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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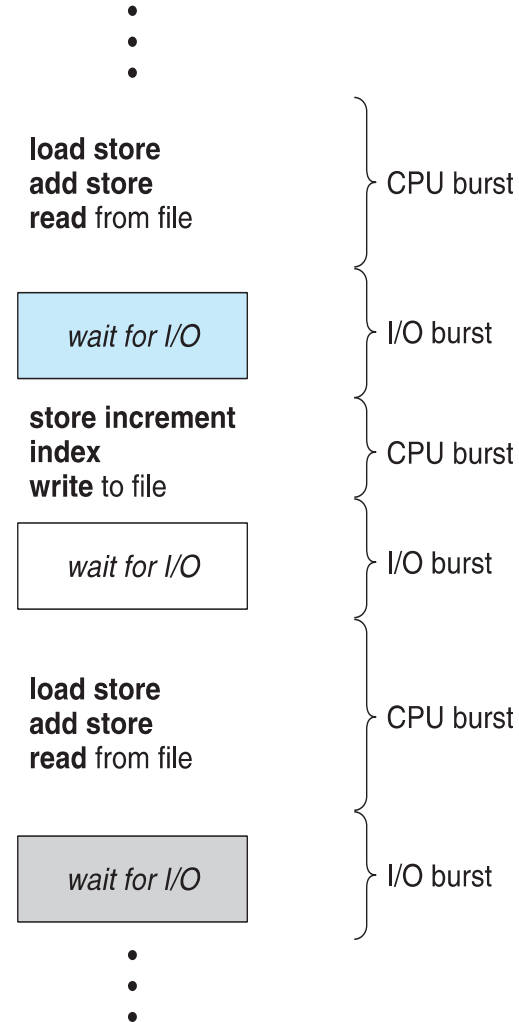Department of Computer Science and Engineering

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

⋮

load store add store **read** from file	CPU burst
wait for I/O	I/O burst
store increment index **write** to file	CPU burst
wait for I/O	I/O burst
load store add store **read** from file	CPU burst
wait for I/O	I/O burst

⋮

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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.)

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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