OPERATING SYSTEM

3- Process State in Operating System

A **process** is a program in execution.
During its lifetime, a process goes through different **states**, depending on what it is doing.

These states help the operating system manage processes efficiently.

Common Process States

Below are the **five main states**, often shown in OS textbooks:

1. New

- The process is **being created**.
- Memory and resources are being allocated.

2. Ready

- The process is **loaded into memory** and ready to run.
- It is **waiting for CPU time**.
- Many processes may be in the ready queue.

3. Running

- The CPU is **currently executing** the process.
- Only **one process** per CPU core can be in this state at a time.

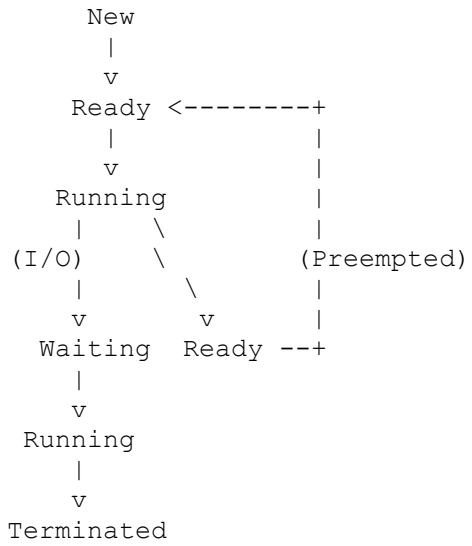
4. Blocked / Waiting

- The process **cannot continue** until some event occurs.
- Usually waiting for **I/O operations** (keyboard, disk, network).
- CPU is not used during this time.

5. Terminated / Exit

- The process has **finished execution**.
- OS releases all resources used by the process.

Diagram: Process State Transition



Explanation of Transitions

- **New → Ready**: Process is created.
- **Ready → Running**: Scheduler gives CPU.
- **Running → Waiting**: Process requests I/O.
- **Running → Ready**: CPU preemption (time slice ends).
- **Waiting → Ready**: I/O is completed.
- **Running → Terminated**: Process finishes.

Summary

A process generally moves through these states:

New → Ready → Running → (Waiting ↔ Ready) → Terminated

These states allow the operating system to manage multiple processes efficiently.