**Process Control Block:** It is a data structure that the operating system maintains for every one of the processes that it manages.

* Program counter: Stack Pointer to the address of the next instruction to be executed for a process.
* Registers: They relate various memory processes that are necessary for virtual to physical address translation for the process.
* List of Open files: It contains useful information which is required scheduling.

Cache memory is used to store the total PCB data.

PCB is created when a process is created. When a process is created and it also gets initialised.

Here Program Counter sets the first instruction in that created process.

Certain fields of process are updated when process state changes.

Program counter changes on every instruction.

**PCB Usage:**  
If the OS has two processes to manage, the first process will be in running state and other will be idle.

Registers contain the value of the running process.

If the OS wants to interrupt the running process, then that process will be in idle state.

Before making it idle, it should store all first process values into the register.

Then another process will get into running state and the register should store now second process values into it.

**Process Life Cycle:**

1. New: It is the state of process when it is newly created.
2. Ready: It is the state of process in which a process is ready to go to running state.
3. Running:  It is the state where the execution goes on.
4. Waiting: It is the state where the other process is in a running state and a process waits for completion of the execution of the running process.
5. Terminated: It is the state where the process ends.

**Process Creation:**

Mechanisms:

* fork: Copies parent PCB into new child PCB.
* exec: Loads new program and starts from first instruction.

**CPU Scheduler:**

It mainly schedules the processes which should go to the running state first based on Ready Queue.

It also keeps the time limit to run a process.

**Inter Process Communication (IPC):** Inter process communication (IPC) is a mechanism which allows processes to communicate with each other and synchronize their actions.

**Mechanisms:**

**Message Passing:**

OS creates a communication channel and the process interacts with it.

The interactions will be like read(receive), write(send).

**Shared Memory:**

OS establishes a shared channel and maps it into each process address space.

Process directly read/write from the memory.