

Computer Types

Last updated 6/14/23

These slides identify the components in computers

Computer Types

- Processor vs. Computer
 - Often used interchangeably
 - We will use Computer to indicate a complete system
 - We will use Processor to indicate the central processing system along with local memories

Computer Types

- General Purpose Processor/Computer
 - Key Characteristics
 - 32/64 bit operations
 - Support non-real-time/time-sharing operating systems
 - Support complex memory systems
 - Multi-level cache
 - DRAM
 - Virtual memory
 - Support DMA-driven I/O
 - Complex CPU structures
 - Extensive Pipelining
 - Superscalar execution
 - Out-of-order execution (OOO)

Used to run programs
the user provides

Computer Types

- General Purpose Computer

- Computers using processors like:

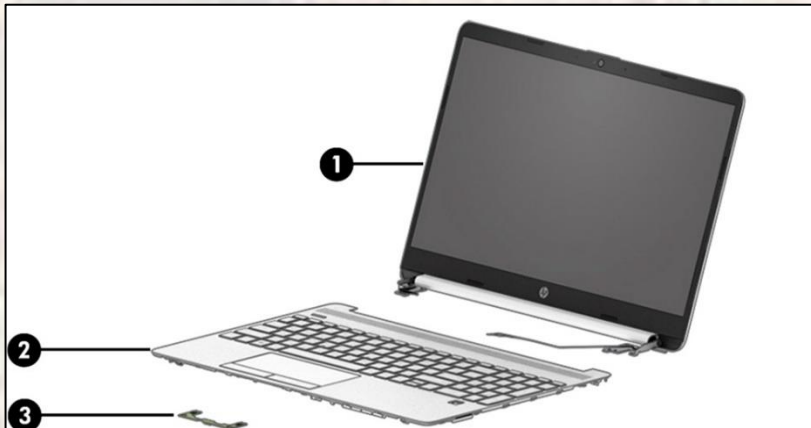
- ARM 7, 9, Cortex A8, A9, A15
- Intel Pentiums, Ix, Core ix...
- AMD Phenom, Athlon, Opteron
- Apple A4, A5, A6
- TI OMAPs

Used to run programs
the user provides

- Laptops
- Desktops
- Tablets
- Portions of Smart Phone (applications processor)

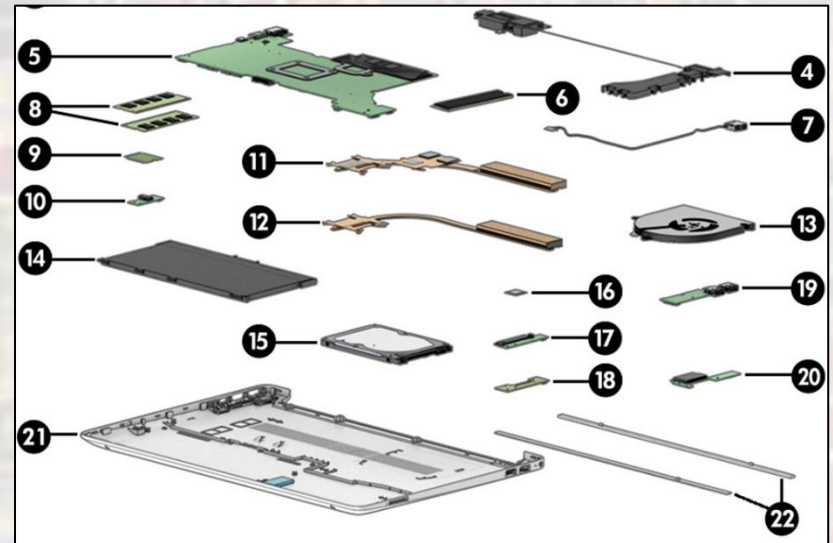
Computer Types

- General Purpose Computer



- 1) Display
- 2) Keyboard
- 3) Touchpad Buttons

- 11) Heat Sink
- 12) Heat Sink
- 13) Fan
- 14) Battery
- 15) Hard Drive
- 16) Fingerprint Reader
- 17) Hard Drive Board
- 18) Solid State Drive Board
- 19) USB
- 20) Card Reader
- 21) Bottom Cover
- 22) Rubber Feet



Computer Types

- Embedded Processor/Computer
 - Key Characteristics
 - 4/8/16/32 bit operations
 - Support real-time operating systems
 - Relatively simple memory systems
 - Memory mapped I/O
 - Simple CPU structures
 - Few registers
 - Limited Instructions
 - Support for multiple I/O schemes
 - Wide range of peripheral support
 - A/D – D/A
 - Sensors
 - Extensive interrupt support

Used to run programs
the manufacturer
provides

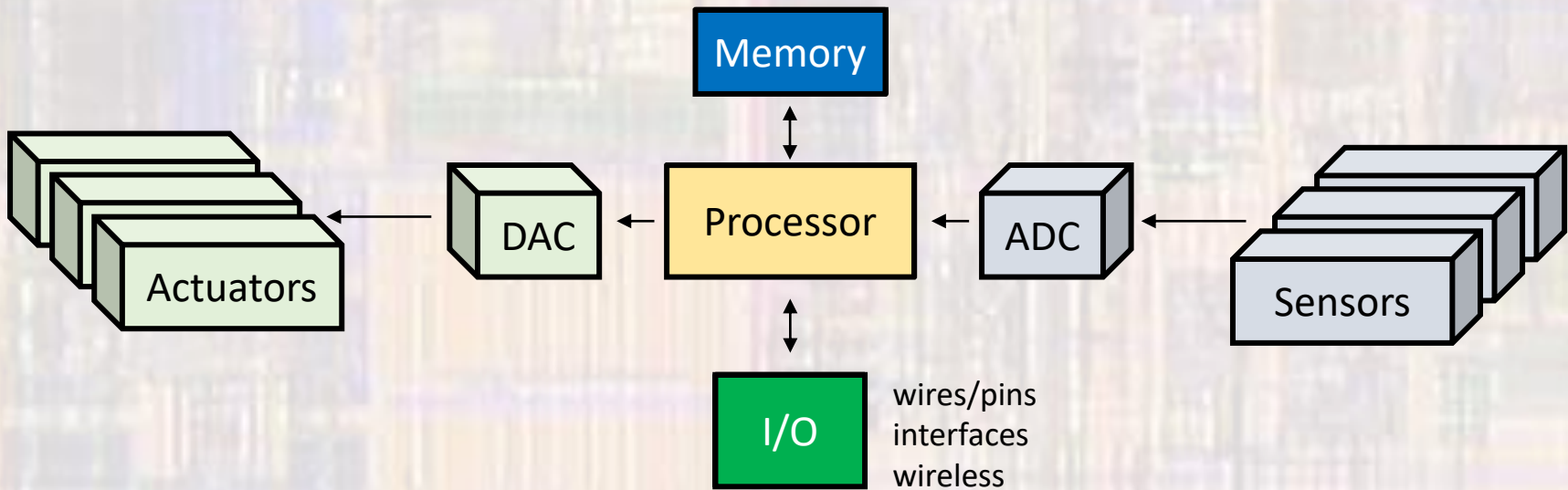
Computer Types

- Embedded Computer
 - Computers using processors like:
 - ARM Cortex Rx, Mx
 - ST Nucleo
 - TI MSP
 - Atmel AVR
 - Old Arduino platform
 - Refrigerators
 - Automotive
 - Industrial Machines
 - Portions of a Smart Phone (call processing)

Used to run programs
the manufacturer
provides

Computer Types

- Embedded Computer



Often no direct user interface

Computer Types

Instruction Sets

- CISC – Complex Instruction Set Computer
 - Name didn't even exist until RISC was defined
 - Used in most processors until about 1980
 - One instruction holds multiple actions
 - Load data from location, add, write data to new location
 - Many times the instructions were designed to emulate high level language constructs
- RISC – Reduced Instruction Set Computer
 - Developed in the '80s
 - Most prevalent architecture today
 - Sometimes called a load/store architecture
 - Instructions are simple
 - Load data from location
 - Add
 - Store data to location
- RISC dominates today
 - Much easier to take advantage of advanced structures like Pipelining, Superscalar, OoO