

Chapter 1

- **Learning objectives:**
 - Describe the basic elements of a computer system and their interrelationship.
 - Explain the steps taken by a processor to execute an instruction.
 - Understand the concept of interrupts and how and why a processor uses interrupts.
 - List and describe the levels of a typical computer memory hierarchy.
 - Explain the basic characteristics of multiprocessor and multicore organizations.
 - Discuss the concept of locality and analyze the performance of a multilevel memory hierarchy.
 - Understand the operation of a stack and its use to support procedure call and return.
- Instruction cycle
 - Fetch next instruction (address pointed to by PC) place into IR (via MAR & MBR)
 - Execute instruction (instruction contains opcode & target memory address)
 - (*If interrupts enabled*) check for interrupts; if present, initiate interrupt handler
- Interrupts
 - Handle interrupt:
 - Save PC, PSW & general register values onto control stack
 - Increment stack pointer accordingly
 - Load new PC from interrupt code
 - Return from interrupt:
 - Restore PC, PSW & general register values from control stack
 - Restore stack pointer
 - Multiple interrupts
 - Sequential processing – disable interrupts during interrupt
 - Con: no priority
 - Nested processing – high priority call can interrupt low priority interrupt call