Lecture#04 Process Control Concept in O.S

An Overview of Process Control Concept and Process Control Block

What is a Process?

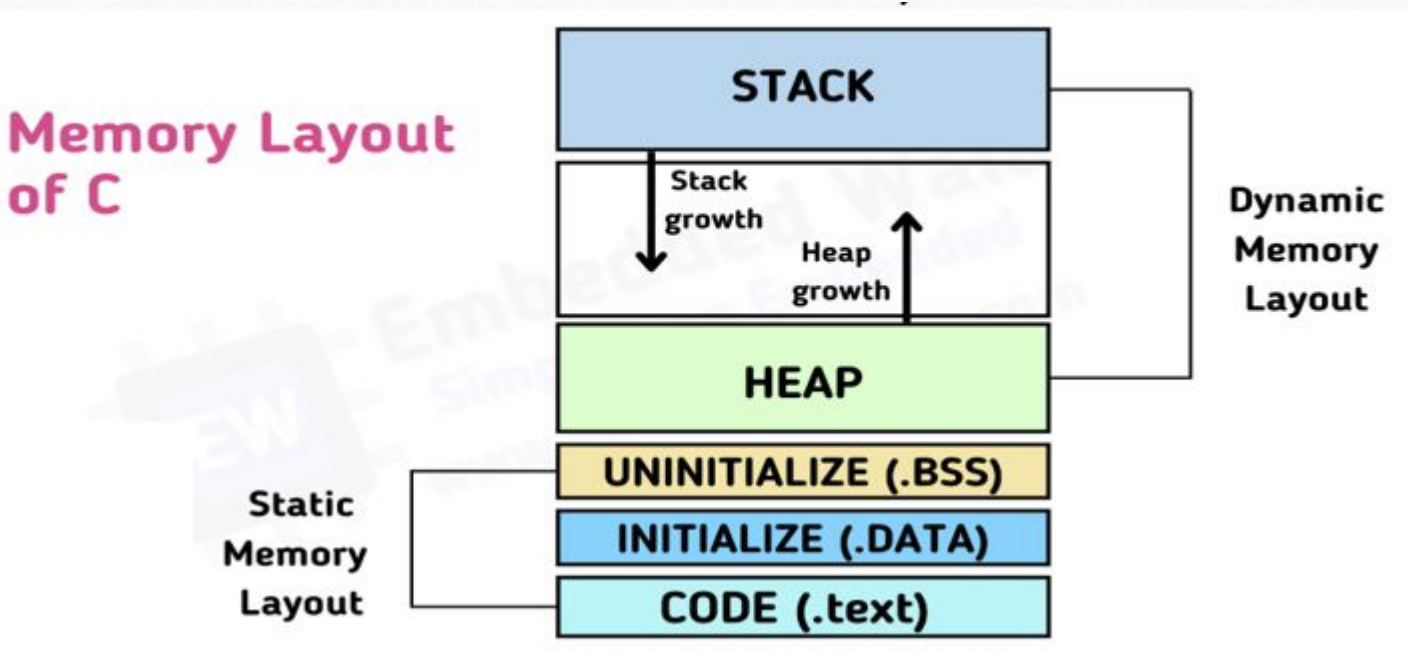
- A program in execution
- Active entity vs program (passive entity)
- Contains Key Elements: program counter, stack, data section
- Basic unit of execution in an operating system

Process in Memory

- Text section (code)
- Data section (global variables)
- Heap (dynamically allocated memory)
- Stack (temporary data storage)

Visual: Memory layout diagram

Process in Memory



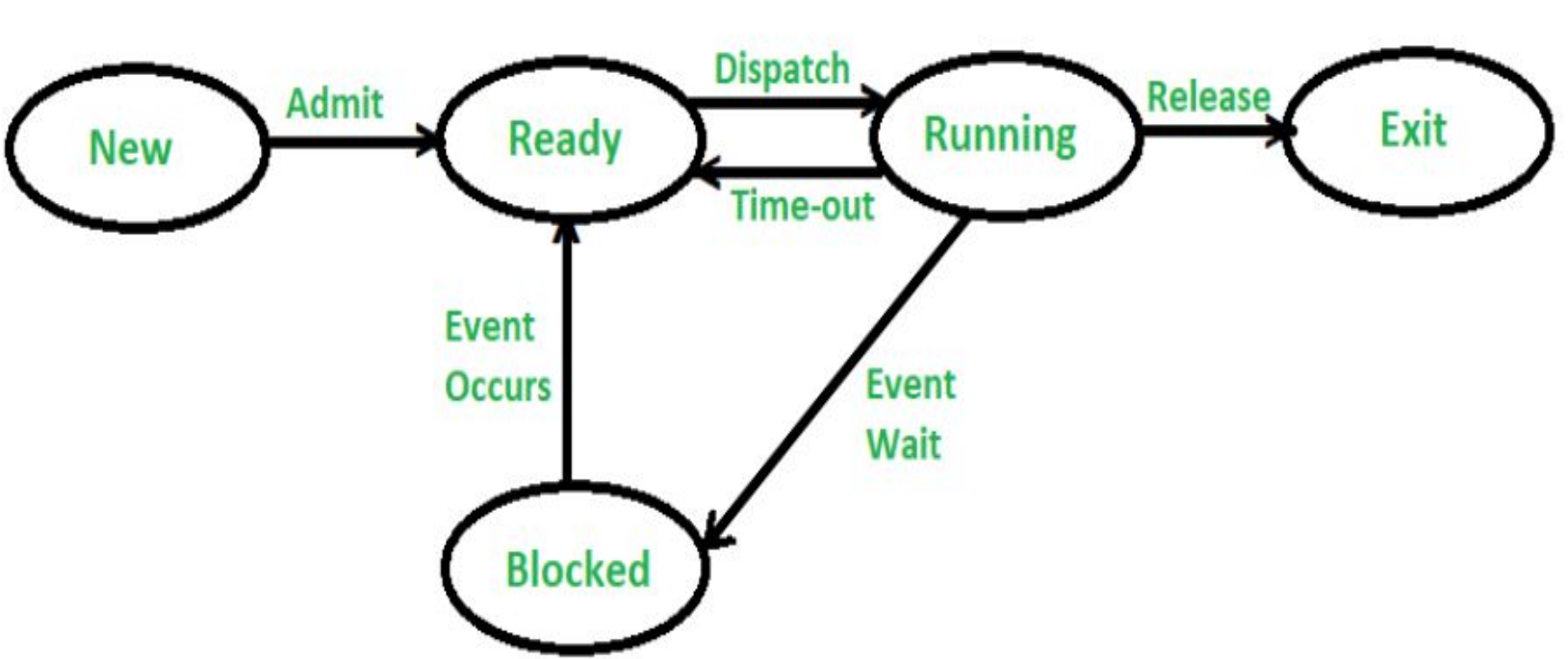
Process States: Overview

Five main states a process can be in:

- New
- Ready
- Running
- Waiting
- Terminated

Visual: Process state diagram

Process States



New State

- Process is being created
- Resources are being allocated
- PCB is being created
- Not yet ready for execution

Ready State

- Process is waiting to be assigned to a processor
- All resources available except CPU
- Multiple processes can be in ready state
- Managed through ready queue

Running State

- Process is executing on CPU
- Instructions being processed
- Only one process per CPU can be in running state
- Time quantum allocation in time-sharing systems

Waiting State

- Process waiting for event/resource
- Cannot execute until event occurs
- Examples: I/O completion, signal receipt
- Moved to ready state when event completes

Terminated State

- Process has finished execution
- Resources being deallocated
- Final state in process lifecycle
- PCB maintained until system cleanup

Process Control Block (PCB): Introduction

- Also called Task Control Block
- Data structure maintained by OS
- Contains all process information
- Created when process is created

END OF LECTURE