Overview of Computers

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Computer Hardware

Overview of Discussion

Computer Types

Parts of Computer

Common Computer Types

Common Computer Types

Desktop
Computer

Common Computer Types

Desktop
Computer

Common Computer Types

Desktop
Computer

Laptop
Computer

Common Computer Types

Desktop Computer

Laptop Computer

Common Computer Types

Desktop
Computer

Laptop
Computer

Palmtop
Computer

Common Computer Types

Desktop Computer

Laptop Computer

Palmtop Computer

Common Computer Types

Desktop
Computer

Laptop
Computer

Palmtop
Computer

Super
Computer

Common Desktop Hardware

Common Desktop Hardware

System unit—contains CPU, RAM (main memory), and other supporting components

Screen (output device)

CD-ROM drive (secondary memory)

Hard-disk drive (secondary memory)

Speakers (output device)

Keyboard (input device)

Mouse (input device)

Hardware vs. Software

Hardware vs. Software

Hardware -

    Monitor,

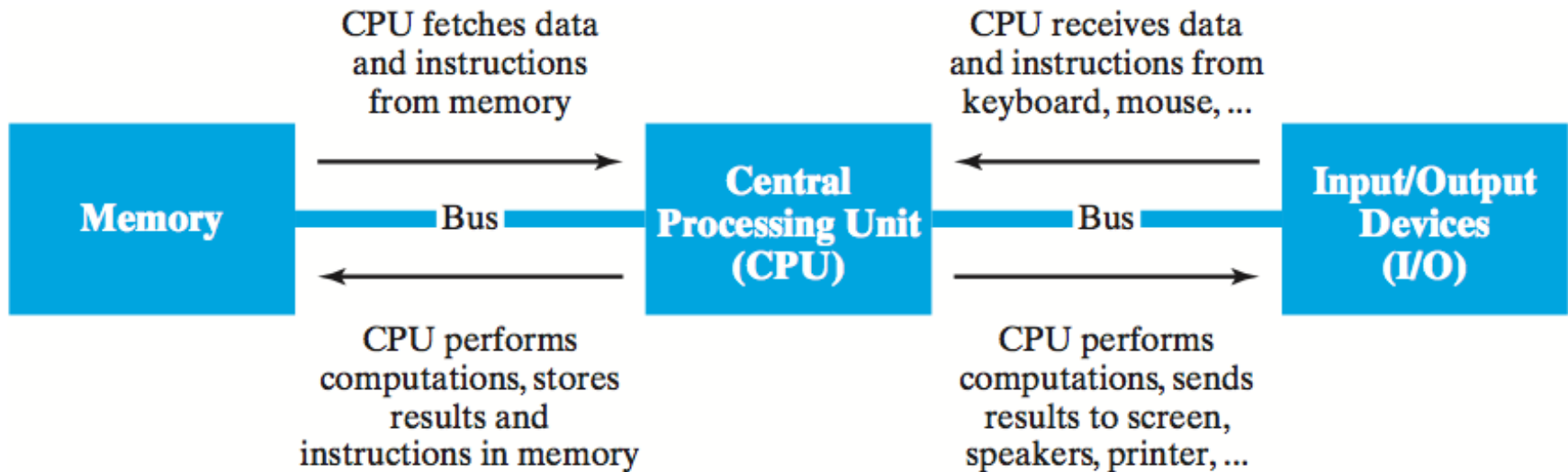   Keyboard,

    Mouse,

    Hard drive

Software -

    Operating system

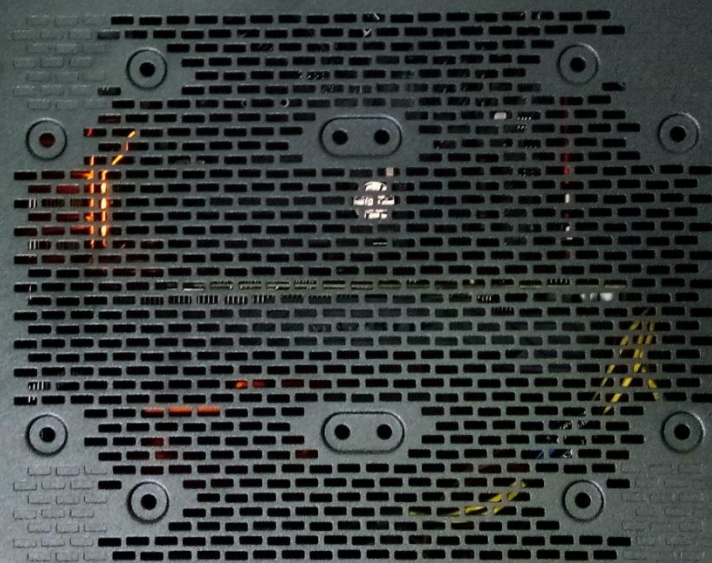   Word processing program

    Web browser

    C compiler

Desktop Specifications

Desktop Specifications

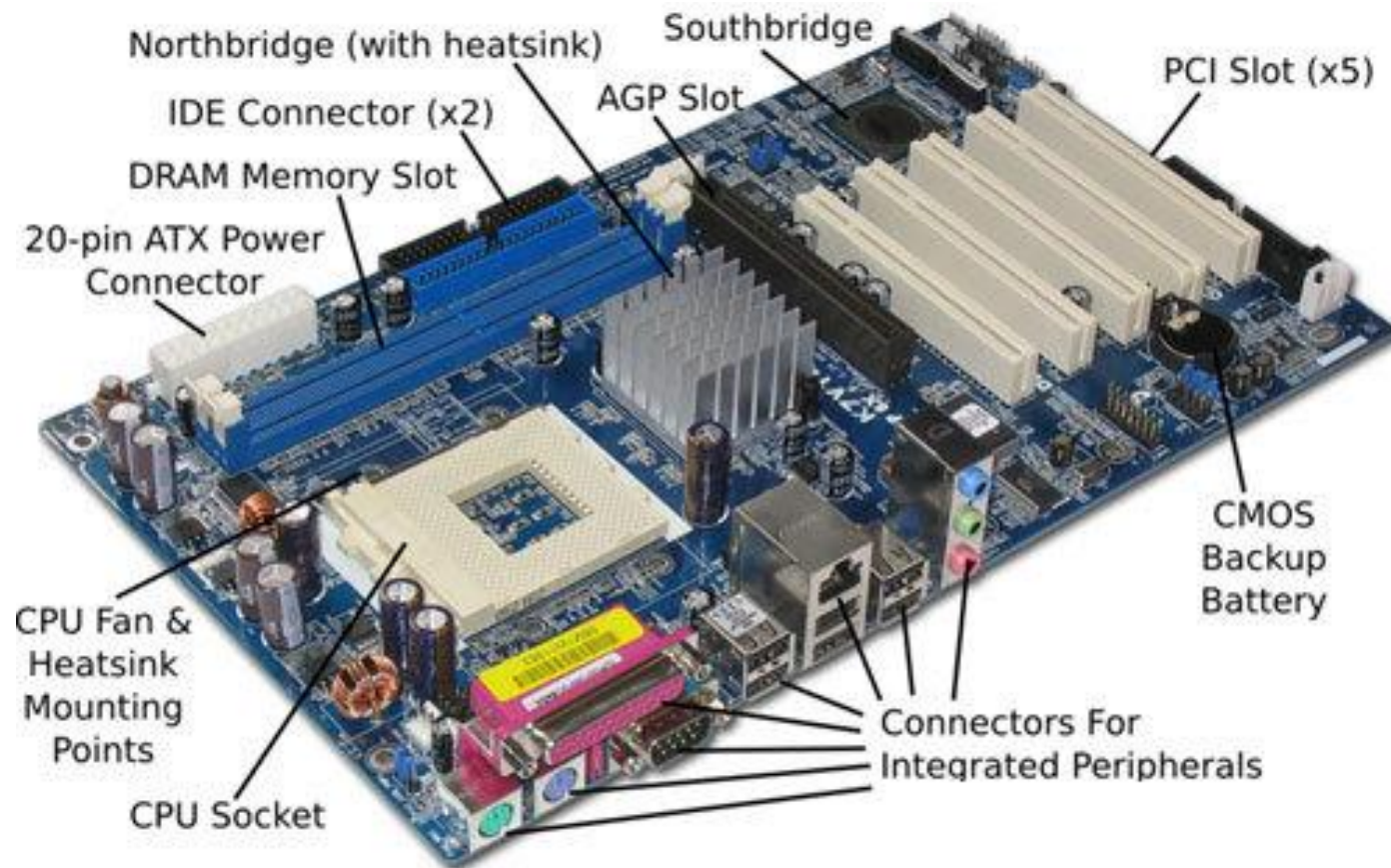|	Desktop System 1	Desktop System 2
CPU	2.2 GHz Intel Celeron 450	3.2 GHz Intel Core i5
HARDWARE — Memory		
Cache	512 KB cache	4 MB cache
RAM	4 GB RAM	8 GB RAM
Hard Drive	320 GB hard drive	1 TB hard drive
CD-ROM/DVD	DVD+/−RW drive	DVD+/−RW drive
Input/Output		
Keyboard	USB multifunction keyboard	wireless multifunction keyboard
Pointing Device	USB optical mouse	wireless optical mouse
Screen	20" HD flatscreen monitor	24" HD flatscreen monitor
Speakers	Multimedia Speaker System	Dolby Surround Sound Speakers
Network Adapter	Integrated 10/100/1000 Ethernet	Integrated 10/100/1000 Ethernet Integrated wireless card & antenna
SOFTWARE — Operating System	Windows 7 Home Premium	Windows 7 Professional
Web Browser	Internet Explorer 8	Internet Explorer 8
Productivity Suite	Microsoft Works 9	Microsoft Office Professional 2007
Security	McAfee Security Center	McAfee Security Center

von Neumann Architecture

Motherboard

Northbridge (with heatsink)
Southbridge
PCI Slot (x5)
IDE Connector (x2)
AGP Slot
DRAM Memory Slot
20-pin ATX Power Connector
CMOS Backup Battery
CPU Fan & Heatsink Mounting Points
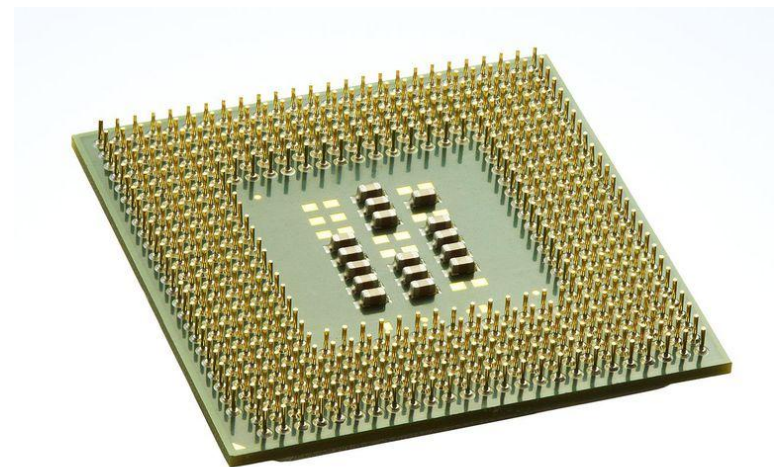Connectors For Integrated Peripherals
CPU Socket

CPU - "brain" of Computer

Made of *circuitry* – electronic components wired together to control the flow of electrical signals

Circuitry is embedded in a small silicon chip, 1-2 inches square

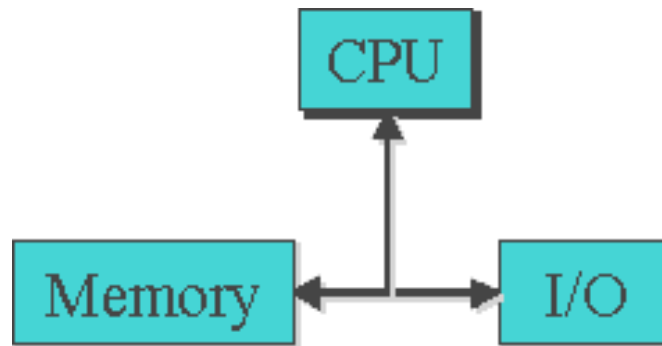Most complex part of a computer (Millions of individual components)

(intel®)

Core™ i7

CPU Working

Obtains data and instructions from memory/IO

Carries out instructions

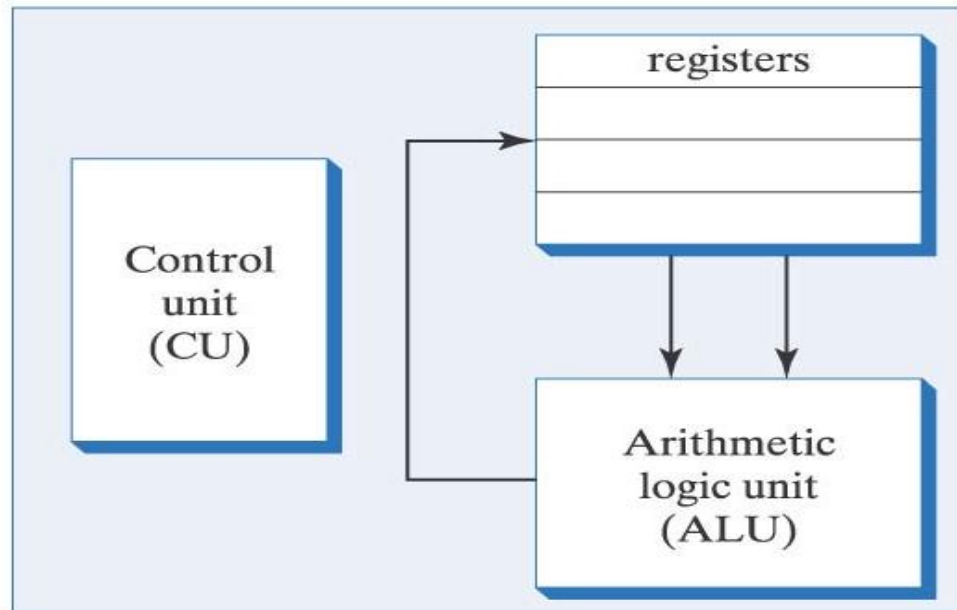Stores/places results back to memory/IO

CPU Subunits

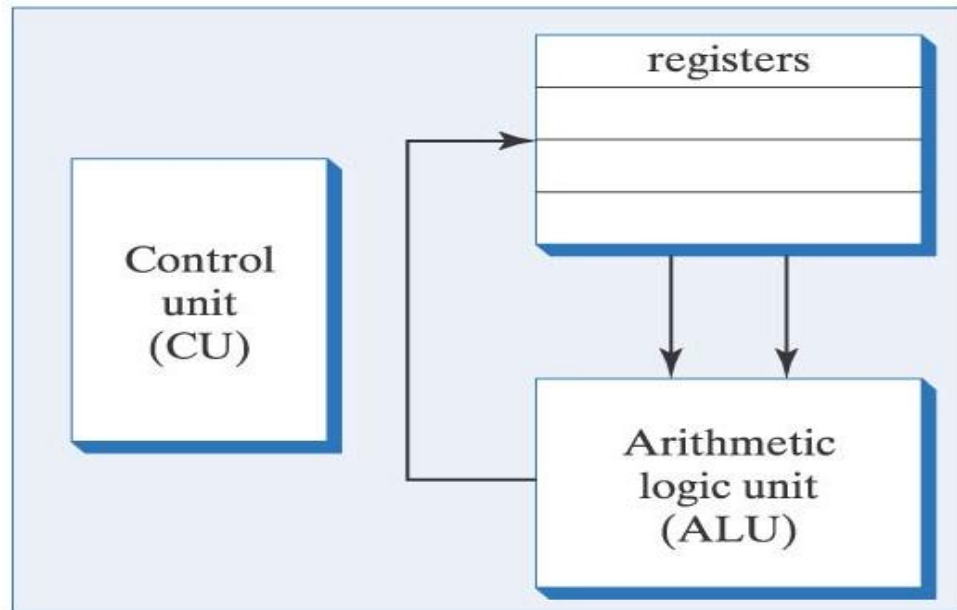Arithmetic Logic Unit (ALU)

Registers

Control Unit (CU)

CPU Datapath Cycle

CPU datapath: Registers - ALU - Registers

CPU datapath cycle

CPU Datapath Cycle

CPU speed = the number of CPU cycles per second

- e.g., an 800MHz CPU can perform 800 million cycles per second

- e.g., a 1.4GHz CPU can perform 1.4 billion cycles per second

CPU Datapath Cycle

CPUs cannot be compared solely on the basis of their speeds

CPU Datapath Cycle
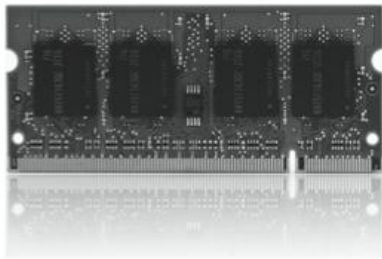
CPUs cannot be compared solely on the basis of their speeds

  ❑ Different instructions sets

  ❑ A slower CPU + richer instructions -> some tasks faster

  ❑ Number of cores

Memory Types

Memory Types

Main memory (or Primary memory)
Secondary memory

RAM chips   Hard disk   Flash drive   Compact disk (CD)

Main Memory – RAM

Memory (cont.)

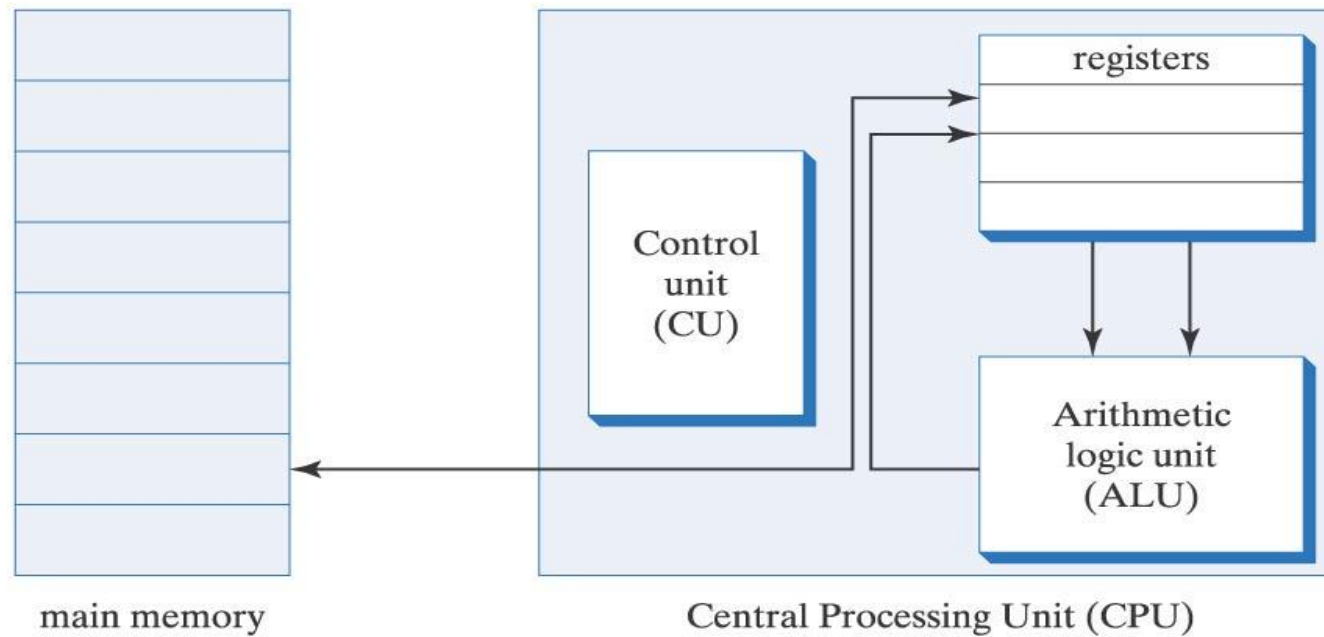High-end computers tend to have

More main memory -

To allow for quick access to more data and programs

More secondary memory -

To allow for storing more long-term data

CPU and Main Memory

main memory

Central Processing Unit (CPU)

Input/Output (I/O)

Input/Output (I/O)

Input devices -

keyboard, mouse, track pad, microphone, scanner
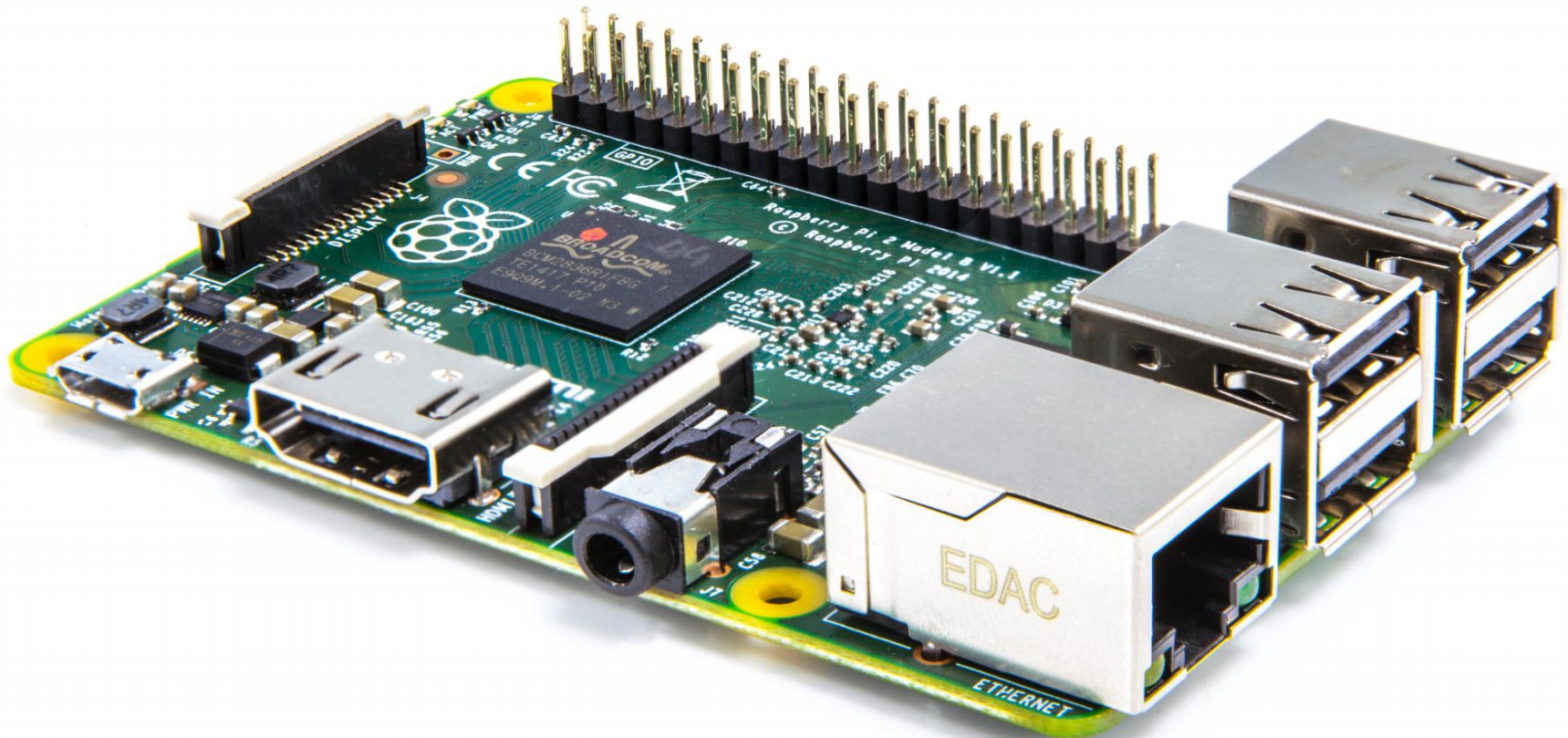
Output devices -

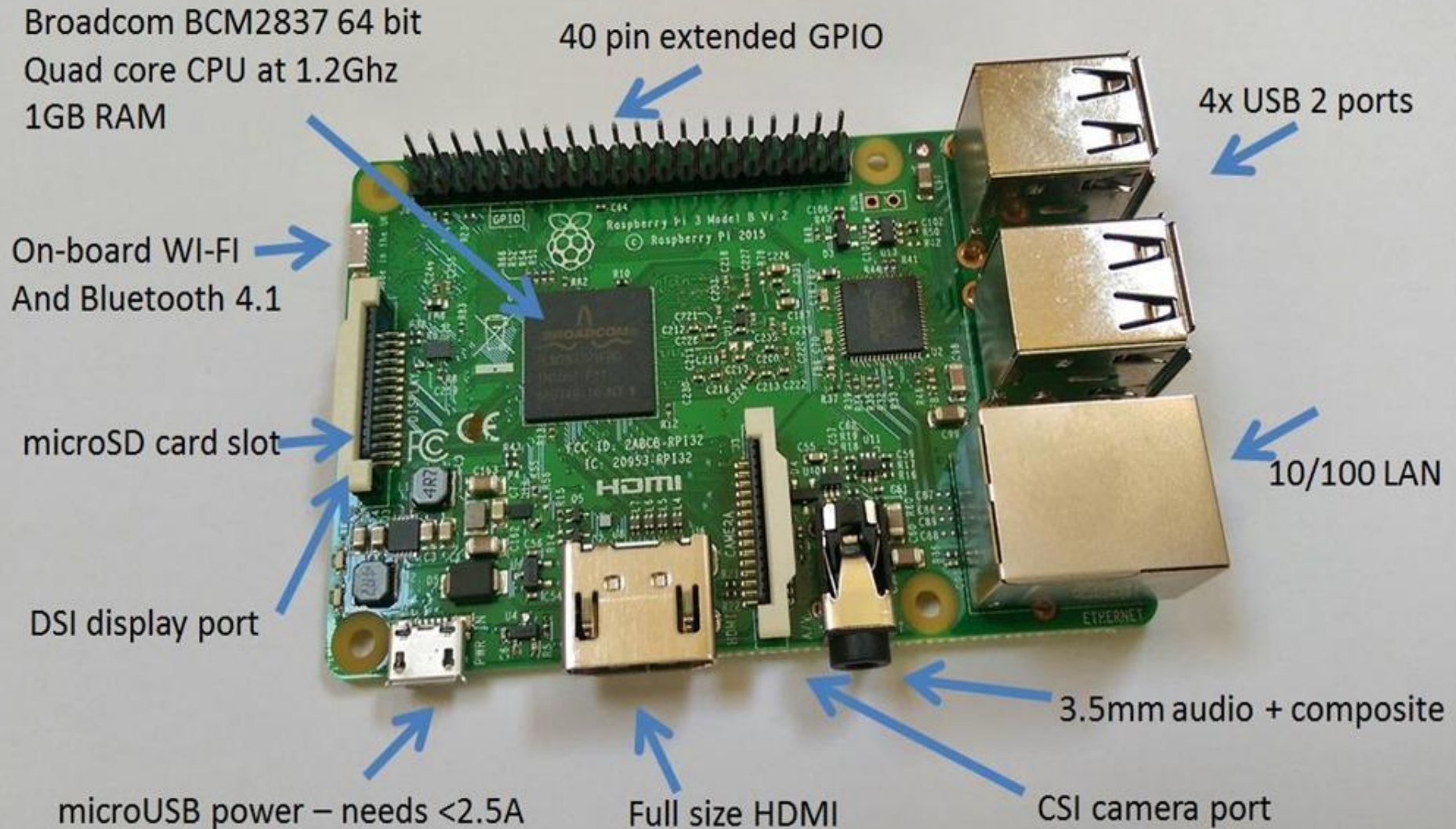monitor, speaker, printer

Systems on Chip

A CPU and more are all interconnected at once rather than attached to a motherboard

   Popular in phones, tables, and game consoles

   Raspberry Pi

Systems on Chip

Broadcom BCM2837 64 bit
Quad core CPU at 1.2Ghz
1GB RAM

40 pin extended GPIO

4x USB 2 ports

On-board WI-FI
And Bluetooth 4.1

microSD card slot

10/100 LAN

DSI display port

microUSB power – needs <2.5A

Full size HDMI

3.5mm audio + composite

CSI camera port

Videos on Computer Basics

Computer Basics

https://www.youtube.com/watch?v=pIsbh6SqfhQ

Looking Inside A Computer

https://www.youtube.com/watch?v=CXWxiADToR0&feature=related

How does Your Computer Think

http://www.youtube.com/watch?v=Q2hmuqS8bwM&feature=related