LECTURE #1 THE ROLE OF ICTS IN KEY SECTORS OF DEVELOPMENT OF SOCIETY. STANDARDS IN THE FIELD OF ICT. STAGES OF ICT.

1. DEFINITION OF ICT
2. THE COMPONENTS OF INFORMATION TECHNOLOGY
3. UNITS OF INFORMATION
4. STANDARDS IN THE FIELD OF ICT
5. THE ROLE OF ICTS IN KEY SECTORS OF SOCIETY
6. STAGES OF ICT DEVELOPMENT

The concept of information technology

Information and communication technologies (ICT) - a set of methods, workflows and software and hardware tools that are integrated with the aim of collecting, processing, storage, distribution, display and use of information. Information technologies are designed to reduce the complexity of the processes of information resources.

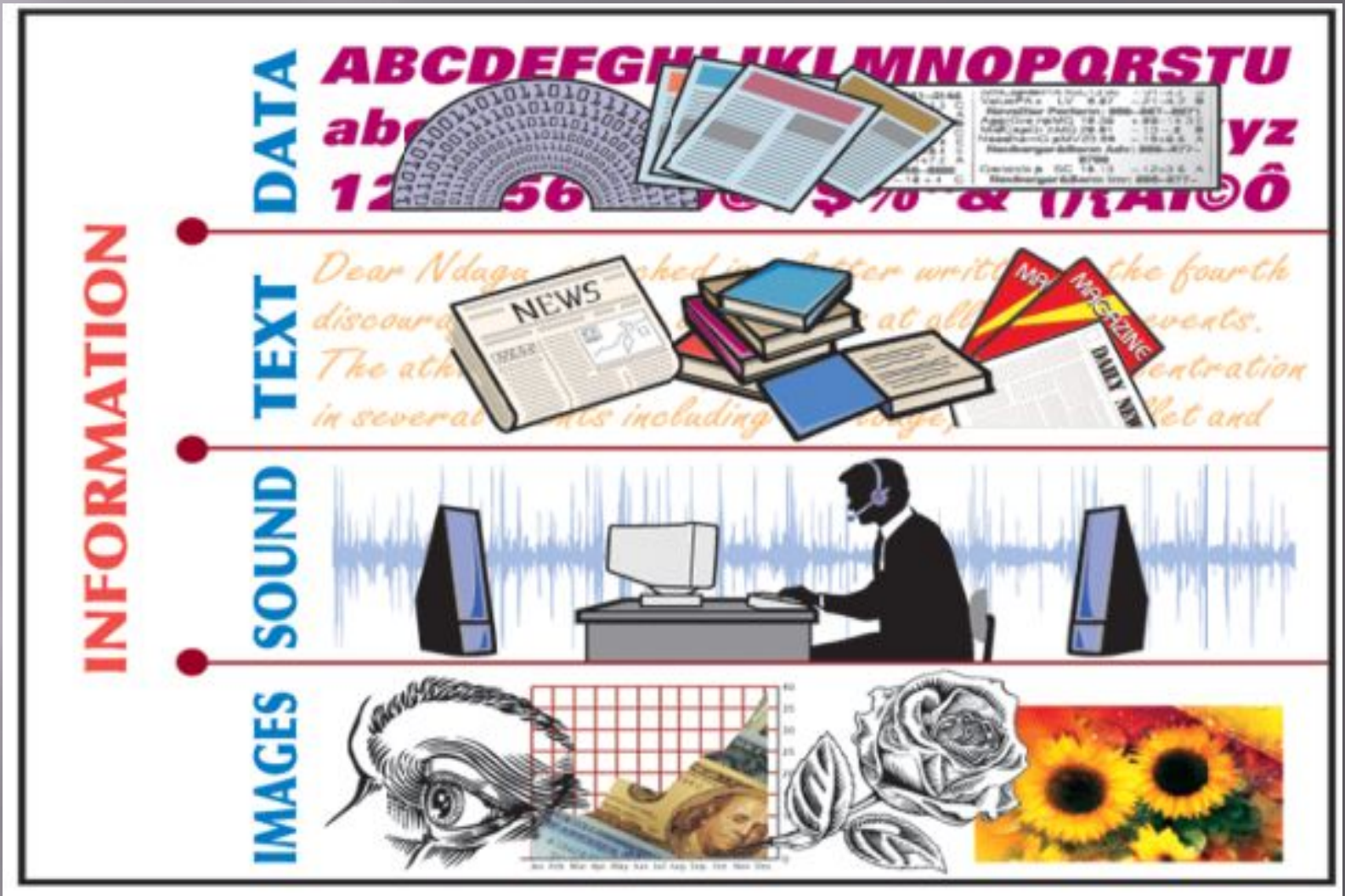
ICT is forms of technology that are used to transmit, process, store, create, display, share or exchange information by electronic means. It includes not only traditional technologies like radio and television, but also modern ones like cellular phones, computer and network, hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing.

- The following table demonstrates range of technologies that fall under the category of ICT.

Information	Technologies
Creation	Personal Computers, Digital camera, Scanner, Smartphone
Processing	Calculator, PC, Smartphone
Storage	CD, DVD, Pen drive, Microchip, Cloud
Display	PC, TV, Projector, Smartphone,
Transmission	Internet, Teleconference, Video conferencing, Mobile technology, Radio
Exchange	e-mail, Cellphone,

The components (structure) of information technology

- **Information -** a collection of information about the properties of an object or process to digest the subject in the form of knowledge.
- The information which is used by people, can be divided into the following main types:
- text - that information can be recorded on paper by hand or using a typewriter and printing equipment and stored on paper (manuscripts, documents, books, newspapers, etc.;
- graphics - this information can be processed by a variety of means and methods of Fine (fine arts, photography) and stored in the form of paintings, drawings, sculptures, photo cards;
- sound - this information can be processed by means of a tape recording and stored on magnetic tapes, records and audio CDs .;
- video information - this information can be processed by means of film and video and stored on film and videotape



Types of information

Data processing

All information supplied to the computer, or encoded digitized, i.e. all characteristics data assigned to the number. Thus, the computer operates with no sound, or video image, and a series of numbers. And it does not process sound or video, and the number. After the treatment, the number again converted into sound or video and we hear the music and see the cartoon on the computer screen.

Any sort of information is called the volume of information.

The unit of information is called a bit. The computer memory cell of 1 bit can be stored for 1 or 0.

8 bits make up one byte.

1 byte=8 bits

There are multiple byte units:

- Kilobyte (KB) 1 KB = 1024 bytes
- Megabyte (MB) 1 MB = 1024 KB.
- Gigabyte (GB) 1 GB = 1024 MB.
- Terabyte (TB) 1 TB = 1024 GB.

For example, we can say that if you make the computer the text of one type written page, it will have a capacity of about 2500 bytes

Standards in the field of ICT.

ICT standards system - a set of normative and technical and regulatory guidance documents, including a set of interrelated standards and other documents in the field of standardization related to ICT, documents defining the methodology of development, coordination, approval, modification, deployment, use and replacement, including a methodology to assess facilities for compliance with these standards and othe documents in the field of standardization.

Standard - a document in the field of standardization, standardization of relevant principles, covering categories such documents as the standard of organization, the standard non-profit association, the industry standard or set of rules (the industry), the national standard, international standard.

- **International standard** - a standard adopted by an international organization.
- **National standard** - a standard adopted by a national authority of the Republic of Kazakhstan for Standardization.
- **Non-profit association Standard** - a standard non-profit professional organization (union, association, etc.), designed for wide application by different stakeholders. The order of development of the standard and non-profit association established this association and is harmonized with the state and industry standards development orders

- **Industry Standard (IS)** - standard related to processes, products and other aspects of a particular field of activity (whether commercial or not aimed at profit).
- **Organization Standard** - a standard developed and approved by the organization itself, based on the necessity of its use to improve production and quality assurance of products, works and services, as well as for the dissemination and use of knowledge in different fields of research results (the test), measurement and development.

Stages of ICT development:

- Pre Mechanical Age
- Mechanical Age
- Electromechanical Age
- Electronic Age

Commincation Timeline

Smoke Signals

Carrier Pigeon

Morse Code

Wireless Radio

Telephone

Fax

Mobile Telephone

Internet

E-mail

Handheld Devices

What Next?

- **The Pre Mechanical Age**

The earliest age of technology has been dated back to the pre mechanical age (between 3000 B.C. and 1450 A.D.).

Human beings at that time primarily communicated with each other using simple picture drawings called petroglyphs.

They created these drawings on rock. The first writing system and first alphabet was created in this period of time

The numbering systems and the abacus, the first calculator, were also invented during this period.

The Mechanical Age

During the mechanical age (between 1450 and 1840) many extraordinary inventions took place. This is where we can see similarities between our modern-day technologies and the rising technologies back then.

- Due to many new technological inventions, there was a great interest in computation and information. Major machine inventions were the following:
- The slide rule (1600s)- an analog computer that allowed users to multiply and divide.
- The Pascaline (around 1642) – a mechanical computer that allowed users to add, subtract, multiply and divide two numbers.
- The Leibniz's machine (1670s) – a machine that was an improvement of the Pascaline that included additional components that made it easier for users to multiply and divide.
- The difference engine (1820s) – a machine creation that could calculate numbers and print the results.
- Even though these machine inventions were not as effective as the latest technologies we use today, they play a big role in the evolution process of information technology

- **The Electromechanical Age**
- During the time of the electromechanical age (between 1840 and 1940), the beginning of telecommunication emerged. Many revolutionary technologies were invented in this stage that led to modern information technology systems. The telegraph was invented to communicate with others over great distances through the use of electricity. This led to the development of Morse Code. This was a system built to communicate with others by breaking down the alphabet into dots and dashes, transformed into electrical impulses and transmitted over a wire. This was very similar to today´s digital technologies that break down information. Shortly afterwards, the telephone and radio were invented. Later on, the first digital computer was created. It consisted of electromechanical computing components, data and program readers, automatic typewriters and input/output and control readers. It was different from our modern computers but it resulted an interest to explore other ways to make the system smaller and to operate more effectively.

The Electronic Age

- The electronic age (from 1940 to present day) is the stage of information technology that we currently live in. It first started when electronic equipment including computers began to take place. At the beginning of this stage, it was realized that electronic vacuum tubes could be used instead of electromechanical parts. The first high-speed digital computer was the ENIAC, Electronic Numerical Integrator and Computer. It was able to solve a large class of numerical problems through reprogramming. It was also one thousand times faster than that of electro-mechanical machines from the previous age.

Control questions:

- What is an information system?
- What is the definition of ICT and its purposes?
- ICT subject and its objectives?
- Describe ICT standards.
- What kind of communications between ICT do you know?