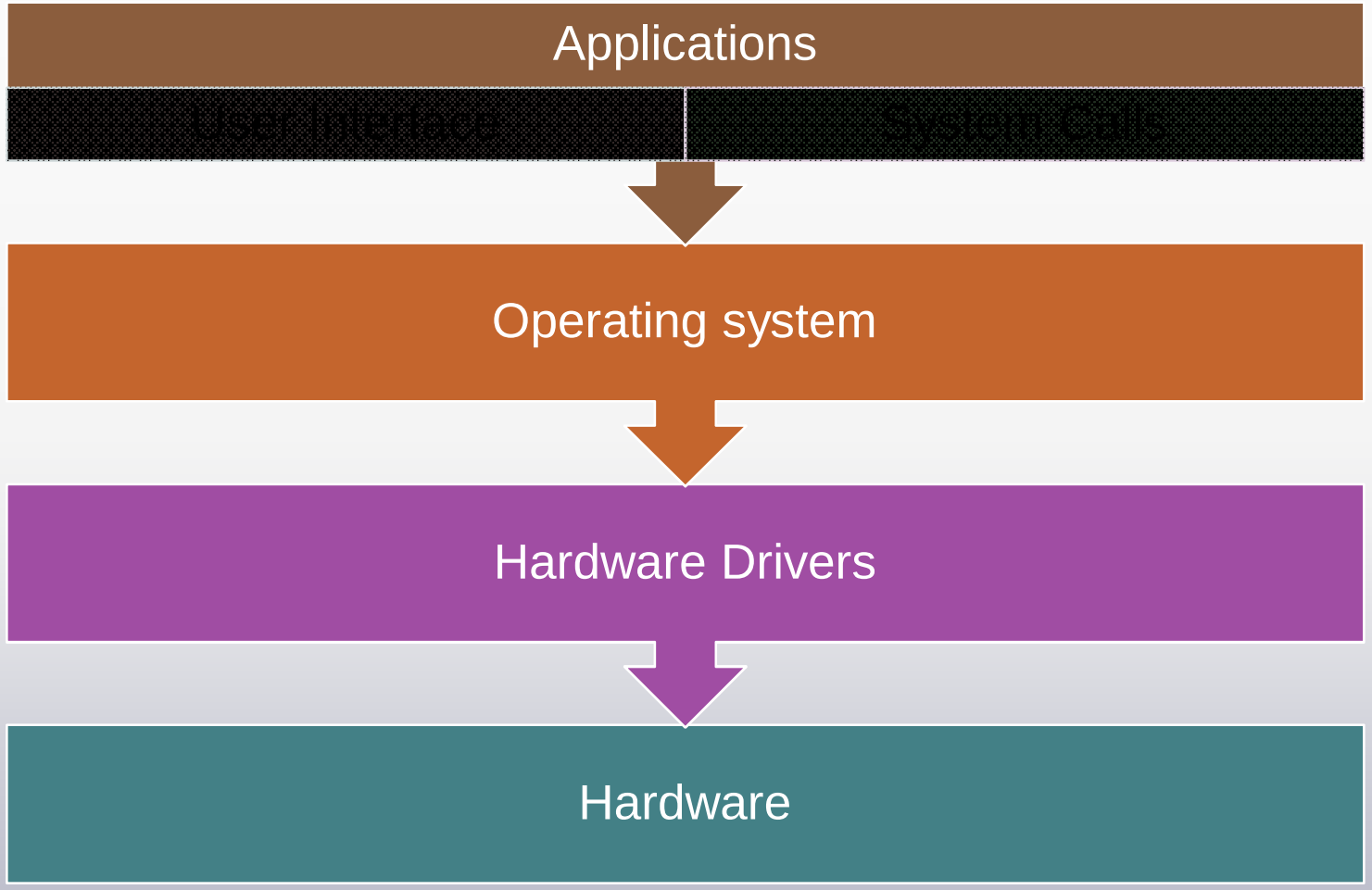
# Operating System Introduction

Dr. Padmaja Joshi

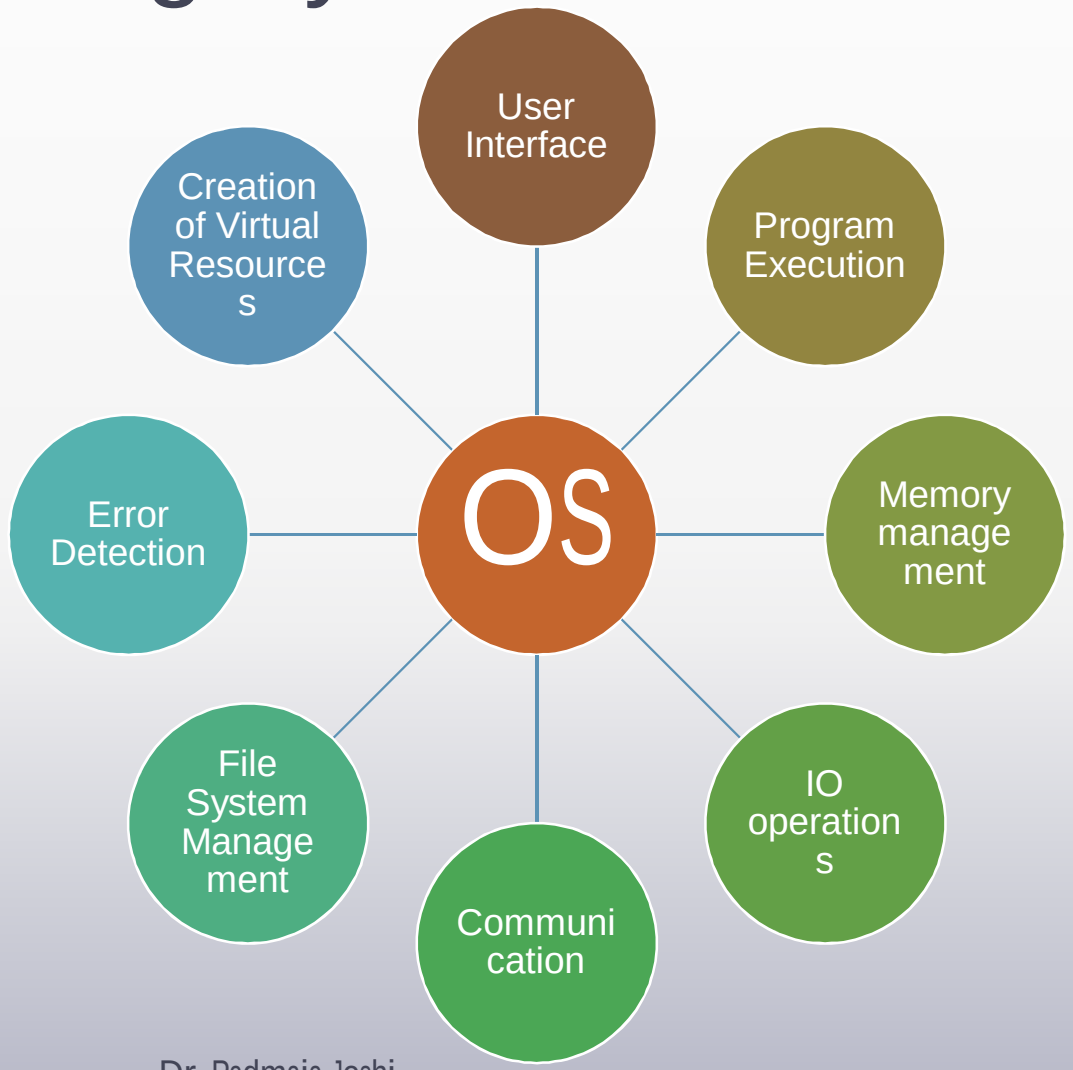
# Operating System is -

- Communication interface with the underlying hardware
- User interface for communicating and building applications on the given hardware
- Provider of basis / libraries / functions for application programs
- Responsible for management of file, CPU, memory, IO

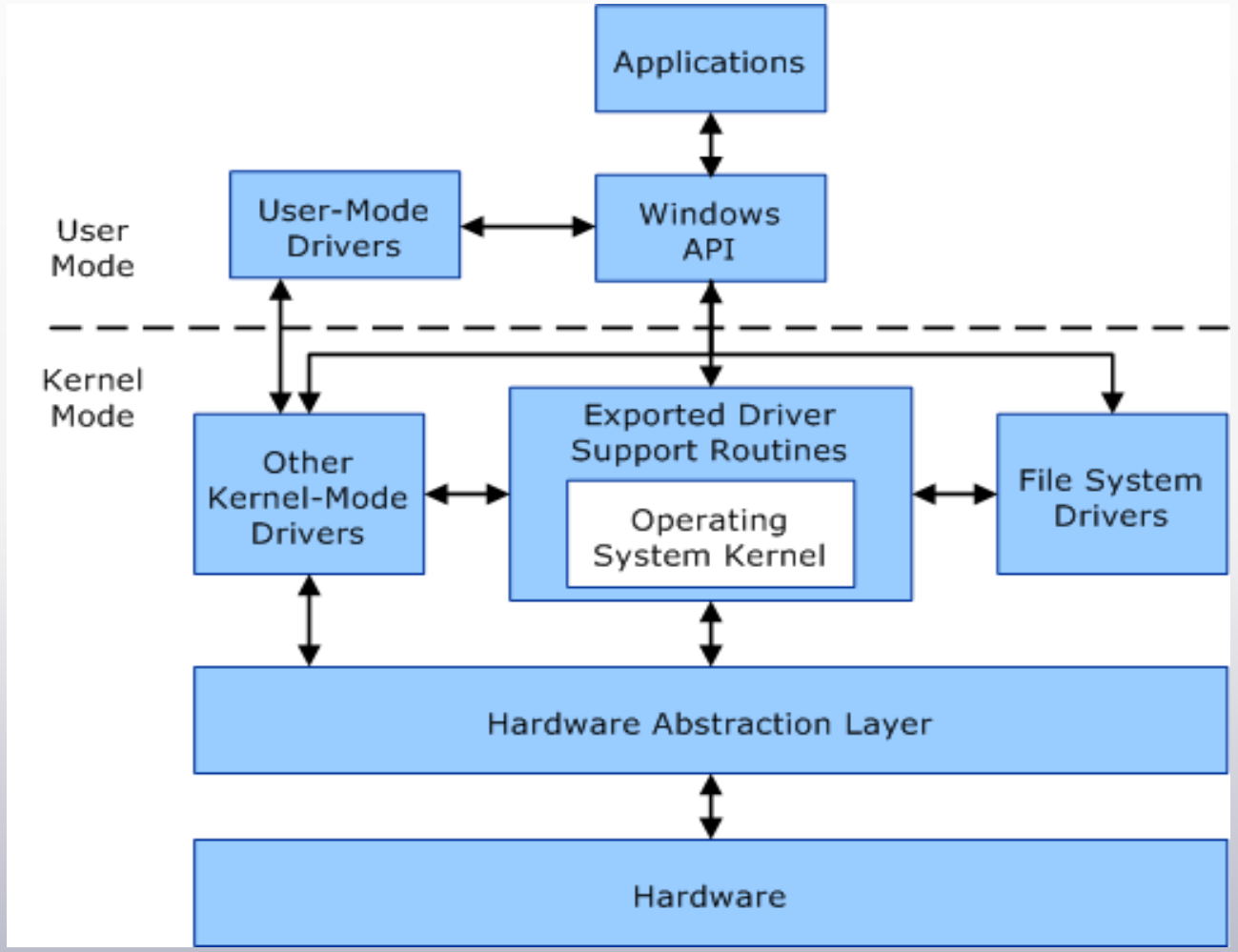
# Operating system

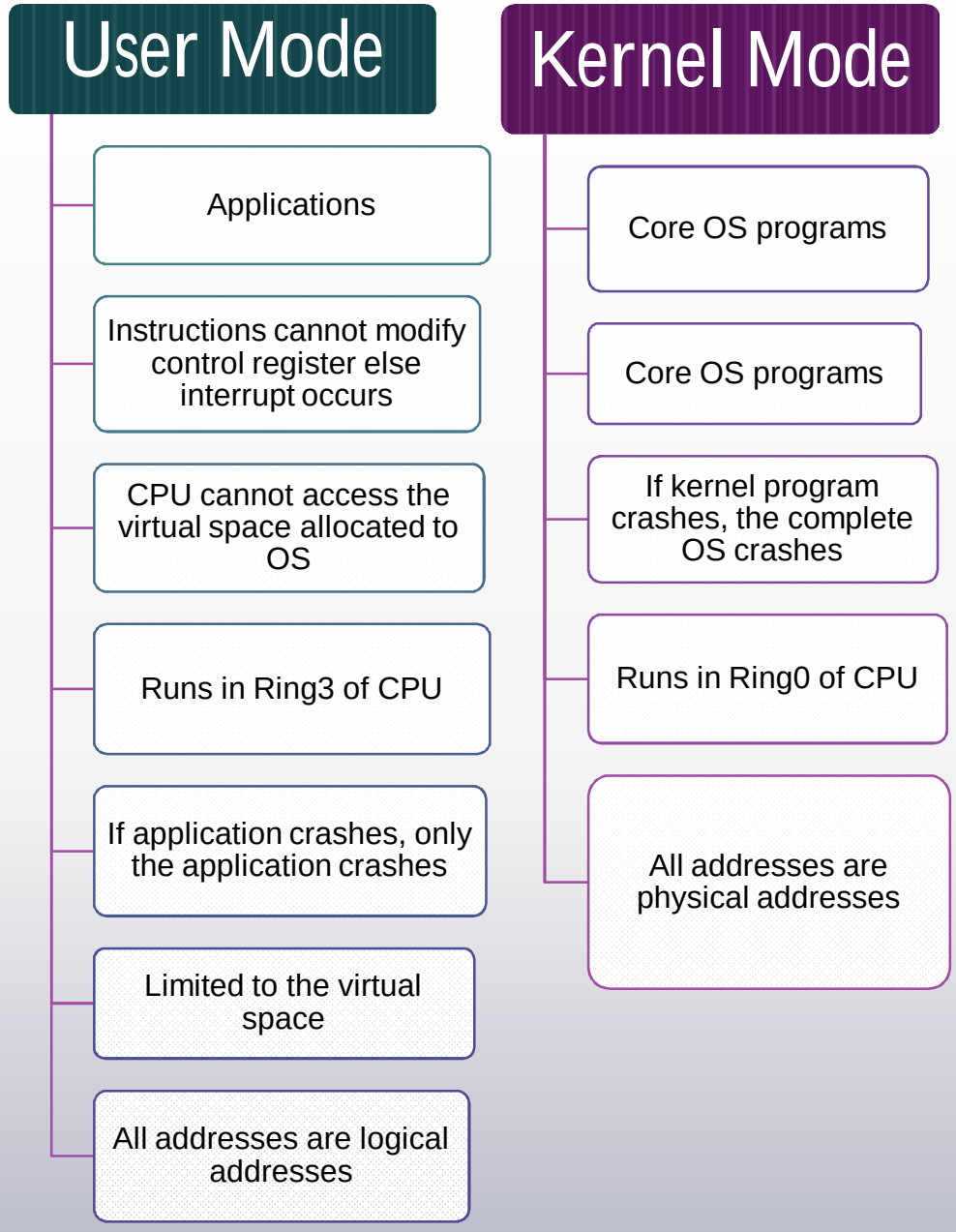


# Operating System Functionalities



# User Mode and Kernel Mode

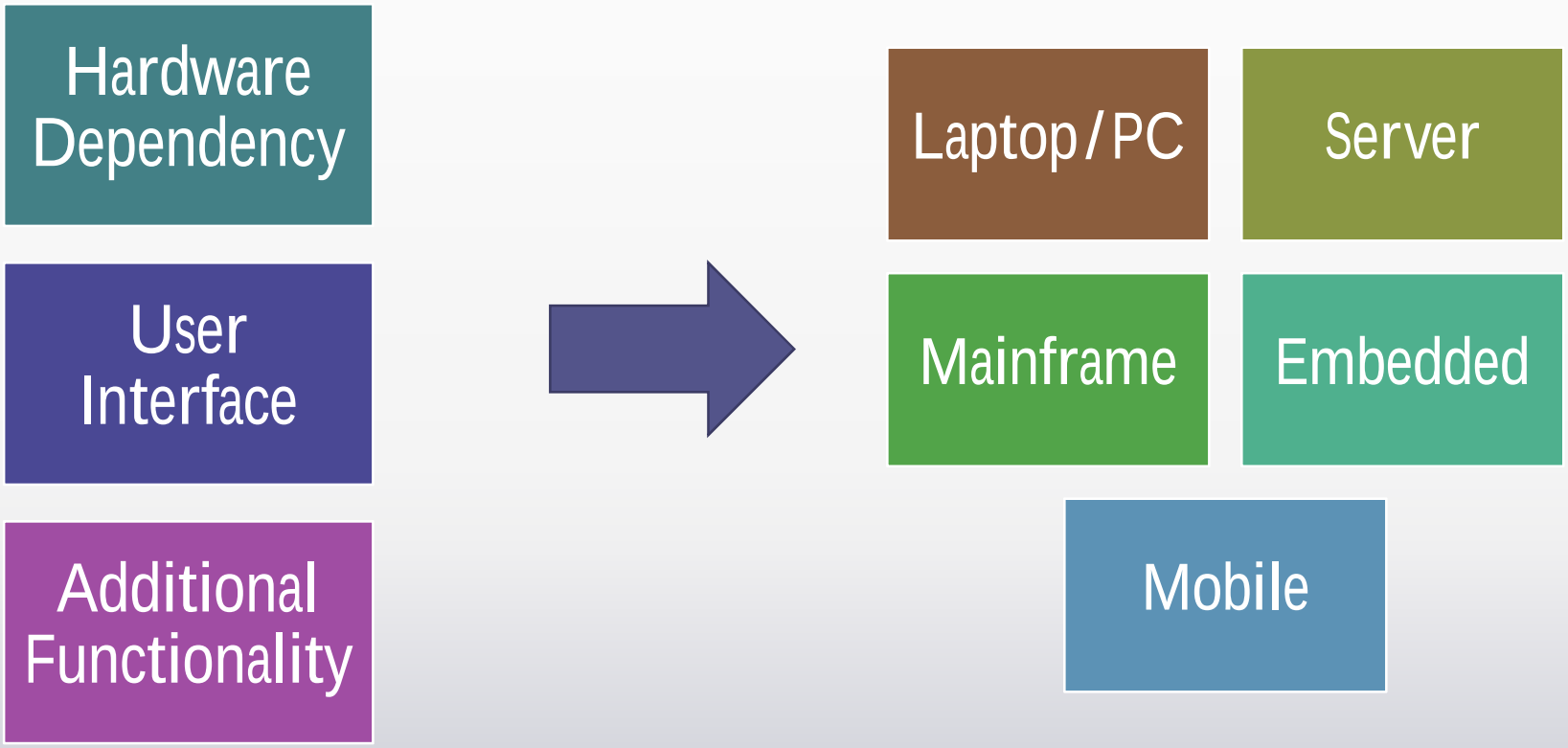



User Mode
Applications
Instructions cannot modify control register else interrupt occurs
CPU cannot access the virtual space allocated to OS
Runs in Ring3 of CPU
If application crashes, only the application crashes
Limited to the virtual space
All addresses are logical addresses
Kernel Mode
Core OS programs
Core OS programs
If kernel program crashes, the complete OS crashes
Runs in Ring0 of CPU
All addresses are physical addresses

# Kernel Space and User Space

- Kernel space (privileged) is strictly reserved for Kernel programs and device drivers
- User space (unprivileged) is used by user applications and will be swapped in and out as and when necessary

# Types of Operating System



# Types of OS

**Mobile**

- Smaller Display – Very Good UI
- Limited resources – Memory, Computing power
- GPS, Mobile N/W, Communication, Sensors
- Rarely close

**Embedded**

- Limited Functionality
- No UI requirements
- No major file management, resource management, IO management

**Server**

- Resource Intensive
- Requires major memory management, File management, IO management
- Virtual Resource creation
- UI mostly CLI as has limited access for security reasons

# THANK YOU