# Operating System

# What is Operating System…?

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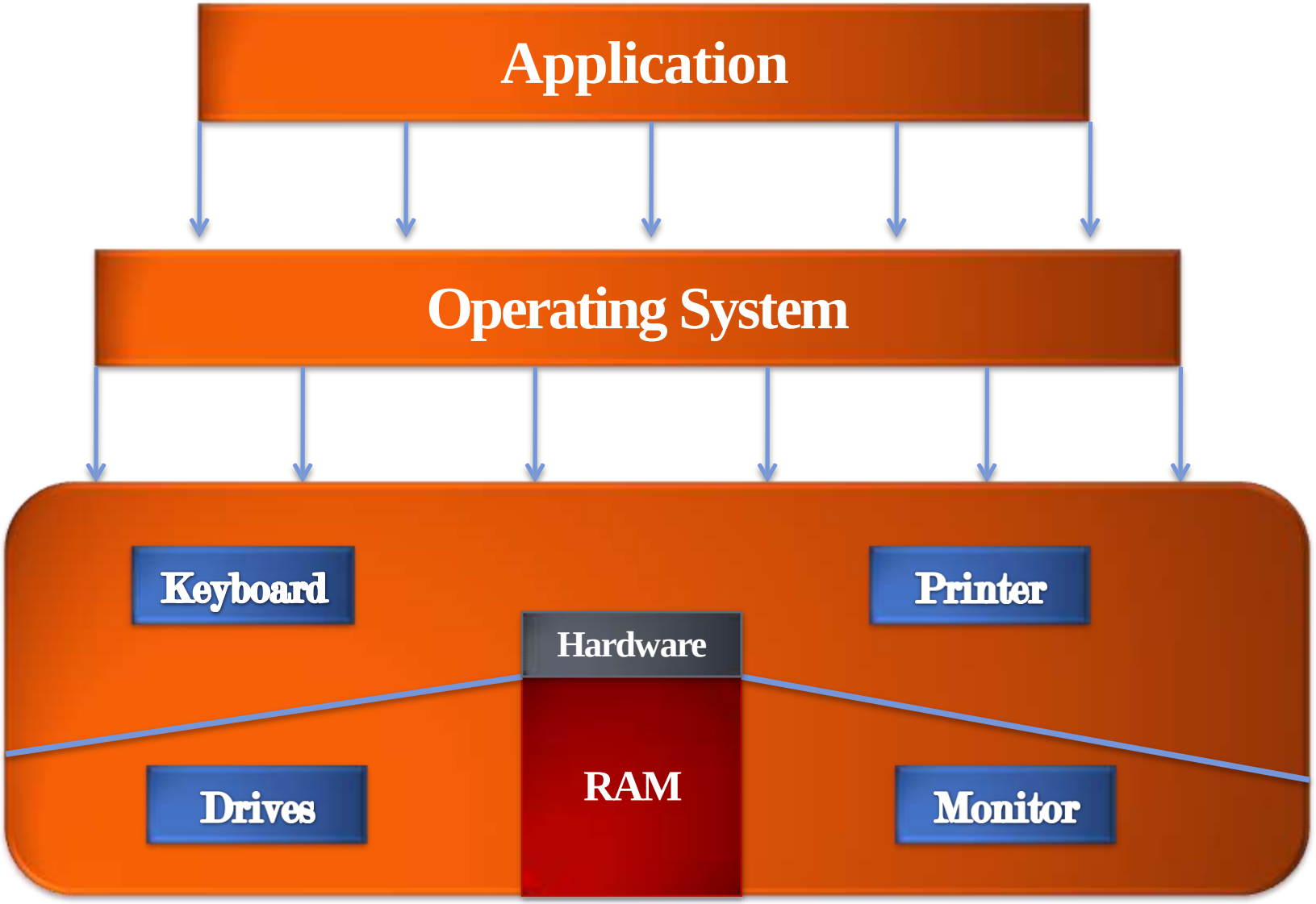
- Operating system is a **System Software**
- Act as **interface** b/w User and the Hardware
- Organized set of programs
- Controls &manage computer resources(H/W, S/W)
- Schedules task, manage storage



# Primary objectives of Operating System

- ✓ Making a computer system convenient to use.
- ✓ Managing the resources.

# Characteristics of operating System

- Is a Program
- Executes at all time
- Act as Platform
- Act as police
- Provide s

# Functions of Operating System

- Process Management
- Memory Management
- File Management
- Security
- Device Management
- Command Interpretation

# Process Management

- Process is a program in execution.
- OS manages creation &deletion of processes.
- Methods for process management are:-
  - Manual loading mechanism
  - Batch processing
  - Multiprogramming
  - Multiprocessing

# Process of Management in Early Systems

- Programmer writes the program.
- Programs are then punched on punch card.
- Cards are submitted to computer centre.
- Cards &data were manually loaded.
- Result of execution of the job was printed on the punch cards.

# Memory Management

- Takes care of main memory
- Deals with part of memory in use &the memory part which is not in use
- Allocates memory to processes &de-allocate

  when they are done

# File Management

- File is a collection of related info.
- Manages file stored on the disk.
- Provides functions to delete, copy, move, rename and view files.
- Backup of files on stable(non volatile) storage.
- File access methods :-
  - ✓ Sequential Access Files
  - ✓ Random Access Files

# Security

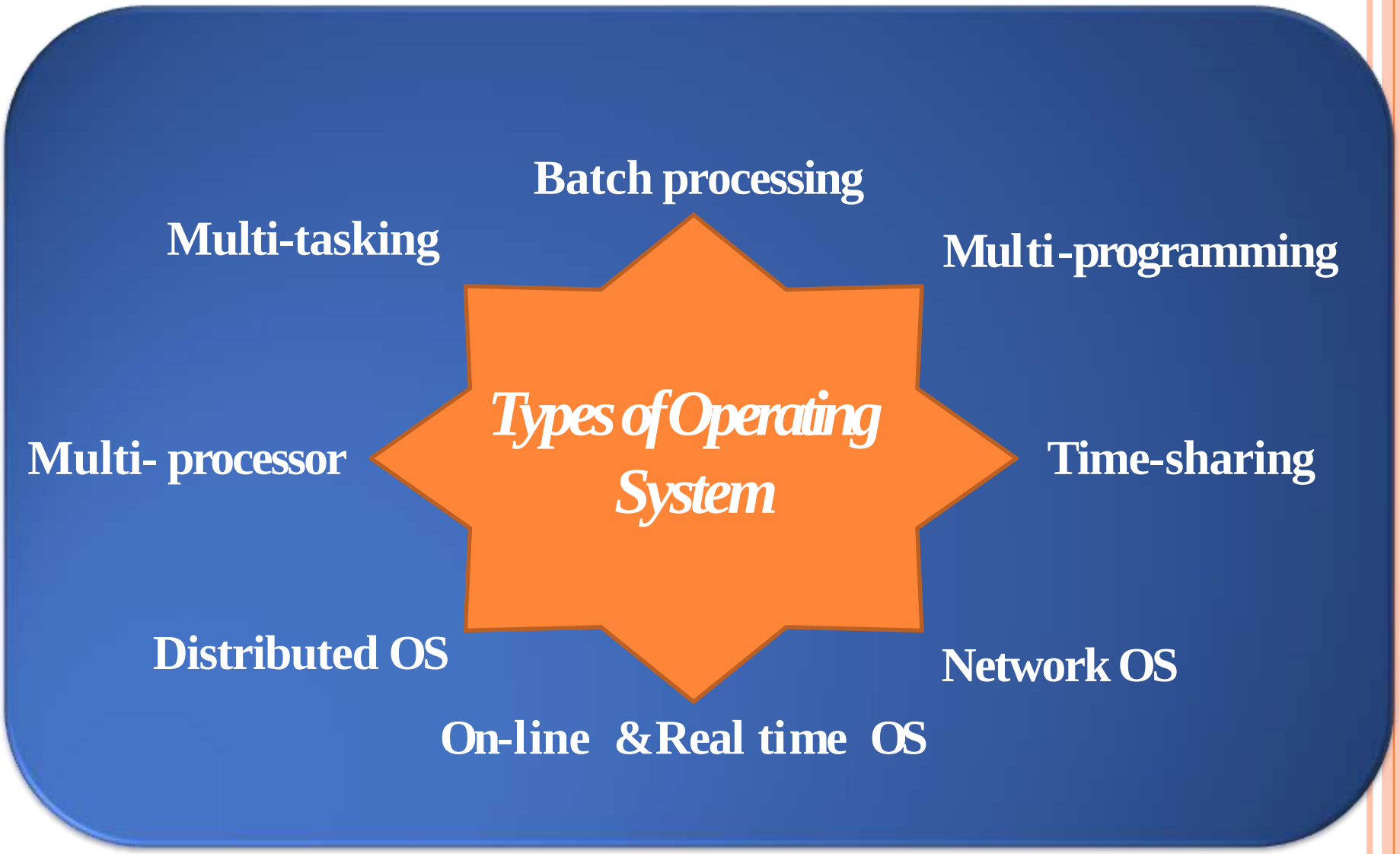
- Protect resources and information against destruction &unauthorized access
- Types of Security:-
  - External Security
    - Adequate back-up data
    - Excess of sensitive information only
  - Internal Security
    - User authentication
    - Access control

# Device Management

- Manages the peripheral devices.
- Accepts input from the user and give corresponding output.
- Consist of policies and procedures for handling I/O devices.

# Command Interpretation

- Act as primary interface between the user & the rest of the system.
- Understands &executes commands entered by human beings.



# Batch processing

- Effective form of processing.
- Programs are prepared Offline.
- Groups of programs are collected together & are processed one by one.
- Advantage:-Reduces computer idle time.
- Disadvantage:- Large turn around time.

# Steps in Batch Processing

- Programmer prepares their programs and data on deck of cards.
- Operator periodically collect the submitted programs and would batch them together.
- Batched programs were loaded into input device.
- Operator gives command to start executing the jobs.
- Jobs automatically loads from the input device.
- After process, operator separates and keep the printed output.

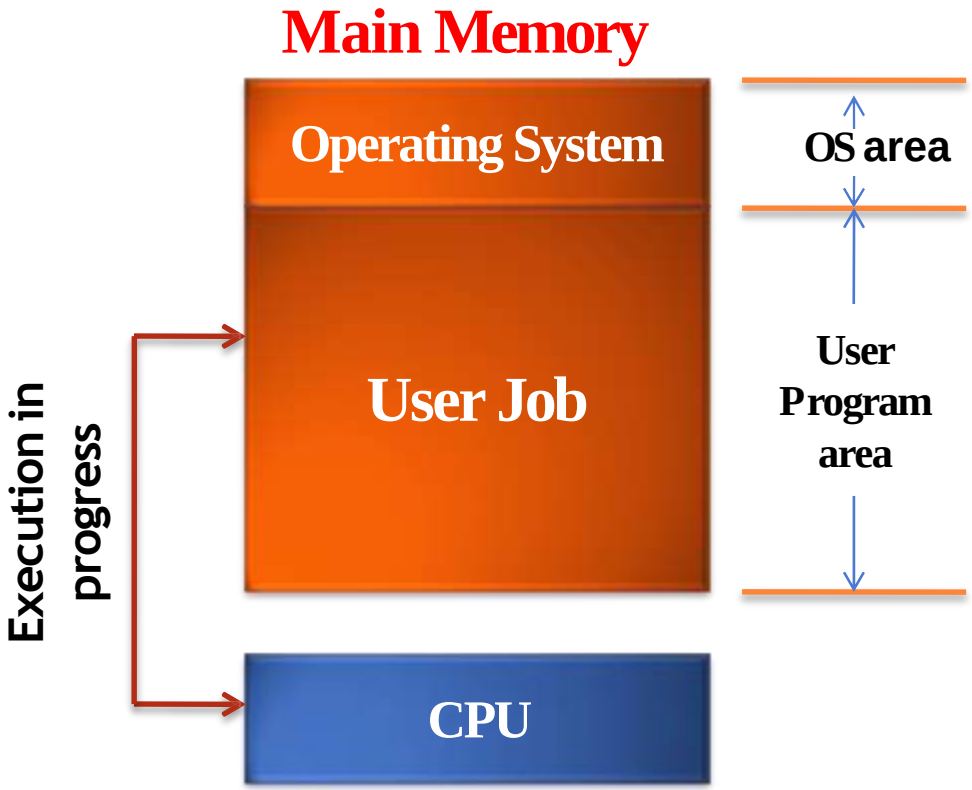
# Some questions……?

- How the computer separates one job from another from a batch of jobs for automatic job-to-job transaction ?
- How does the system know which complier or what hardware devices are to be used by a particular job when there is no operator interventions ?
- Ans:- Control Statements and Job Control Statement (*JCLs*)

# Job Control Statements

- CS and JCL are used by the operating system to identify a new job and to determine resource need.
- Control cards are indentified by a special character or pattern on the card.
- JCL tells the OS things such as :-
  - the name of the job
  - the user's name
  - the I/O devices used during processing.
  - the complier or the assembler to be used.

# Uniprogramming System

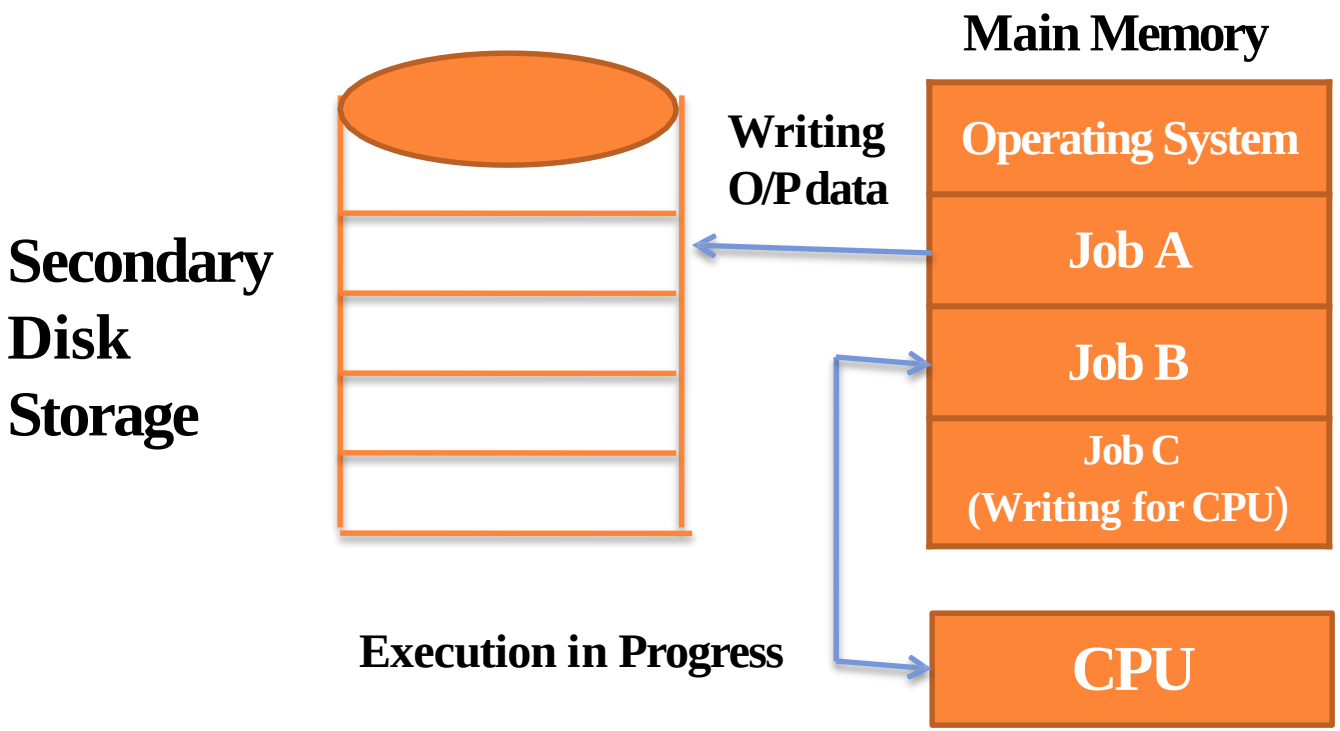



**A Uniprogramming system model in which only one job is processed by the system at a time and all the system resources are exclusively available for the job until it completes.**

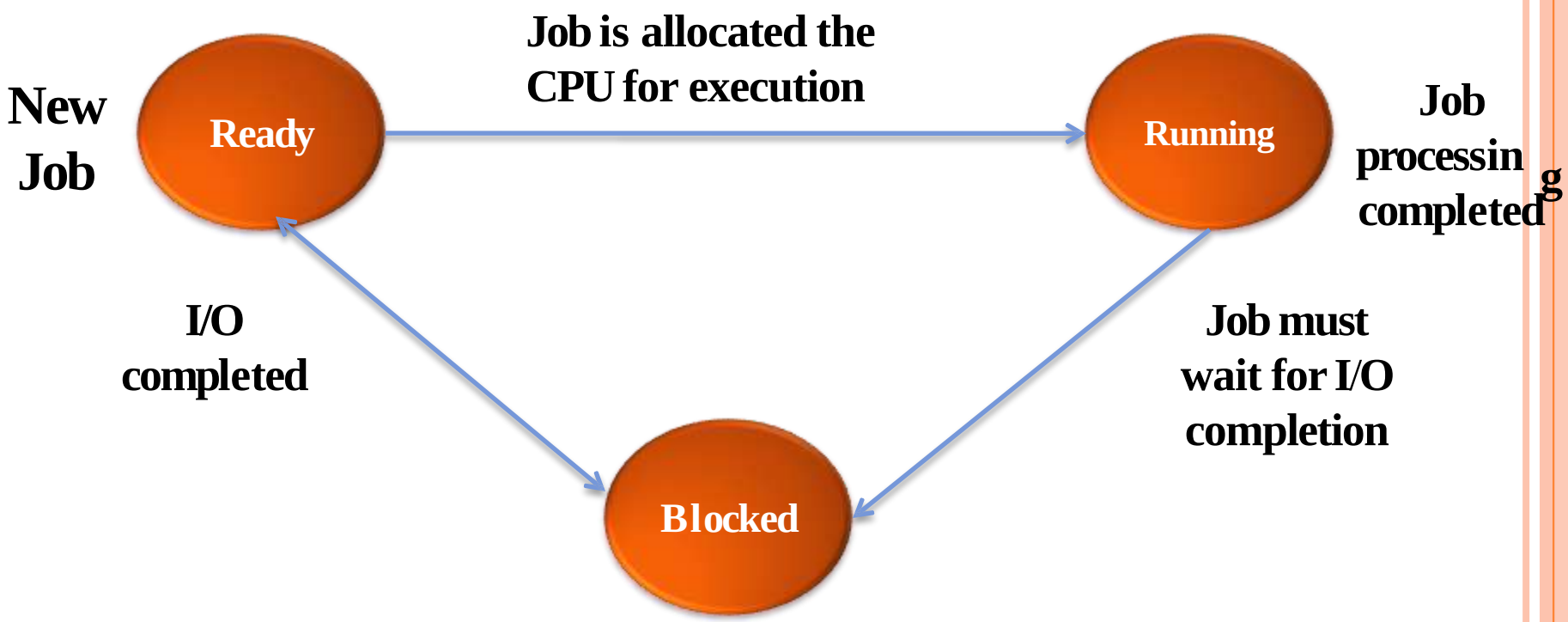
# Multiprogramming System

- Is a interleaved execution of two or more programs by the same computer.
- One or more programs are executed at the same time.
- Different scheduling techniques are:-
  - ✓ First come first serve
  - ✓ Round robin (RR)
  - ✓ Shortest job first (SJF)

# Multiprogramming System



# Multiprogramming System



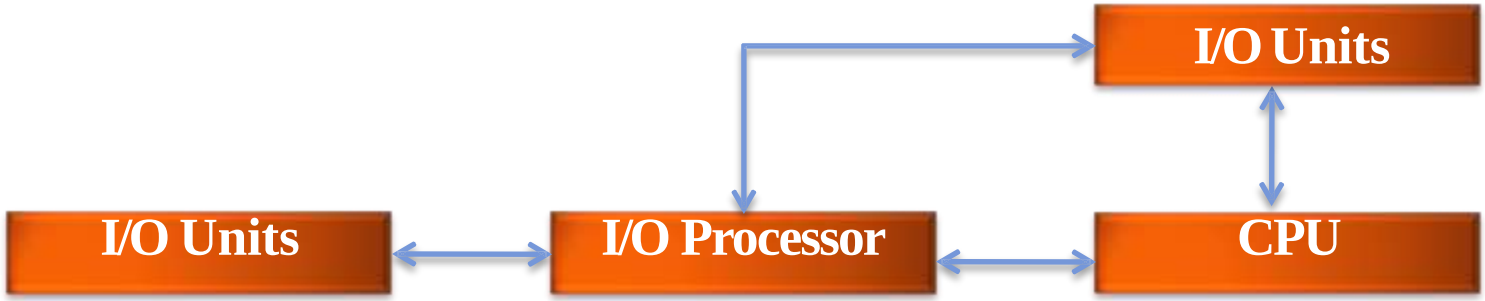

**Three different stages of Job**

# Multitasking System

- It is the system capability to concurrently work on more than one task.
- Same as multiprogramming.
- Multitasking is referred in context to single user.

# Multiprocessing System

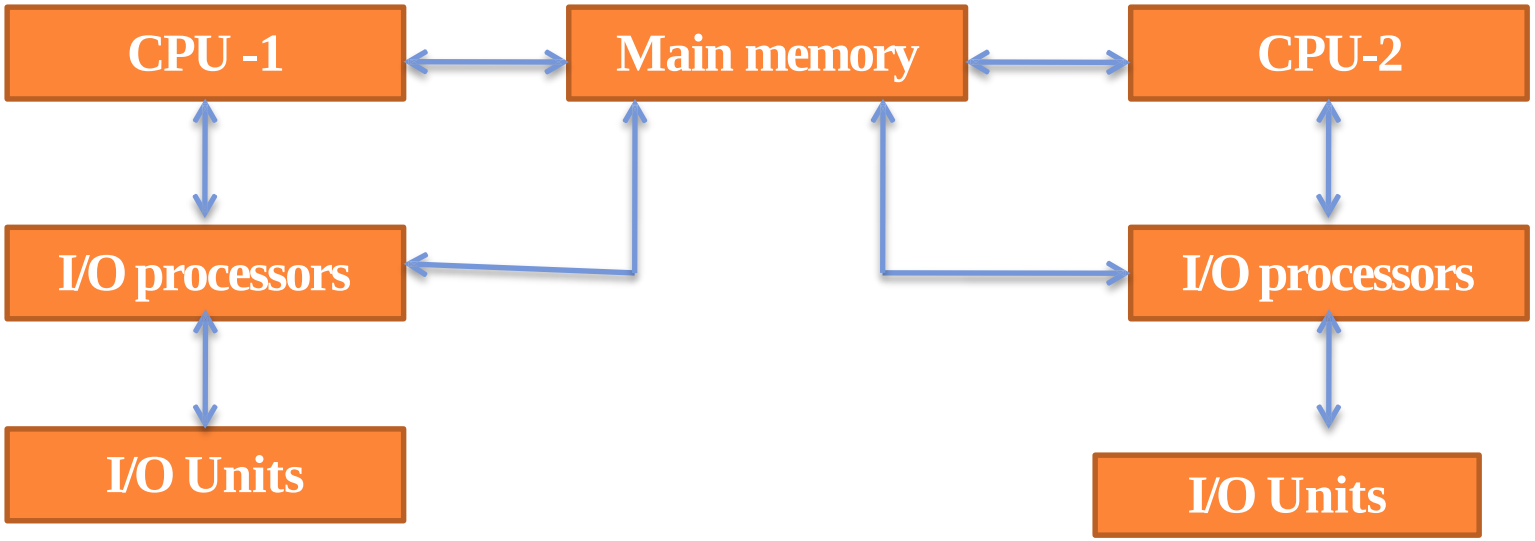
- Multiprocessing system is a integrated system.
- Two or more CPU is present.
- Simultaneously execute several programs.




**Architecture of a computer system showing its CPU, memory &I/O processors**

# Multiprocessing System

- Multiprocessing systems are of two types:-
  - ✓ Tightly coupled systems
  - ✓ Loosely coupled systems.

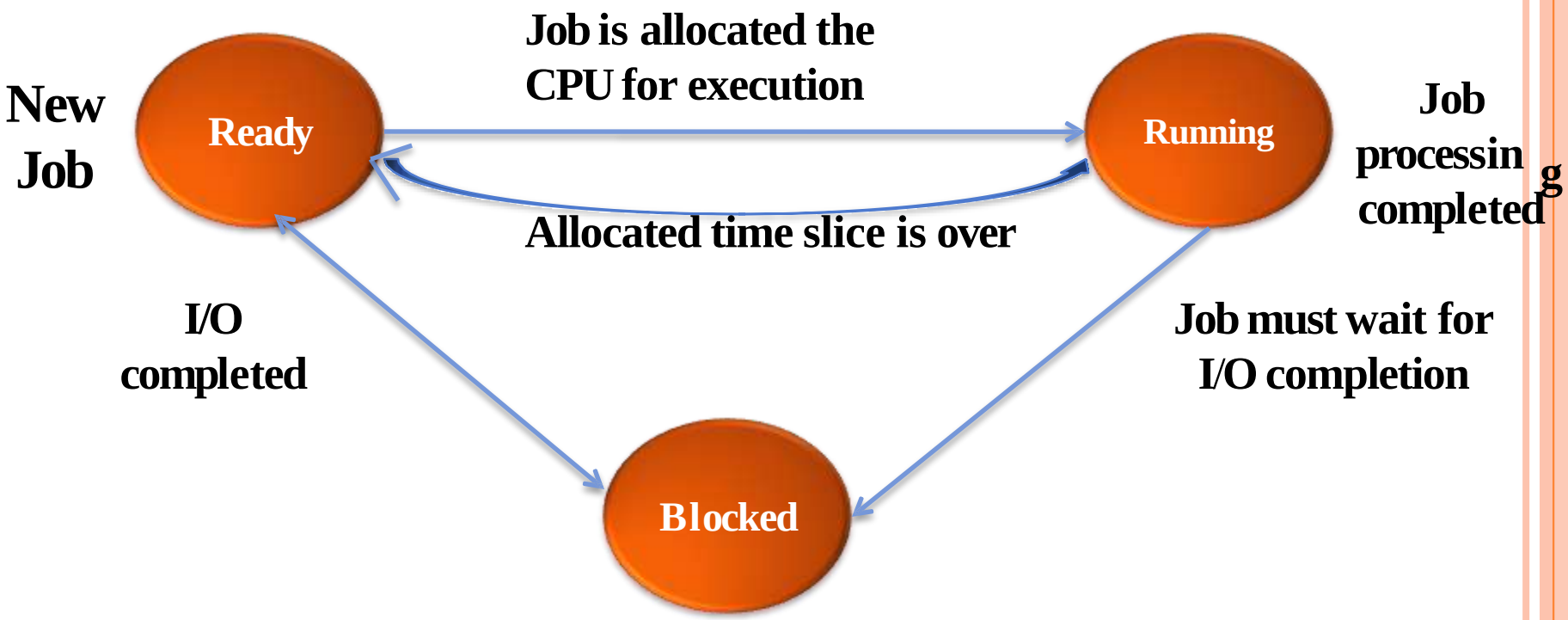



**Basic Org. of a physical multiprocessing System.**

# Time Sharing System

- Is a mechanism to provide simultaneous interactive use of computer system.
- There are many terminals connected to the same computer.
- CPU scheduling algorithm is used.
- Concept of Time Slice is used.

# Time Sharing System




The process state diagram for a time-sharing system

# Online Operating System

- Consists of entering transaction data and viewing the results immediately.
- Airline reservation, Railway reservation, &banking are some of the examples.
- These OS cannot be modified as it support single application.

# Thank You