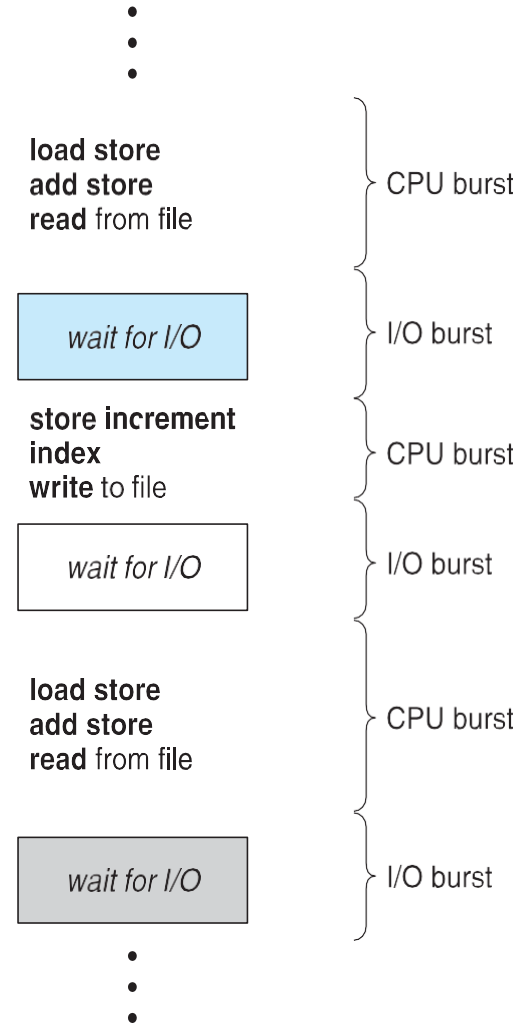
- Basic Concepts
- Scheduling Criteria
- Scheduling Algorithms
- Thread Scheduling
- Multiple-Processor Scheduling
- Real-Time CPU Scheduling
- Algorithm Evaluation



Basic Concepts



- Maximum CPU utilization obtained with multiprogramming
- CPU-I/O Burst Cycle – Process execution consists of a **cycle** of CPU execution and I/O wait
- **CPU burst** followed by **I/O burst**
- CPU burst distribution is of main concern





CPU Scheduler



- **Short-term scheduler** selects from among the processes in ready queue, and allocates the CPU to one of them
 - Queue may be ordered in various ways
- CPU scheduling decisions may take place when a process:
 1. **Switches from running to waiting state**
 2. **Switches from running to ready state**
 3. **Switches from waiting to ready**
 4. **Terminates**
- Scheduling under 1 and 4 is **nonpreemptive**
- All other scheduling is **preemptive**



Scheduling Criteria



- ❑ **CPU utilization** – keep the CPU as busy as possible
- ❑ **Throughput** – # of processes that complete their execution per time unit
- ❑ **Turnaround time** – amount of time to execute a particular process
- ❑ **Waiting time** – amount of time a process has been waiting in the ready queue
- ❑ **Response time** – amount of time it takes from when a request was submitted until the first response is produced, not output (for time-sharing environment)



Scheduling Algorithm Optimization Criteria



- Max CPU utilization
- Max throughput
- Min turnaround time
- Min waiting time
- Min response time



REFERENCES



TEXT BOOKS:

- T1 Silberschatz, Galvin, and Gagne, “Operating System Concepts”, Ninth Edition, Wiley India Pvt Ltd, 2009.)
- T2. Andrew S. Tanenbaum, “Modern Operating Systems”, Fourth Edition, Pearson Education, 2010

REFERENCES:

- R1 Gary Nutt, “Operating Systems”, Third Edition, Pearson Education, 2004.
- R2 Harvey M. Deitel, “Operating Systems”, Third Edition, Pearson Education, 2004.
- R3 Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 9th Edition, John Wiley and Sons Inc., 2012.
- R4. William Stallings, “Operating Systems – Internals and Design Principles”, 7th Edition, Prentice Hall, 2011