COMPUTER SYSTEMS ORGANIZATION

High Level Organization of a Computer System

Spring 2012 -- IIIT-H -- Suresh Purini

Basic Course Goal

- Course Goal: To study the anatomy of a typical Computer System.

- Well, what is a typical computer system?

  - Desktops, Laptops, Netbooks, …

- How about Server Machines?

  - In what way they are different from Desktops/Laptops?

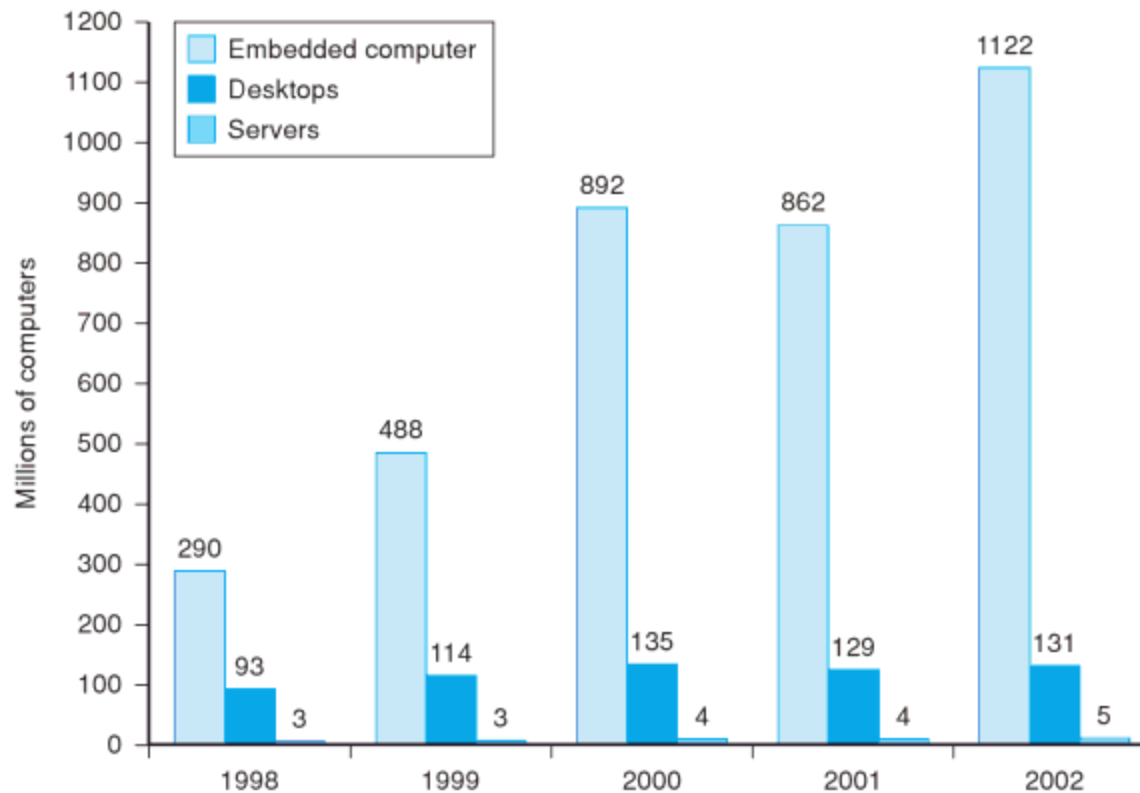- How about Embedded Computers lying inside Cell Phones, Automobiles, Airplanes, Set Top Boxes, Televisions etc. ?
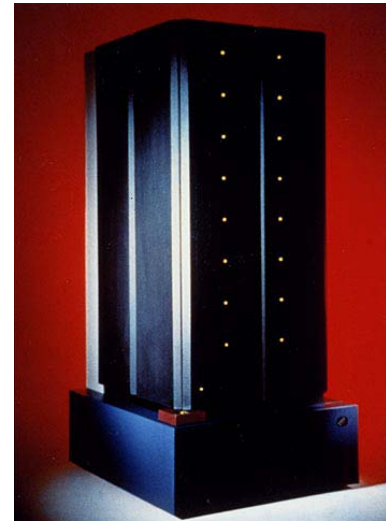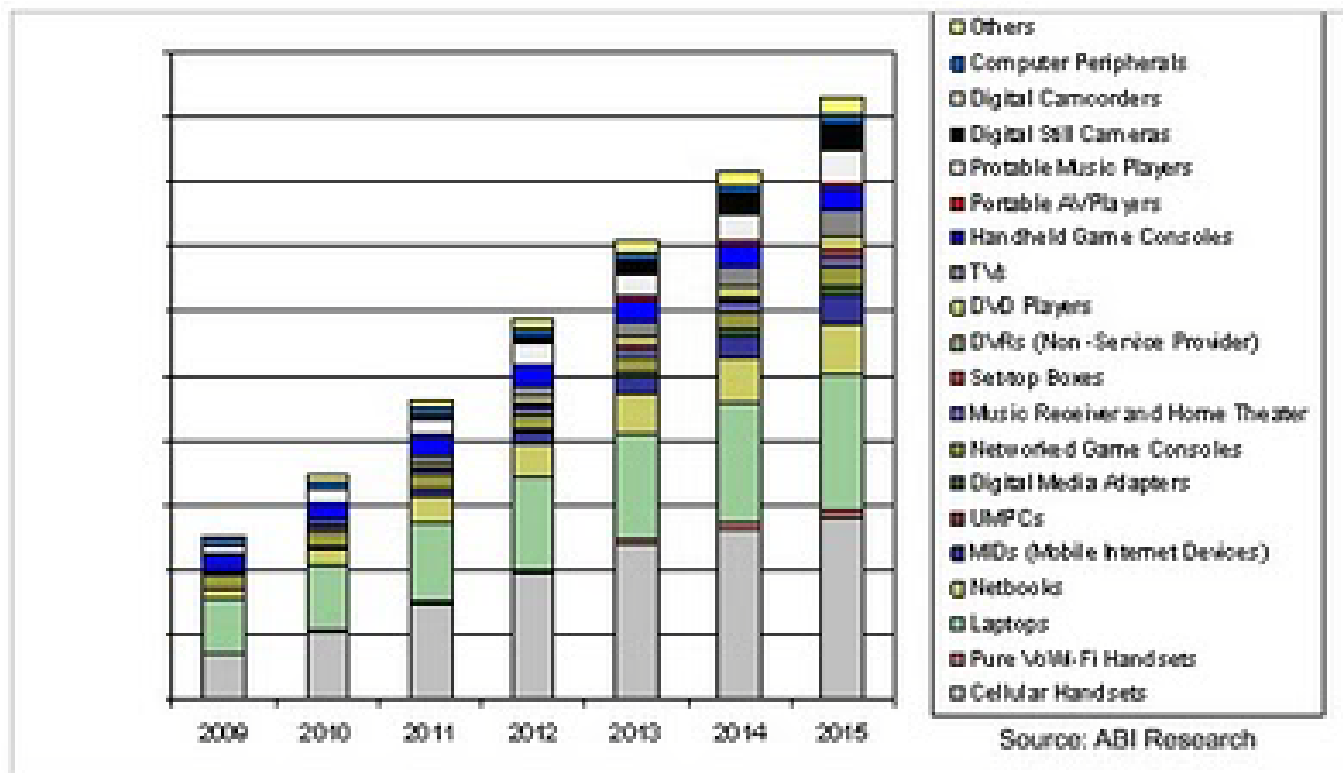
Plug Computers

Sales Distribution

Number of distinct processors sold between 1998 and 2002.

Sales Distribution Projections
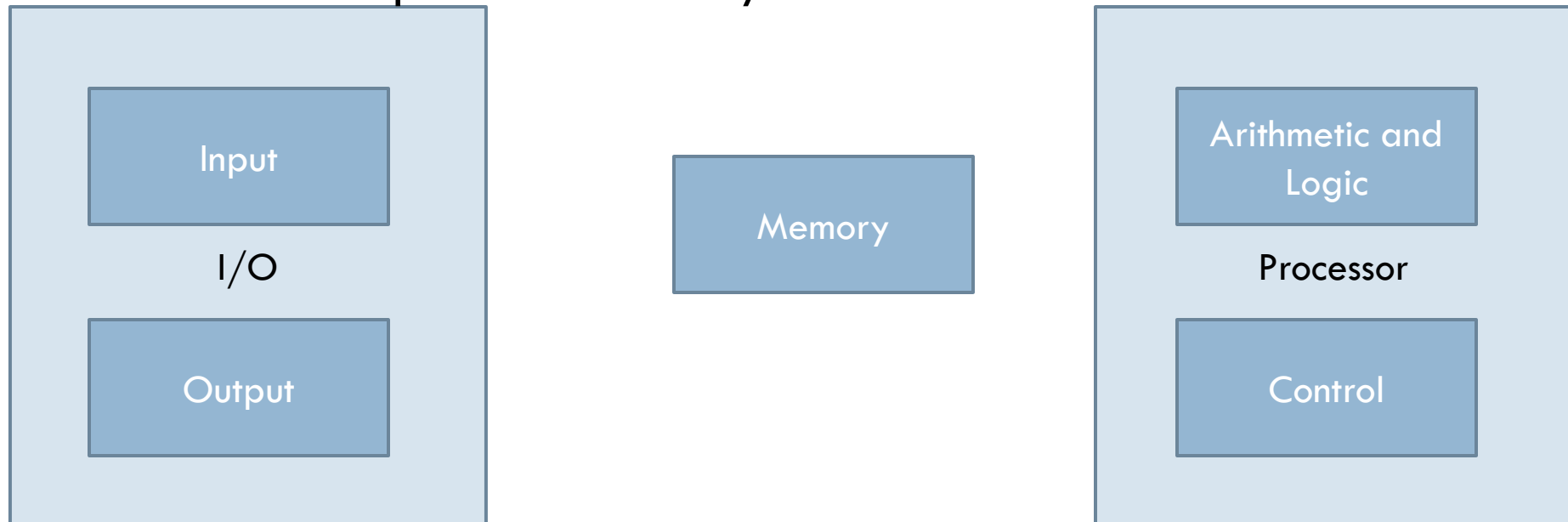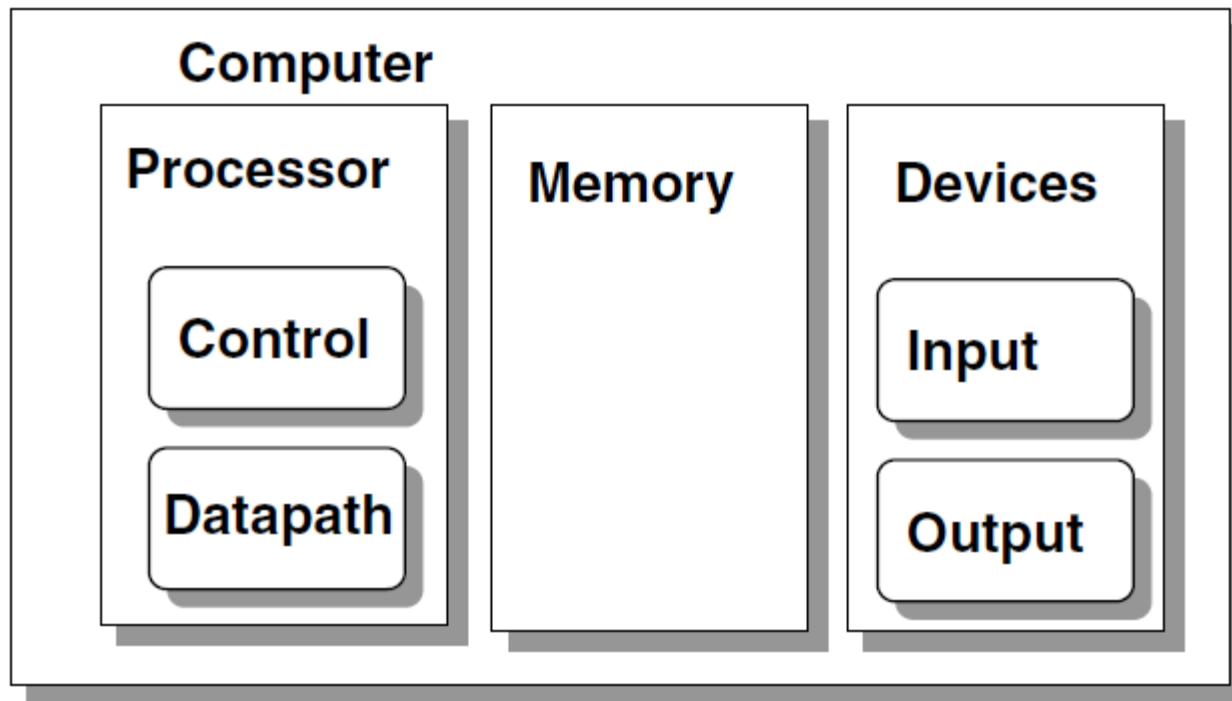

Source: ABI Research

Microprocessor Sales Distribution
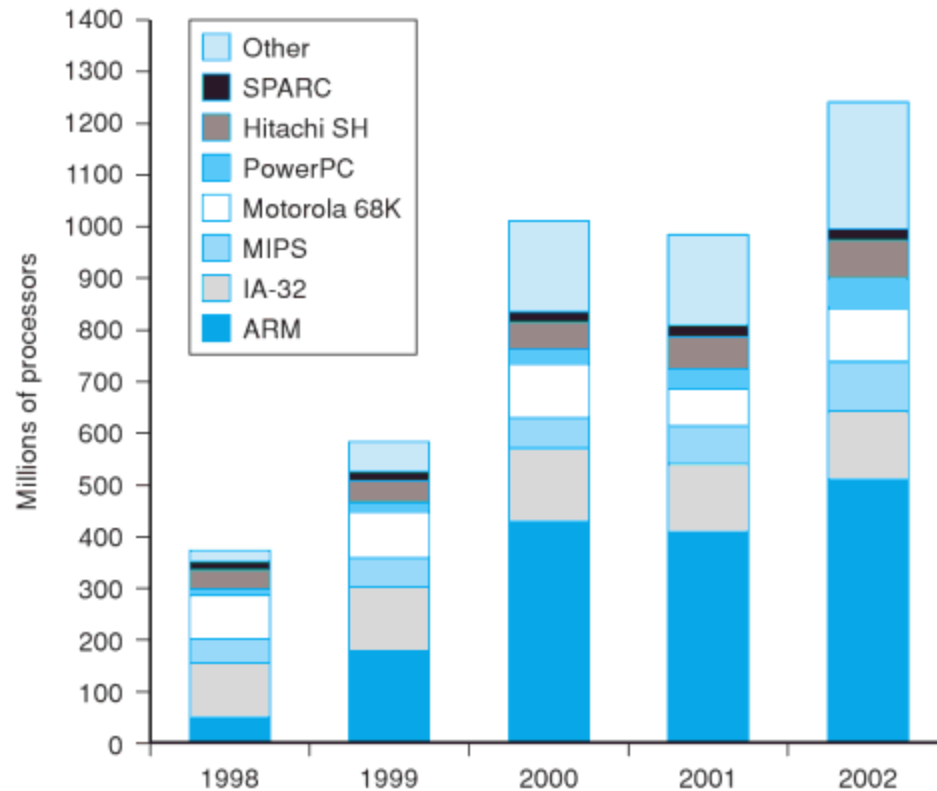
Major Functional Units of a Computer

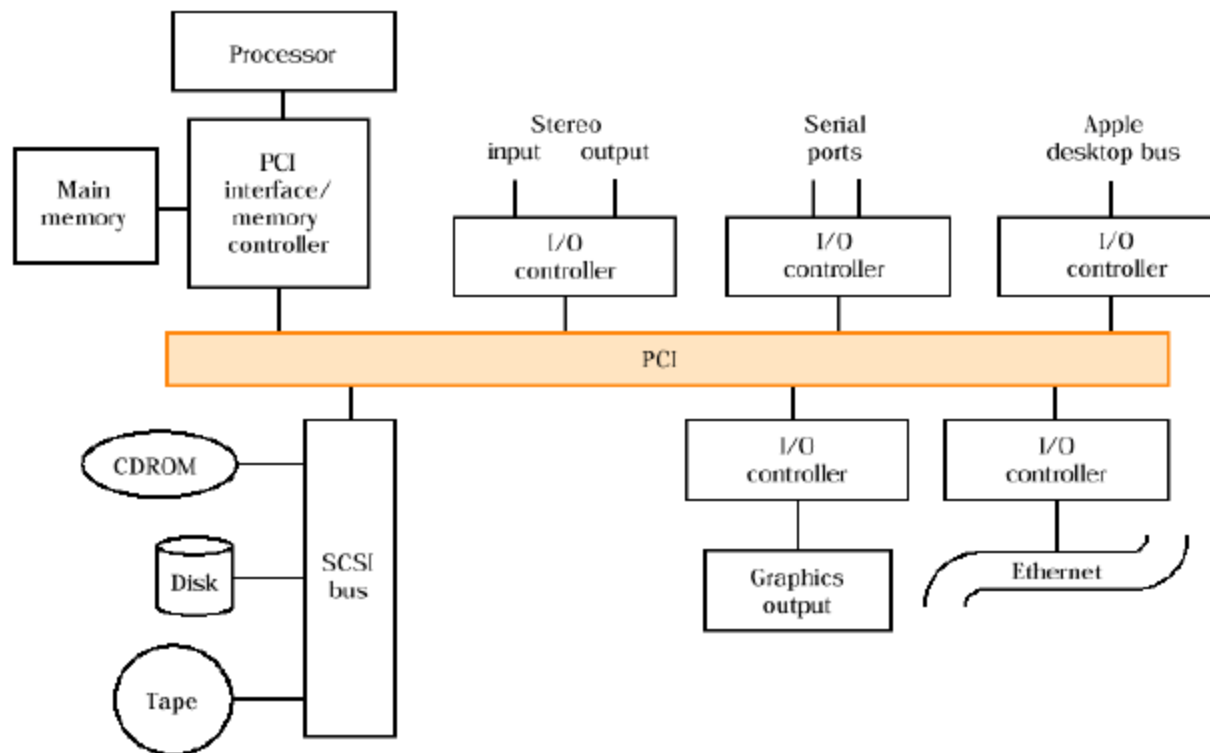Embedded Computers, Desktops and Servers are composed of three main parts functionally.

Input		**Arithmetic and Logic**
I/O	**Memory**	Processor
Output		**Control**

These Three Components can be interconnected in many ways.
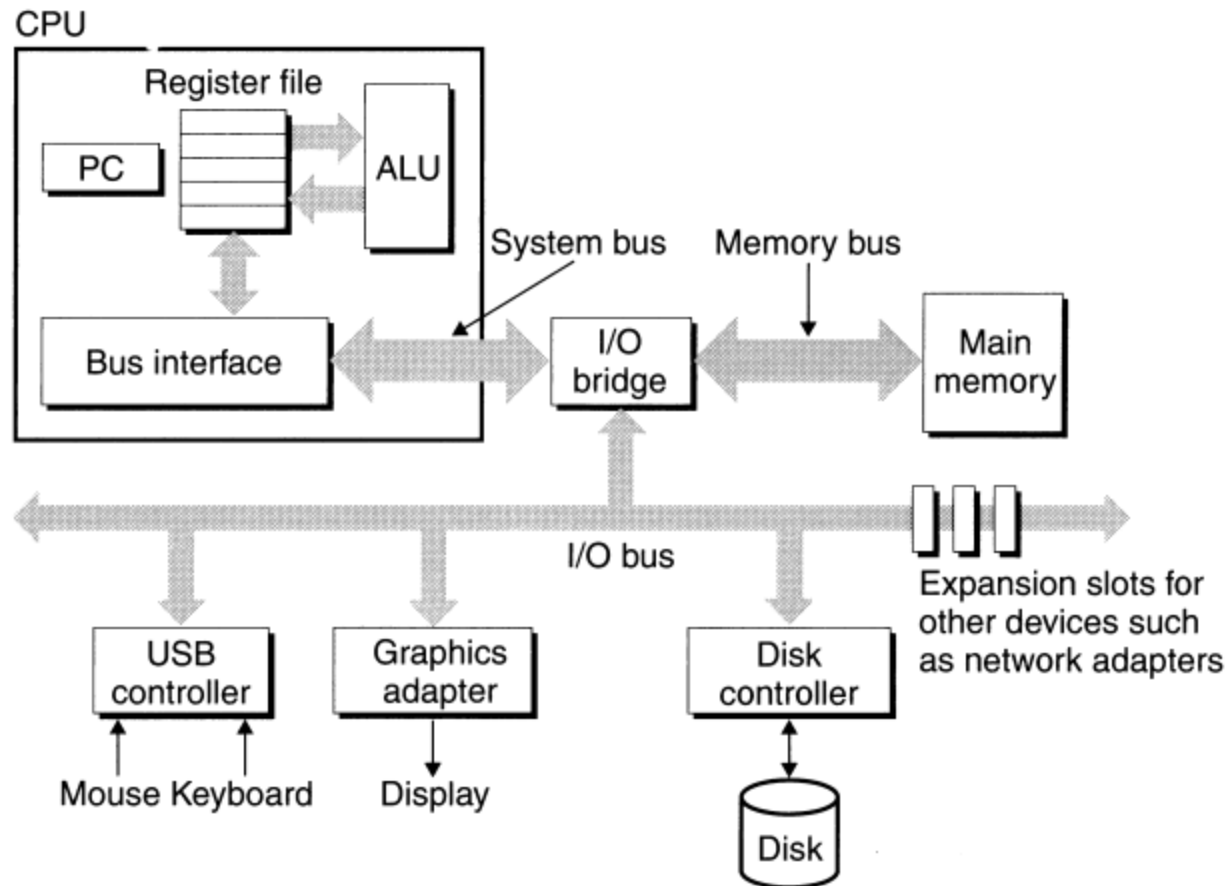
Major Function Units

Source: Prof. Cheung's Course Notes (Imperial College, London)

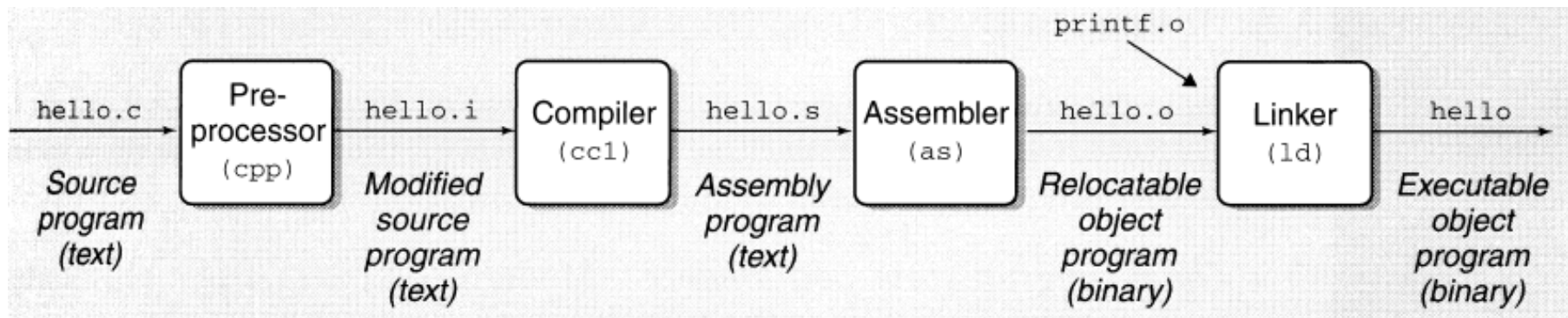# Typical Hardware Organization of a System

Source: Prof. Cheung's Course Notes (Imperial College, London)
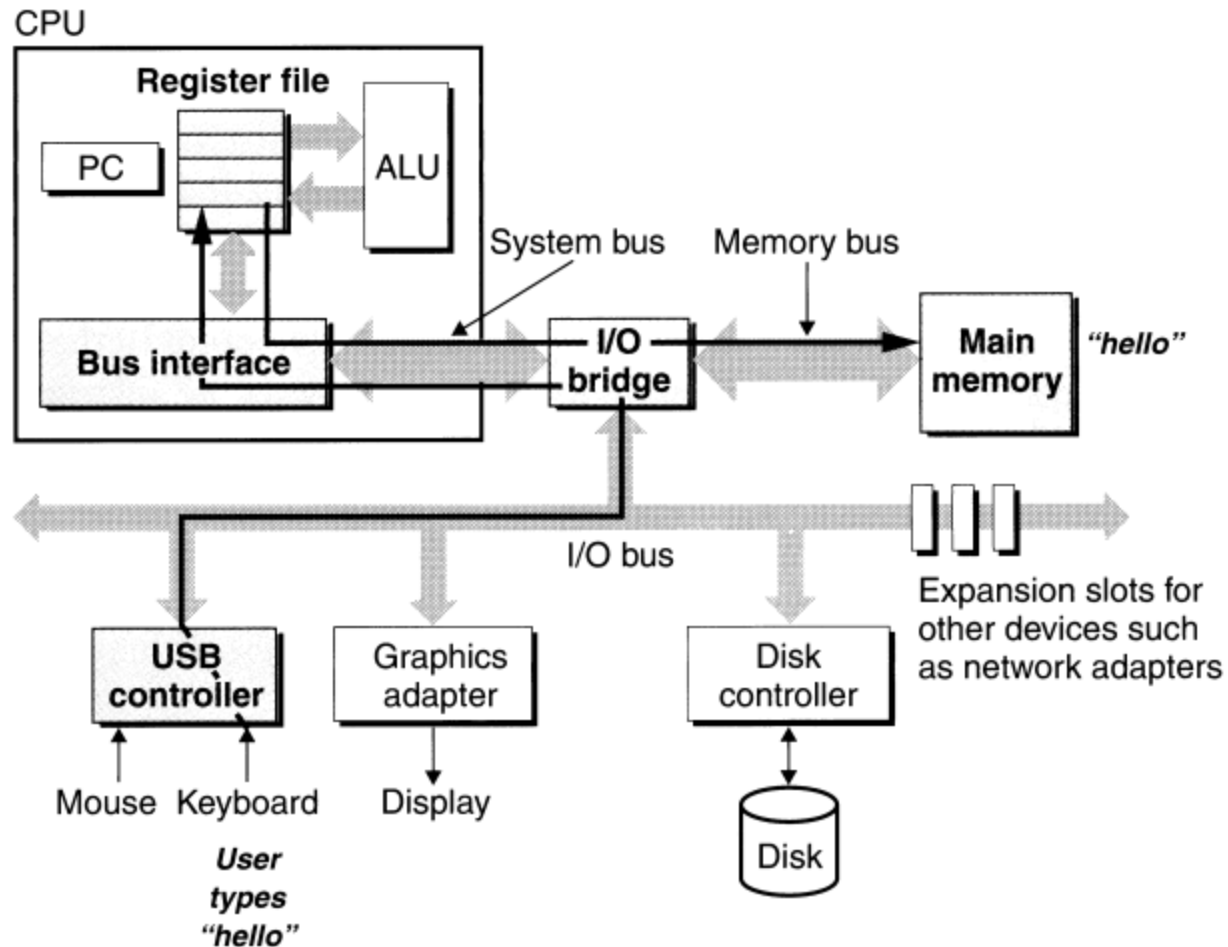
Typical Hardware Organization of a System

Typical Compilation Sequence

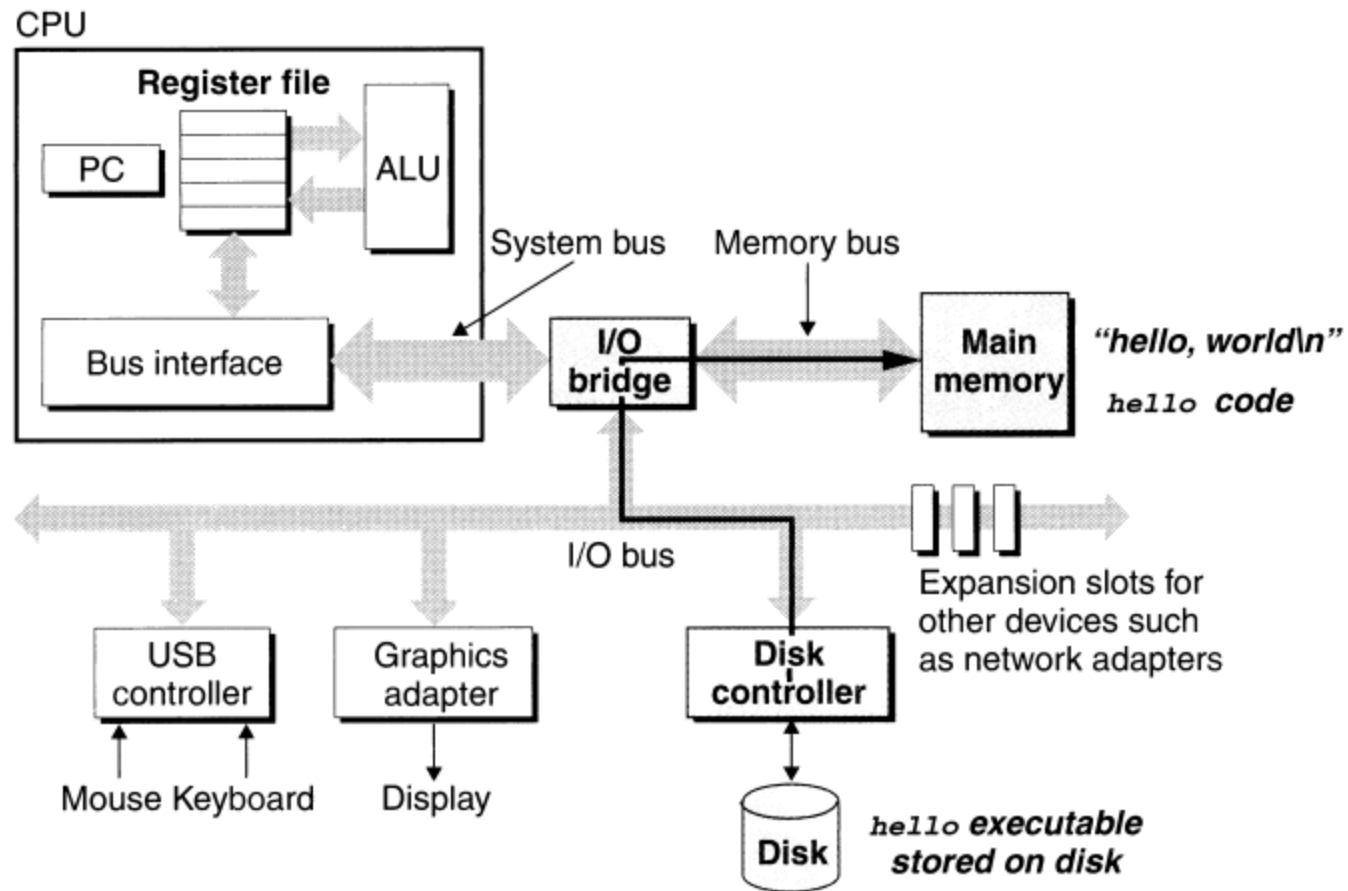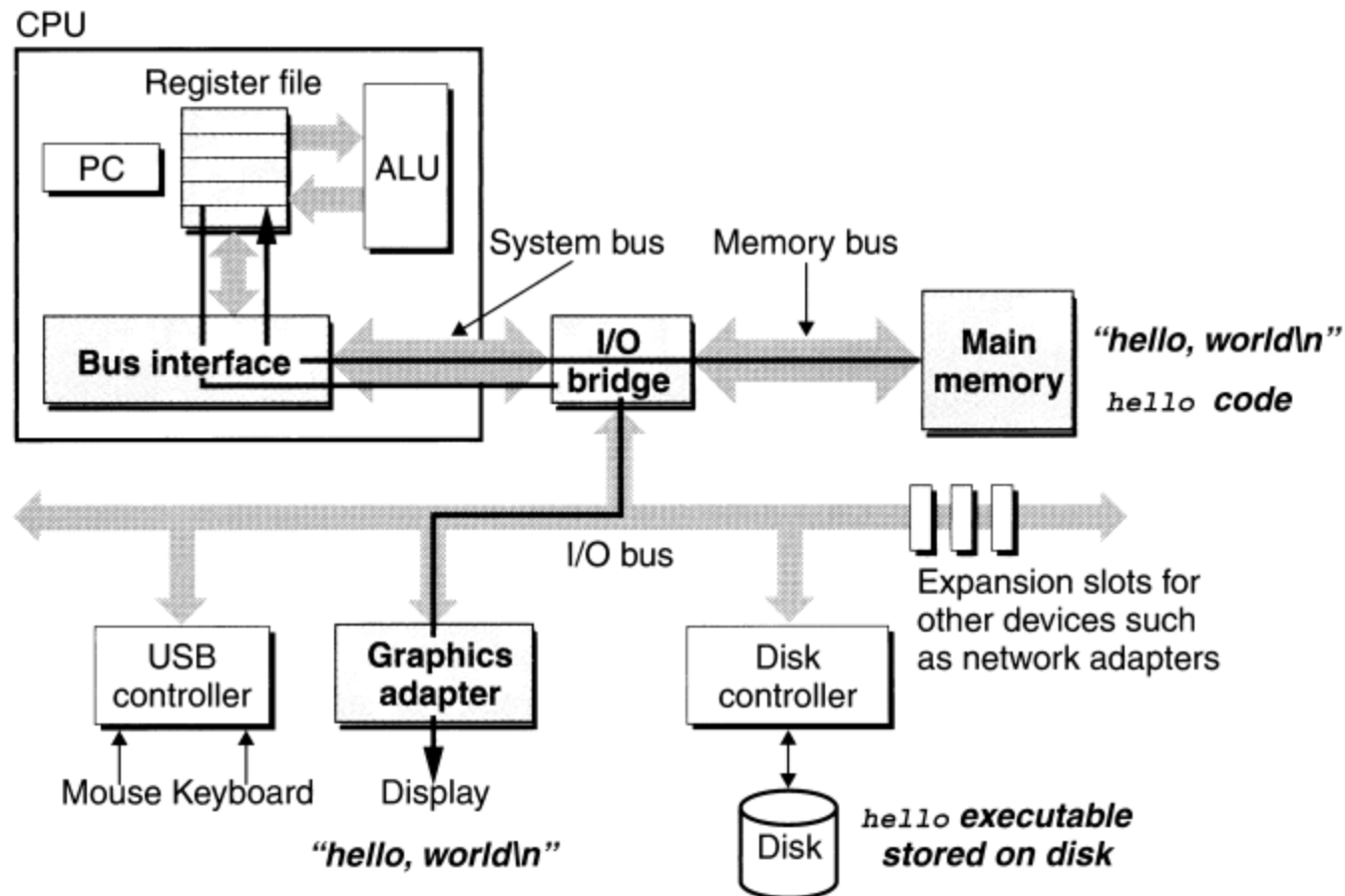# Running the "Hello World" Program
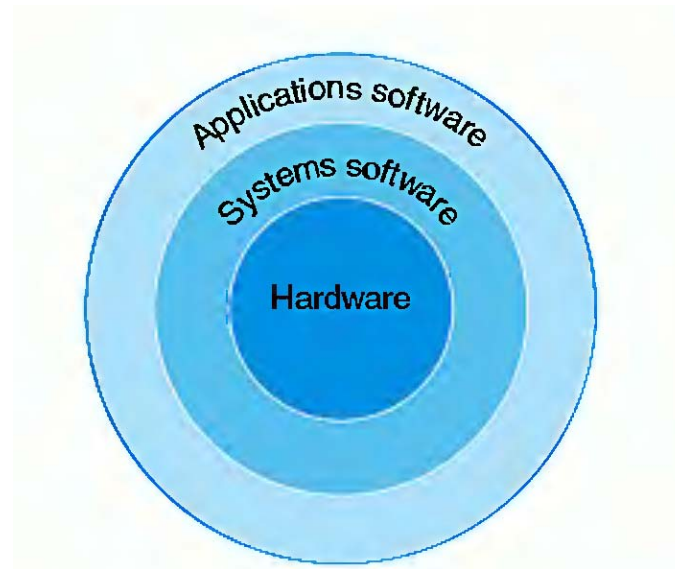
Running the "Hello World" Program

Running the "Hello World" Program

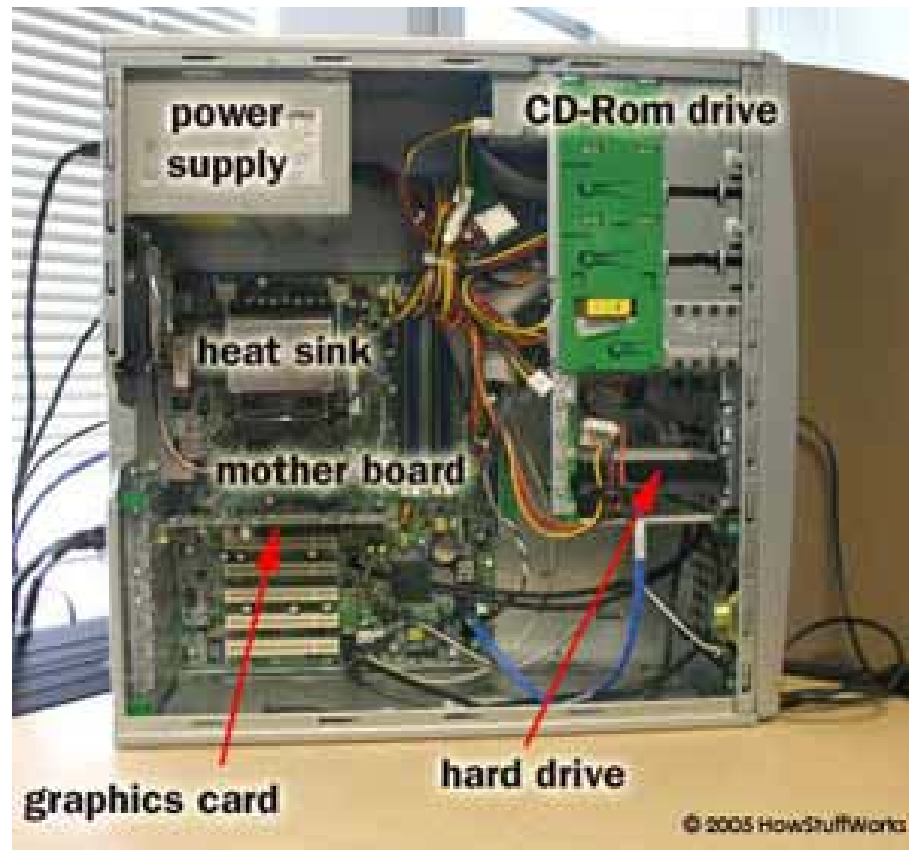# Computer System = Hardware + System Software + Application Software

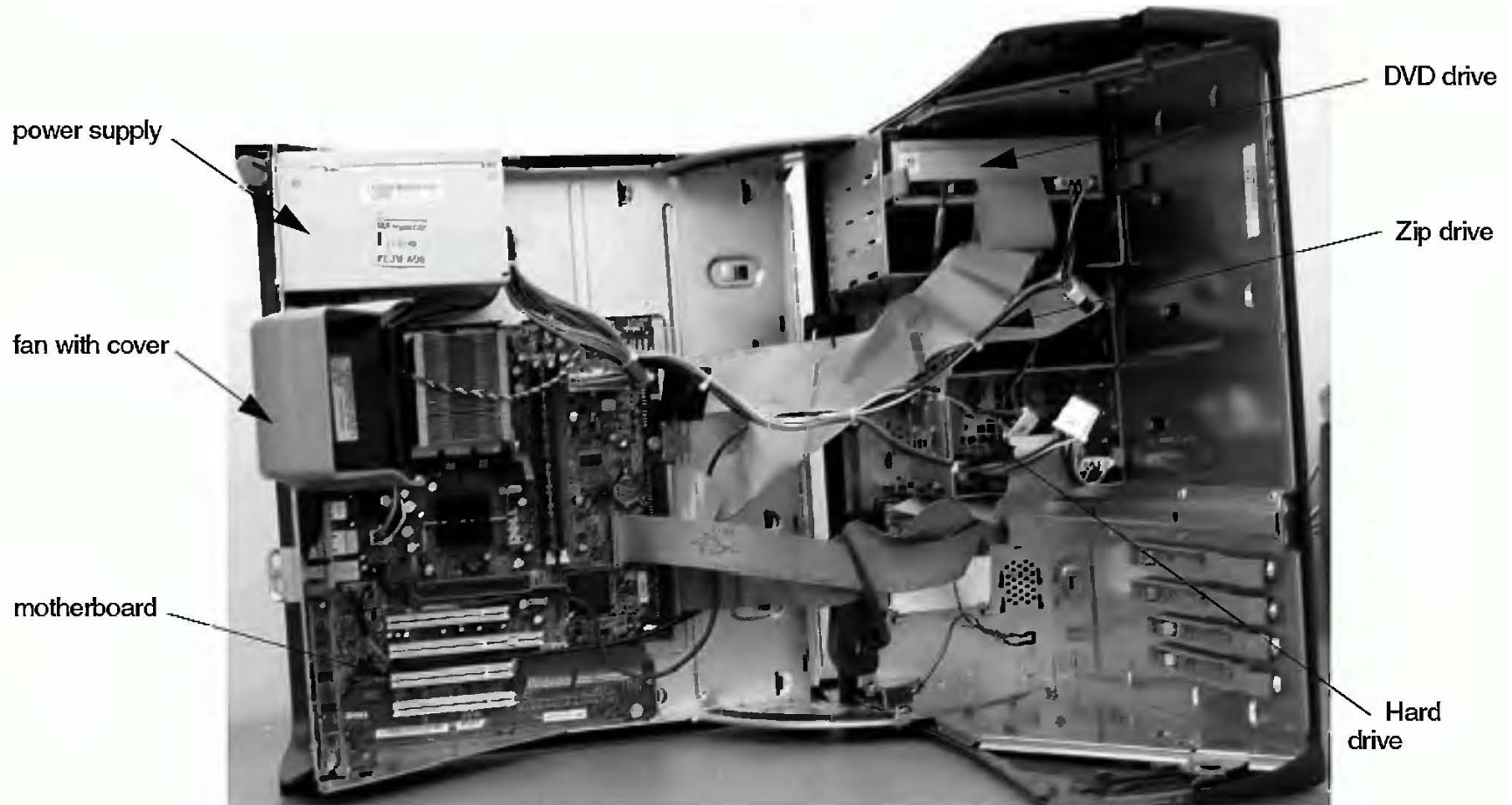Source: H&P-3 (Hennesy & Patterson, 3rd Edition)

System Software: Operating System, Device Drivers, Loaders, Linkers, Compilers, Assemblers, Editors, ….

Application Software: Web browsers, user-specific applications, …..

Inside a PC

power supply

CD-Rom drive

heat sink

mother board

graphics card
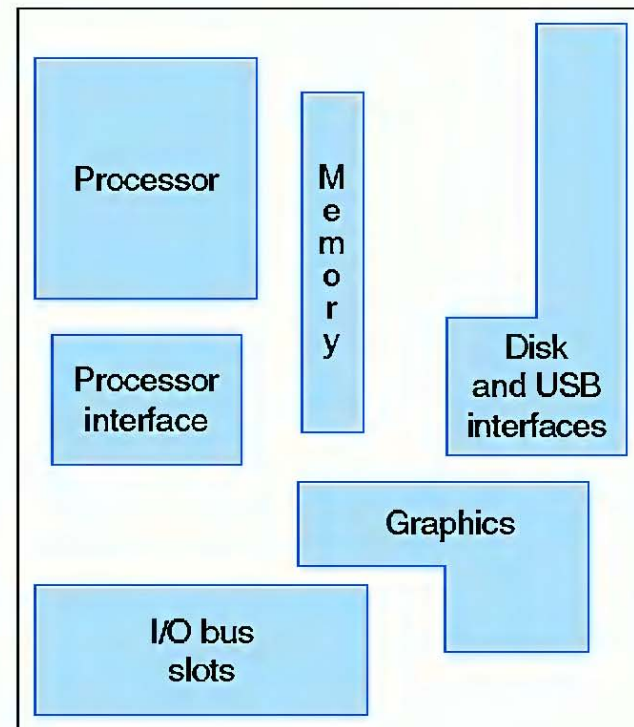
hard drive

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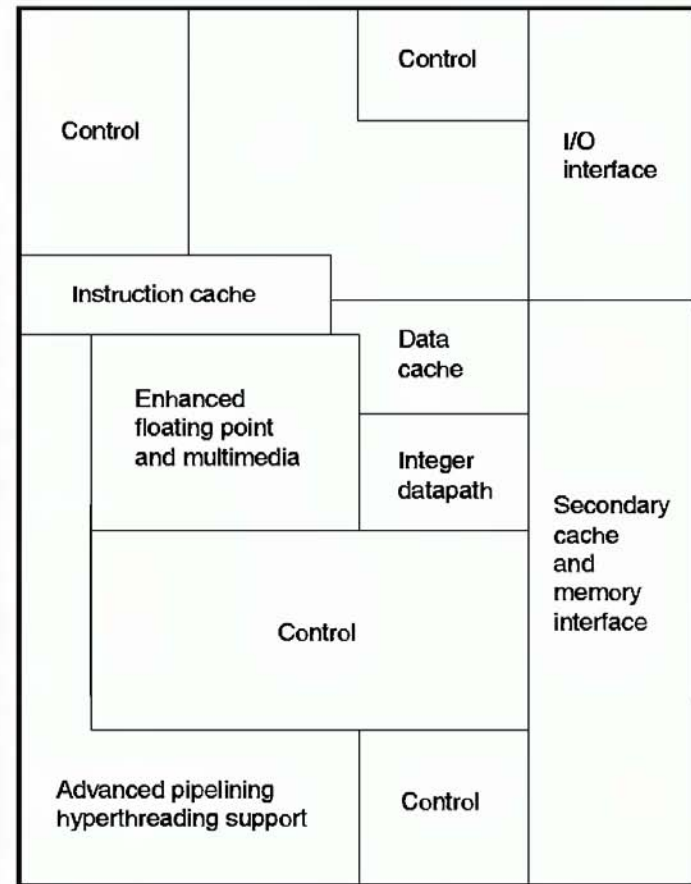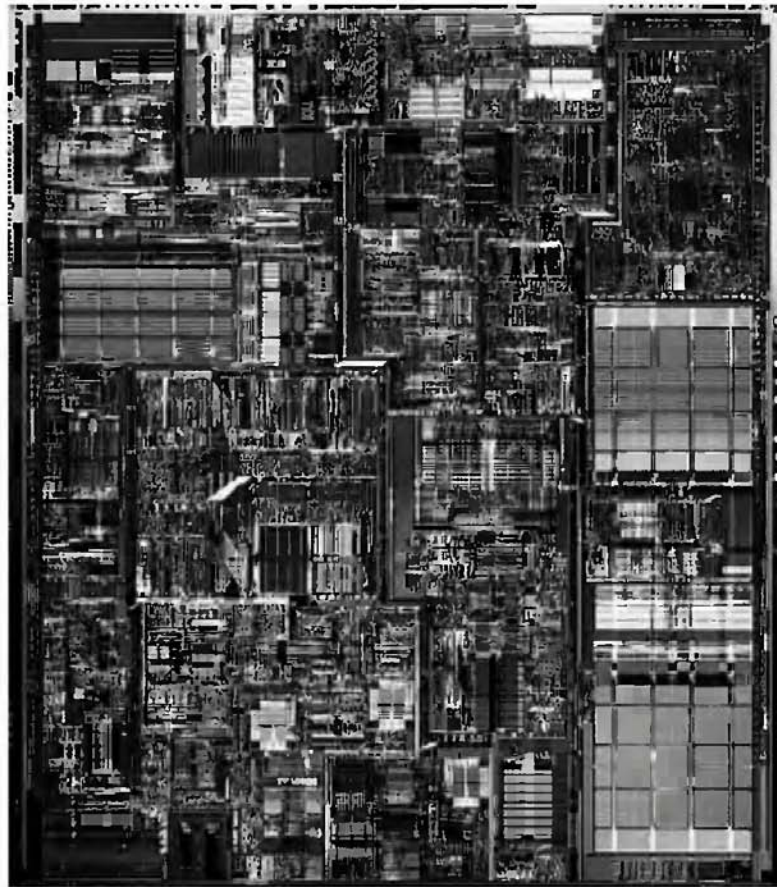
Inside a PC

Source: H&P-3 (Hennesy & Patterson, 3rd Edition)

Close-up of Motherboard

Source: H&P-3 (Hennesy & Patterson, 3rd Edition)

Inside a Pentium 4 Processor

Source: H&P-3 (Hennesy & Patterson, 3rd Edition)

Inside a Laptop