Introduction to Operating Systems

- What is Operating System?
- Functions of Operating System
- Layers of Operating System
- Types of Operating System

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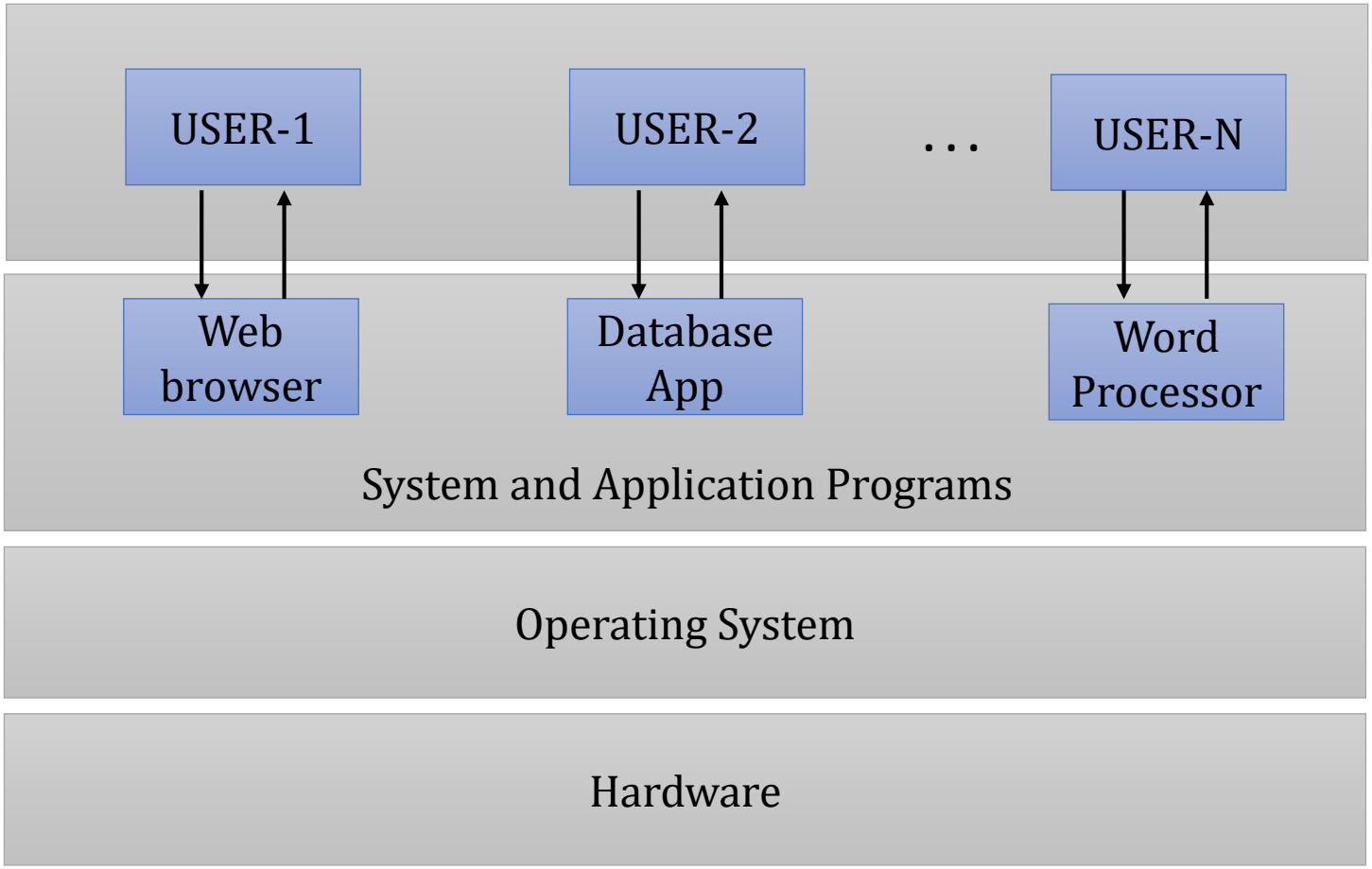
Introduction

- Consider a bare machine with hardware only.
  - Can we write a simple program and execute it on h/w directly; without any s/w?
    - **YES**
  - Why do we need softwares then?
    - **Convenience**
- Operating System (OS) is a collection of softwares that manages hardwares.
- OS is an interface between the user and the hardware.

Abstract view of a Computer System



Abstract view of a Computer System

- 2 view points of OS
  - USER View (Convenience)
  - SYSTEM View (many complicated tasks that are abstracted from users)

Functions of OS

- Interface: between Application Programs (USERs) and the hardware.
- Server: Provides services.
- Resource Manager:
  - CPU: OS assigns CPU to different tasks being executed.
  - Main memory: Processes are to be stored.
  - Secondary Memory: Programs/Files are to be stored.
  - I/O devices: Co-ordination and assignment of different I/O devices among the executing processes.

Functions of OS

- Accountant: Keeps track of
  - How much memory is used; and how much is free.
  - How much time a user has to use a printer or CPU, etc.
- Guardian to the System: Protects all resources. E.g., A printer may not be used by all users.
- Coordinator: If T_i need the input from T_j then T_i can't start its execution before T_j.

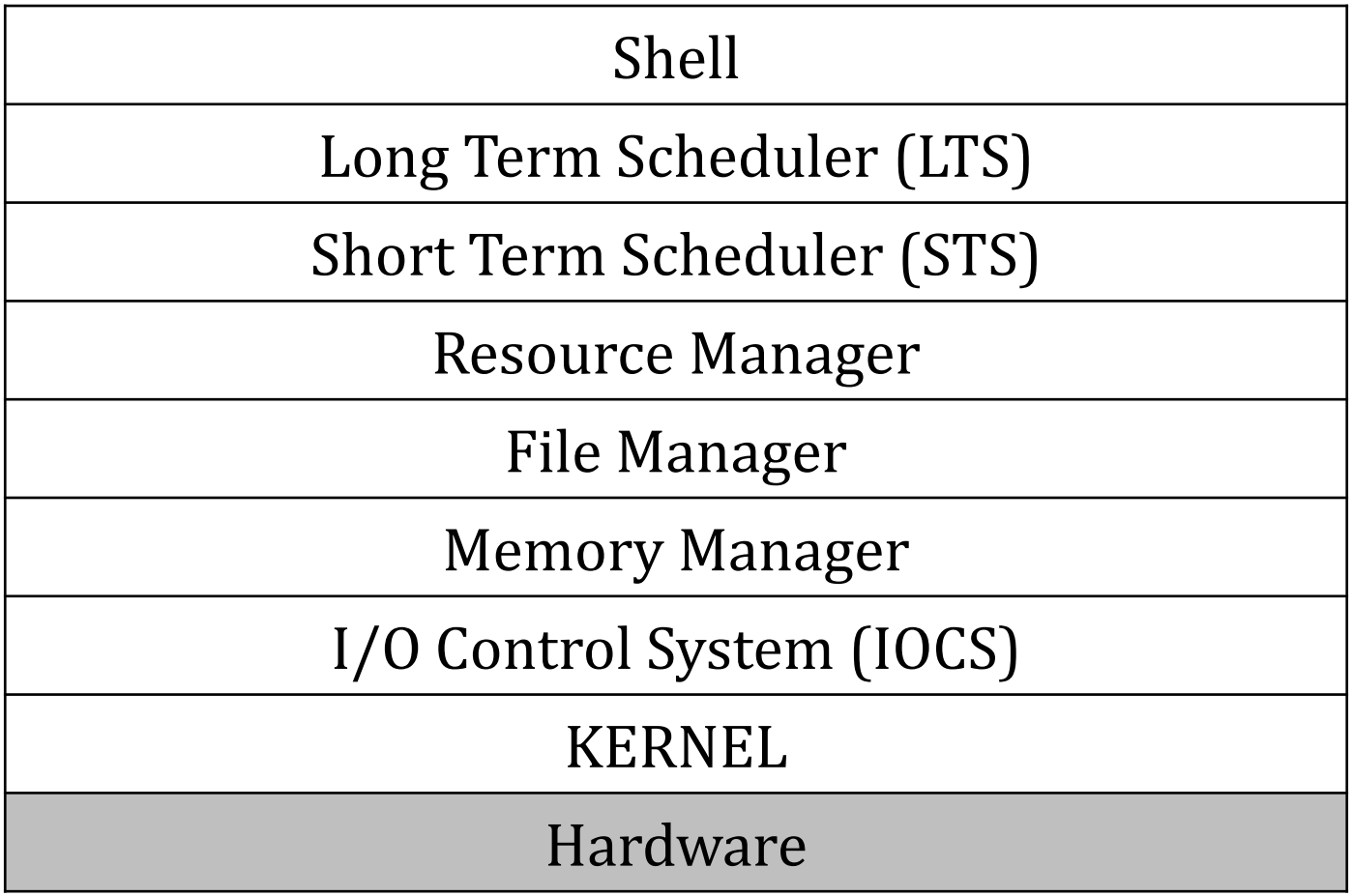
Functions of OS

- Resource Utilization Maximizer:
  - Printer is to be allocated to T1 first.
  - By the time T2 demands for printer, T1 has already used it

Task T1
Print-1 Print-2 Print-3 … … …

Task T2
… … … … Print-4 Print-5

OS: Layered Structure



Types of OS

- Batch OS
- Multi Programming OS
- Multi Processing OS
- Time Sharing OS
- Multi Threading OS
- Real Time OS