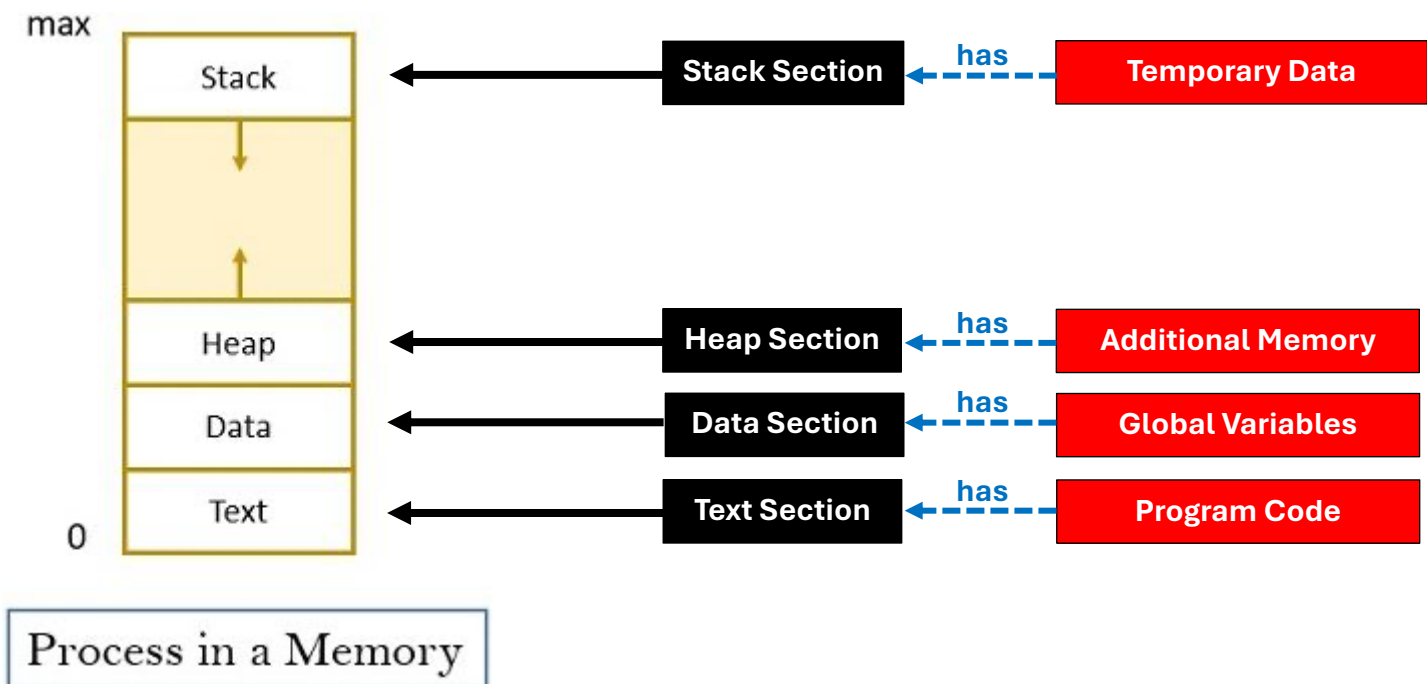


Learning Topics

1. Process Concept
2. Process Scheduling
3. Operations on Processes
4. Inter Process Communication
5. Communication in Client-Server Systems

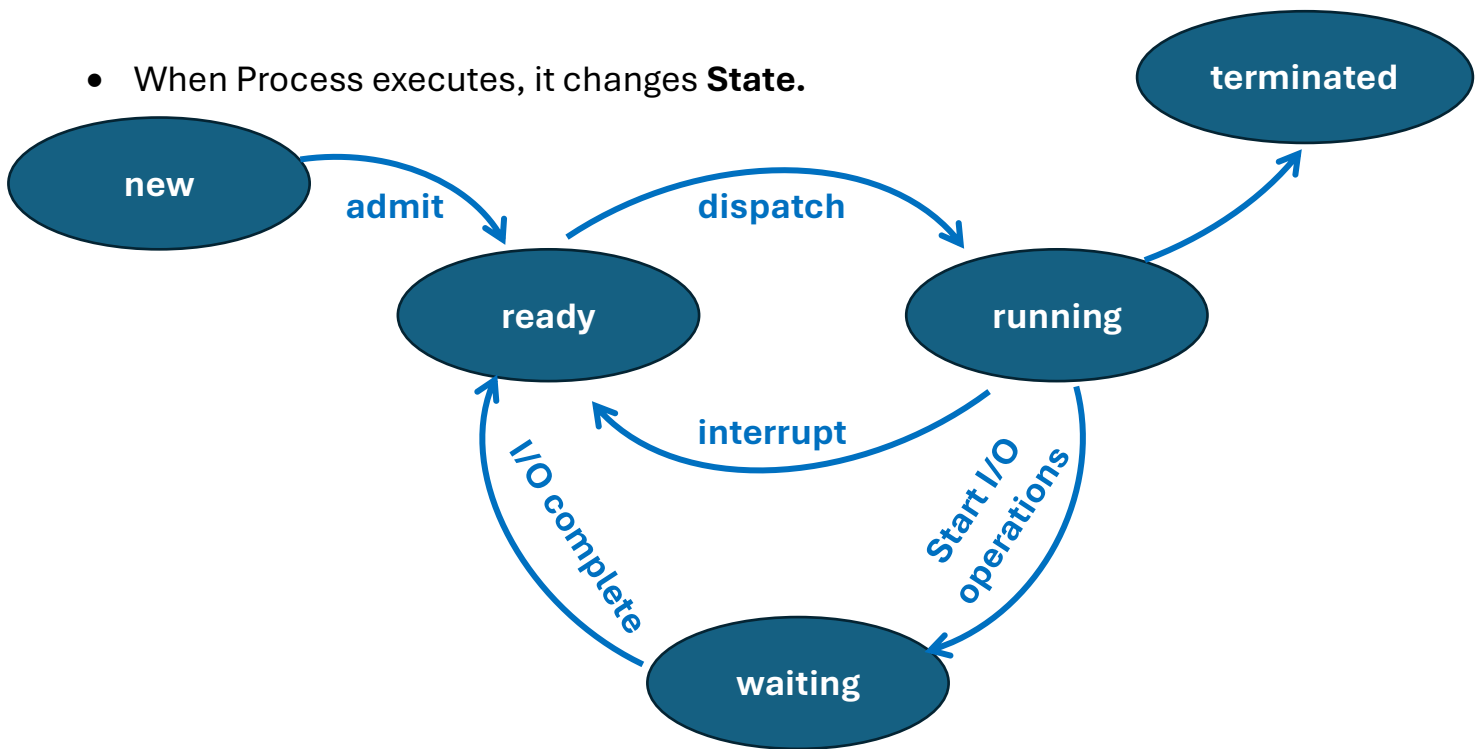
1. Process Concepts

- Process is a **Program in its Execution**. - *What is Process?*
- A program execution starting via **GUI mouse clicks** or **Command Line entry**.
- Process execution is **Sequential**. (*Instructions of the program executes one by one.*)
- CPU uses a **Register** called **Program Counter / Instruction Pointer** to accessing instructions one by one.
- Process needs like **CPU time, memory, files and I/O devices** to complete the execution.
- Every process consist of **4 Sections**.



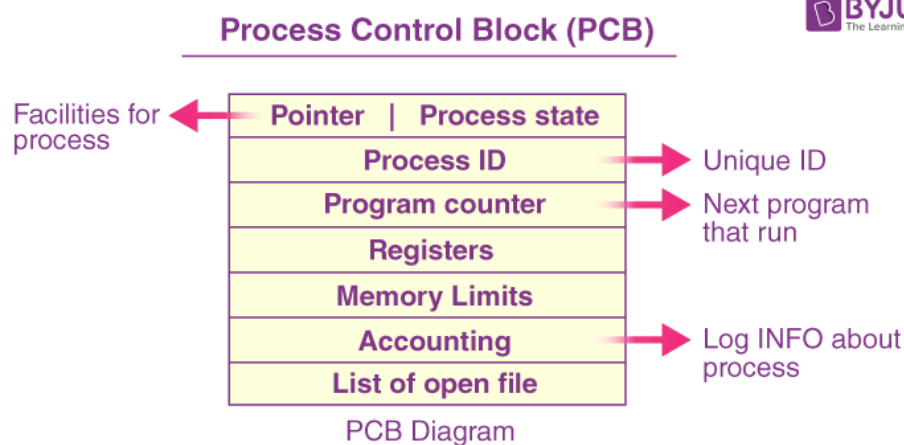
Process State

- When Process executes, it changes **State**.



Process Control Block (PCB) – Task Control Block

- Block of Information about each Process.



- **Process State** - running, waiting, etc.
- **Process Number** (Process ID)
- **Program Counter** - Location of instruction to next execute.
- **CPU Registers** - Contents of all process-centric registers.
- **CPU Scheduling Information** - priorities, scheduling queue pointers.
- **Memory-Management Information** - memory allocated to the process.
- **Accounting Information** – CPU used, clock time elapsed since start, time limits.
- **I/O Status Information** – I/O devices allocated to process, list of open files.

2. Process Scheduling

- **Moving Processes** Hard Disk → RAM and RAM → CPU
- There **2 types** of Process Schedulers.

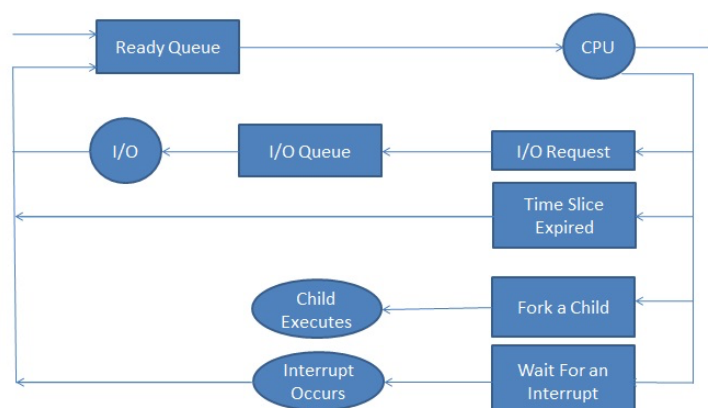
CPU / Short-Term Scheduler	Job / Long-Term Scheduler
RAM → CPU	Hard Disk → RAM
Operating Processes ready state to running state	Operating Processes new state to ready state
Speed (it's working with CPU and memory)	Not Speed (compare to the short-term scheduler)

- LTS selects processes doing only CPU operations (**CPU bound**)
 - **CPU : busy**
 - **I/O : idle**
- LTS selects processes doing only I/O operations (**I/O bound**)
 - **CPU : idle**
 - **I/O : busy**
- LTS selects a good mixture of CPU and I/O bound processes that called **degree of multiprogramming**

Medium-Term Scheduler

- Uses when Long-Term Scheduler is **not implement**.

Queueing Diagram

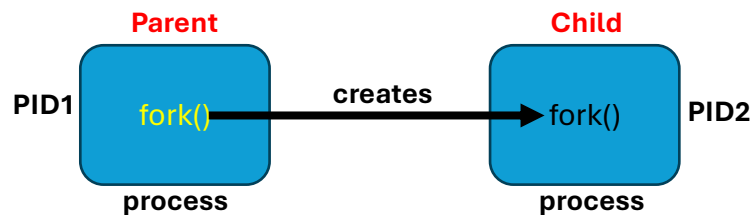


Context Switch

- When CPU switches to another process, **Saved the State of Old Process and Resume it to New Process. - Use of Context Switch**
- The time period for the above process called **Context Switch Time**.
- Context switch time **depend on Hardware Support**.

3. Operations on Processes

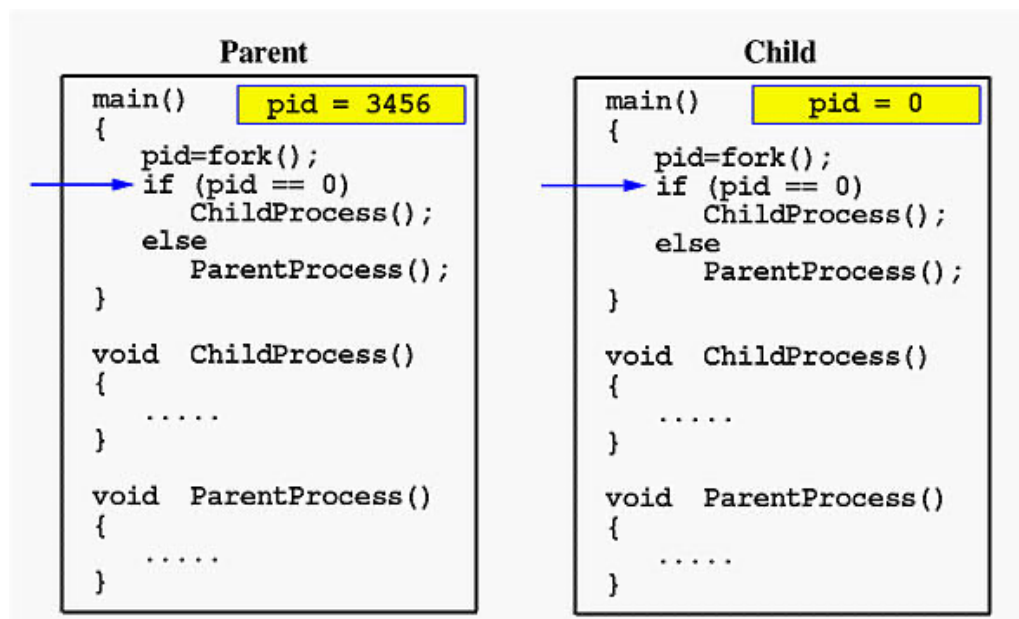
Process Creation



- Parent process creates Child processes.
- 1 Parent** can have **multiple Child Processes**.
- Only change **Process ID (PID)**.
- Both process are running parallelly.
- Everytime **Parent must wait** until the **Child Processes are Terminated**.

fork() System Call

- When fork() system call compile it divide the process into Parent & Child processes.
- Parent Process – PID > 0**
- Child Process – PID = 0**
- Error – PID < 0**



4. Interprocess Communication

- It means **Communication between Processes**.
- It has 2 types of models

Shared Memory	Message Passing
Created in the User Memory	Created in the Kernel Memory
Faster	Slower (because it accessing the Kernel Mode)

5. Communication in Client-Server Systems

Sockets

- Socket **consist of IP Address + Port Number**.
- It define as an endpoint for communication.

