

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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Lecture-9 By Vivek Dubey

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COMPUTER SCIENCE AND ENGINEERING

CS403PC

COMPUTER SCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

CS403PC

BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

Scheme of Operating System

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S. No.	Course Code	Course Title	L	T	P	Credits
3	CS403PC	Operating Systems	3	0	0	3
6	CS406PC	Operating Systems Lab	0	0	3	1.5

UNIT-2:

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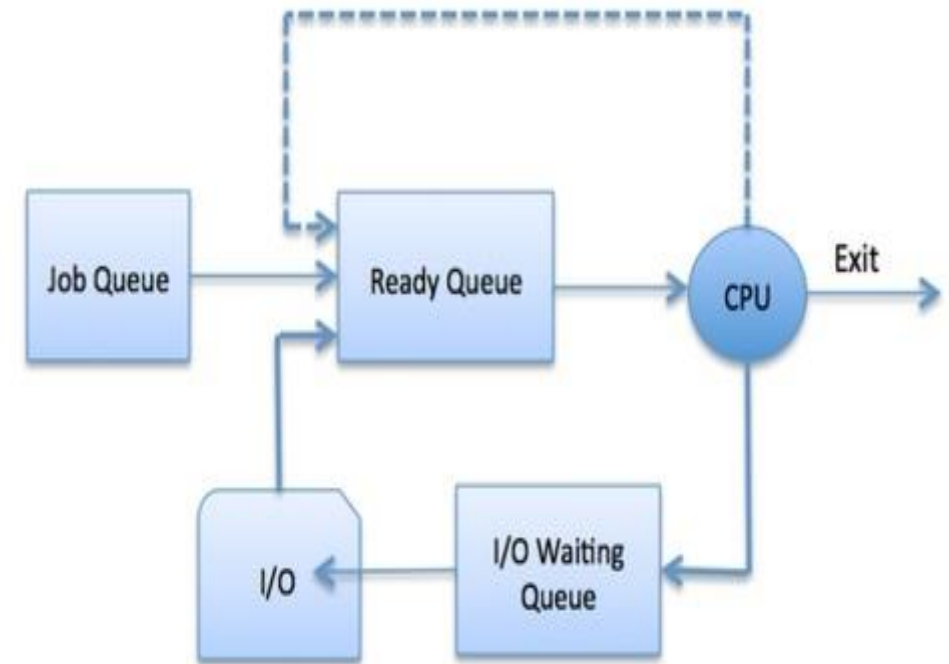
- **Process and CPU Scheduling –**
 - Process Concepts and **Process Scheduling**, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling.
- **System call interface for process management–**
 - fork, exit, wait, waitpid, exec

Process Scheduling

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- The process scheduler **selects** an available process (possibly from a set of several available processes) for program execution on the CPU.
- **Process Scheduling Queues**
 - ✓ As processes enter in the system, they are put into a **job queue**, which consists of all processes in the system.
 - ✓ The processes that are residing in main memory and are ready and waiting to execute **ARE KEPT ON A LIST** called the **ready queue.**



Two-State Process Model

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Two-state process model refers to running and non-running states

- **Running**

- *When a new process is created, it enters into the system as in the running state.*

- **Not Running**

- *Processes that are not running are kept in queue and waiting for their turn to execute. Each entry in the queue is a pointer to a particular process. Queue is implemented by using linked list.*
- **USE OF DISPATCHER:**
 - *When a process is interrupted, that process is transferred in the waiting queue.*
 - *If the process has completed or aborted, the process is discarded.*
 - *In either case, the dispatcher then selects a process from the queue to execute.*

Types of Schedulers

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- Schedulers are special system software which handle process scheduling in various ways.
- Their main task is to select the jobs *to be submitted into the system* and *to decide which process to run.*
- Schedulers are of three types
 - ✓ Long Term Scheduler
 - ✓ Short Term Scheduler
 - ✓ Medium Term Scheduler

• Short Term Scheduler

- This is also known as CPU Scheduler and runs very frequently.
- The primary aim of this scheduler is to improve CPU performance and increase process execution rate.

• Long Term Scheduler

- It is also called a job scheduler and runs less frequently.
- It decide which program must get into the job queue. From the job queue, the Job Processor selects processes and loads them into the memory for execution.
- Primary aim of it (i.e. LTS), is to maintain a good degree of Multiprogramming.

• Medium Term Scheduler

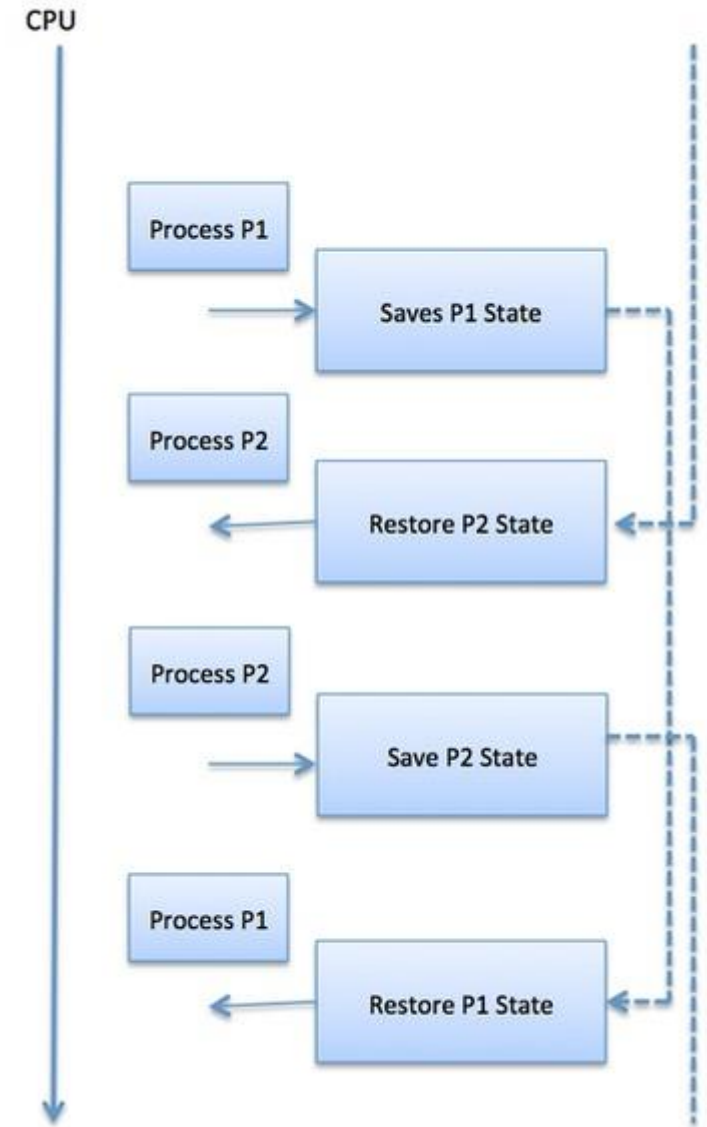
- It is a part of swapping.
- It removes the processes from the memory.
- It reduces the degree of multiprogramming.
- It is in-charge of handling the swapped out-processes.

Context Switch

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- It is the mechanism to store and restore the state or context of a CPU in Process Control block, so that a process execution can be resumed from the same point at a later time.
- Using this technique, a context switcher enables multiple processes to share a single CPU.
- Context switching is an essential part of a multitasking operating system features.



Contd..

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- **Context switches are computationally intensive** since register and memory state must be saved and restored.
- **To avoid the amount of context switching time,** some hardware systems employ two or more sets of processor registers.
- **When the process is switched,** the following information is stored for later use.
 - ✓ Program Counter
 - ✓ Scheduling information
 - ✓ Base and limit register value
 - ✓ Currently used register
 - ✓ Changed State
 - ✓ I/O State information
 - ✓ Accounting information