Lecture 2. Introduction to computer systems. Architecture of computer systems

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Introduction to computer systems. Architecture of computer systems

1. Review of computer systems
2. Evolution of computers
3. Architecture and components of computer systems
4. Use of computer systems

Vocabulary

1. Hardware	Аппаратное обеспечение
2. Software	Программное обеспечение
3. Processor	Процессор
4. Memory	Память
5. Input/output devices	Устройства ввода/вывода
6. System software	Системное программное обеспечение
7. Application software	Прикладное программное обеспечение
8. Supercomputers	Суперкомпьютеры
9. Mainframe computers	Мэйнфреймы
10. Minicomputers	Миникомпьютеры
11. Workstations	Рабочие станции
12. Notebook/laptop	Ноутбук/Портативные ПК
13. Handheld PC	Карманные ПК
14. Desktop PC	Настольный персональный компьютер
15. Tablet PC	Планшетный ПК

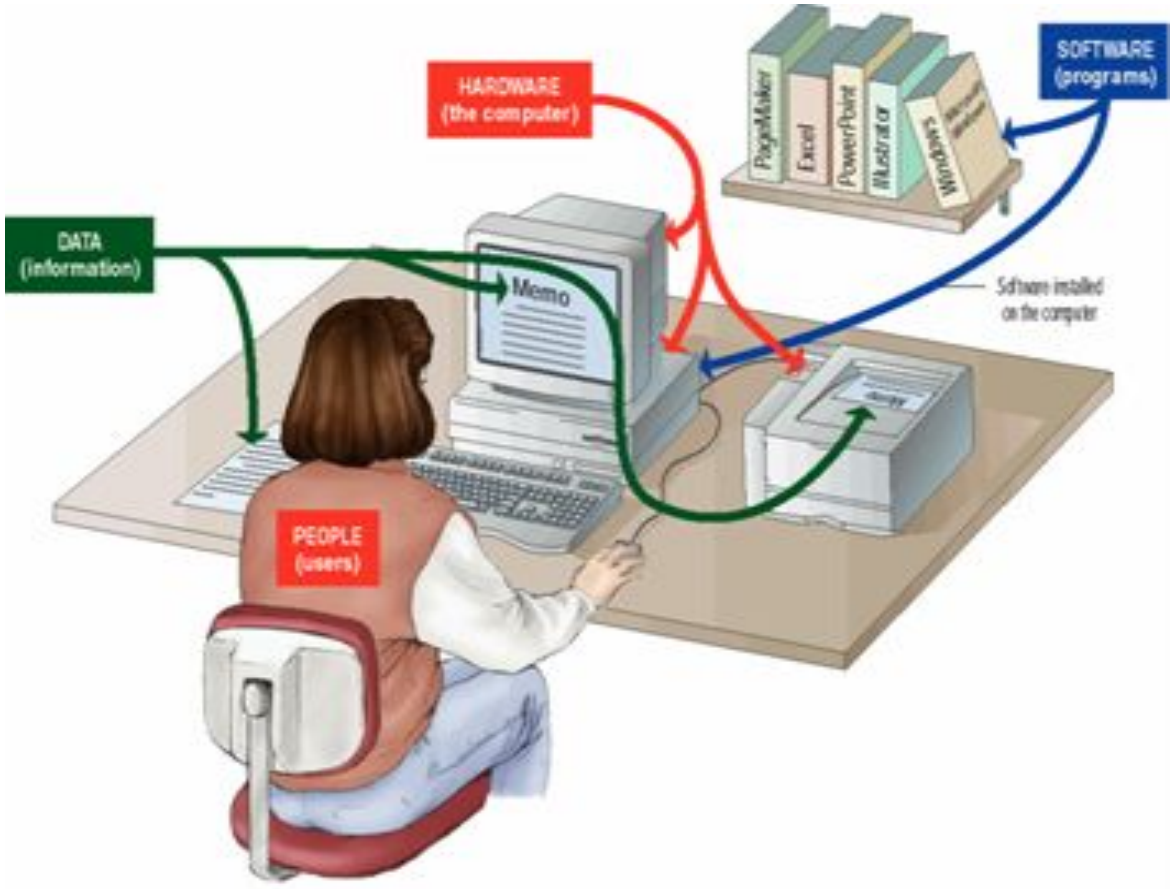
1. Review of computer systems

A computer is an electronic device that accepts input, processes it according to a series of instructions (called computer programs or software), and produces output.

What is a Computer System?

A complete computer system consists of four parts:

1. Hardware
2. Software
3. Users
4. Data



Hardware

- The physical devices that make up the computer are called **hardware**
- A computer's hardware consists of interconnected electronic devices

Hardware

Main categories of computer hardware are

- Processor
- Memory (also called main memory or primary memory)
- Storage (also called secondary memory)
- Input/output devices

Software

A set of instructions that makes the computer perform tasks (also called **computer program**)

Software

1. System software

Programs primarily for the computer's use, helping it to perform tasks and manage its own resources like operating systems, network management systems, device drivers, compilers

2. Application software

Programs developed for the users, enabling them to perform tasks such as word processors, library systems…

3. ***Utility software***: is software such as anti-virus software, firewalls, disk defragmenters and so on which helps to maintain and protect the computer system but does not directly interface with the hardware.

2 Evolution of computers

GENERATION	COMPONENT	FUNCTION
First **1940 - 1956**	Vacuum tubes	• to store and process data • example: ENIAC
Second **1956 - 1963**	Transistor	• to replace vacuum tubes in computers • do not produced lots of heats and use less power • faster, cheaper and smaller
Third **1964 - 1971**	Integrated circuits	• replacing transistors • more reliable and compact than computer made with transistor • cost less to manufacture
Fourth **1971 -Current**	Microprocessor	• built onto a single silicon chip • 100 times smaller than ENIAC
Fifth Present and beyond	Artificial Intelligence	• still in development • some application such as voice recognition

3. Architecture and components of computer systems

Main categories of computers are:

1. Supercomputers
2. Mainframe computers
3. Minicomputers
4. Workstations
5. Microcomputers, or personal computers (PC)

Supercomputer

- A super computer can perform more than one trillion calculation per second.
- Typical uses for supercomputers include mapping of human genome, weather forecasting, and modeling complex processes like nuclear fission.

Tianhe-2

Mainframe

- A mainframe computer is a large computer capable of simultaneously processing data for hundred or thousands of users.
- Mainframe computers are used in large organization where many people need access to the same data

IBM z13s

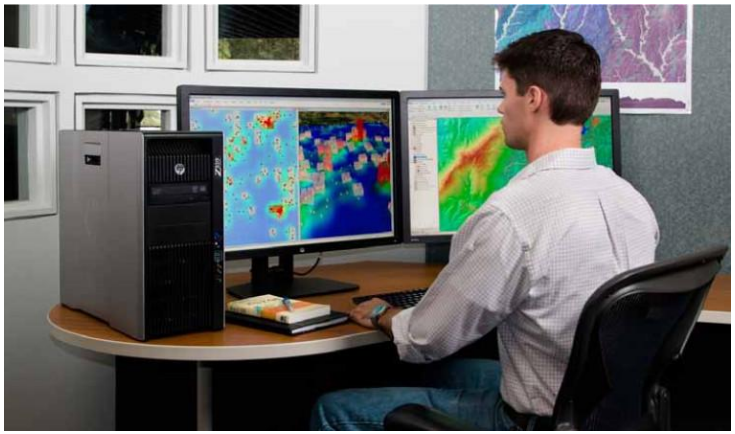
Minicomputers

- A minicomputer is a mid-sized computer designed to accept input from multiple input terminals.
- The capabilities of a mini computer are in between the Mainframe and the p s.

Intel NUC Kit NUC6i5SYH- Mini PC

Workstations

The machines are used by scientists, engineers and animators who need a lot of number-crunching power



Lenovo ThinkPad W700ds

CompuLab Airtop

Personal Computer (PC)

Personal computers (PC) also called microcomputers are designed to meet the computing needs of an individual.

Various forms of personal computers are

1. Desktop PC
2. Notebook/laptop PC
3. Handheld PC
4. Tablet PC

1. Desktop PC

- A desktop personal computer fits on a desk and runs on power from electrical wall outlet.
- The main unit can be housed horizontally under a monitor or it can be housed in a vertical case.
- Desktop personal computers are commonly used in offices, schools, and homes.

2. Notebook/laptop PC

A **notebook** personal computer (also called laptop) is a small lightweight computer that incorporates screen, keyboard, storage, and processing components into a single portable unit.

Lenovo IdeaPad Y700 -17 "

3. Handheld PC

- A handheld personal computer features a small keyboard or touch sensitive screen and is designed to fit into a pocket, runs on batteries, and be used while holding it.
- Handheld PCs are also called palmtop computers.
- A popular type of handheld computer is the personal digital assistant (PDA)

Vulcan FlipStart

4. Tablet PC

- A tablet personal computer is a portable computing device featuring a touch-sensitive screen that can be used as a writing or drawing pad.
- The tablet PC is the newest development in portable, full featured computers.
- Tablet PCs offer all the functionality of a notebook PC, but they are lighter than the notebook PC.
- A tablet PC can accept input from the electronic pen or from the user's voice.

ASUS Nexus 7 Android

3.Use of computer systems

Independent work of student №1

1. Organization for Standardization in ICT

Organizations	Name	Logo
Kazakhstani organization	1. 2.	
Russian Organization for Standardization	*1.* *2.* *3.*	
International organizations	*1.* *2.* *3.*	

2. Communication between ICT and achievement of the objectives of a sustainable development in the Millennium Declaration