

Fourth OS Concept: Dual Mode Operation

- **Hardware** provides at least two modes:
 - “Kernel” mode (or “supervisor” or “protected”)
 - “User” mode: Normal programs executed
- What is needed in the hardware to support “dual mode” operation?
 - a bit of state (user/system mode bit)
 - Certain operations / actions only permitted in system/kernel mode
 - » In user mode they fail or trap
 - User- > Kernel transition sets system mode AND saves the user PC
 - » Operating system code carefully puts aside user state then performs the necessary operations
 - Kernel- > User transition clears system mode AND restores appropriate user PC
 - » return-from-interrupt