

# Mathematical and software support for computers, complexes and computer networks

**Aimurzaeva Gulnaz Pukharbaevna**

Assistant Lecturer, Department of Natural and Exact Sciences, Nukus Branch, Tashkent University of Information Technologies named after Muhammad al-Khwarizmi  
aymurzaevagulnaz1990@gmail.com

**Seitniyazov Davronbek Bayramovich**

Assistant Lecturer, Department of Computer Systems, Nukus Branch, Tashkent University of Information Technologies named after Muhammad al-Khwarizmi  
dawranbek.ds@gmail.com

**Annotation:** “Mathematical and software support for computers, complexes and computer networks” is a specialty that deals with the development of mathematical theory of programming, the creation, maintenance and operation of software for various purposes for computers and computer systems, as well as complexes built on their basis, computer and neural networks, characterized in that it includes theoretical and experimental research in the field of software tools for organizing and managing the processing of data and knowledge, the creation of applied mathematical software, software tools for automating program development and human-computer communication. The following article is devoted to mathematical and software support for computers, complexes and computer networks.

**Key words:** computer, software, network, complex, cable, modem, remote control, transmission parameters. The scientific, theoretical and national economic significance of solving the problems of this specialty is to increase the efficiency of data and knowledge processing processes in computers, complexes and computer networks and to reduce the time for their creation.

## 1. Tools for managing computer networks

Computer network management tools are tools that are used to manage different computer networks and to establish interactions between them, and are divided into the following groups according to their capabilities:

- Means for exchanging information between computers connected by serial cables using a special cable. Examples include Brooklin Bridge, Desk Link, LapLinkIII, and Fast Lynx;
- Tools that allow you to use the telephone line (if you have a modem) to exchange information. Examples include Telemate, Procomm, and DataLine;
- Tools for organizing and managing small local area networks. Examples include Lantastic and Personal Netware;
- Tools that allow large local area networks to provide file services and manage those networks. Examples include Nowell OS, Unix OS, OS / 2, Windows NT, Linux, Windows Server;
- Tools for managing international computer networks connected by telephone, radio, satellite communication channels, fiber-optic channels. Examples are various browsers, e-mail, Web pagers, fax programs that manage and work with systems such as the Internet, Euronet, Fidonet, Relcom.

Special software is required to exchange data via modem. Many operating systems have and are creating such programs. For example, on the Macintosh System - SmartCom; Windows SmartCom, CrossTalk, WinCom, Comm Works, Telix, Procom Plus, Hyper Terminal; In OSF2 Warp - Hyper Access is available. Such programs are often sold on floppy disks with a modem. In addition to communicating between computers, communication programs perform a number of other functions:

-Error correction: Various interruptions may occur during data transfer. Interruptions are external events that affect data transmission. Interruptions can be caused by short circuits in the mains, the transmission of contacts, or nearby sources of strong magnetic fields, such as an air conditioner or a television. When they transmit sound, the transmission speed may decrease even if they do not affect it much. The modem, along with its software, fixes transmission errors and eliminates interruptions.

Data archiving. Of course, it takes less time to transfer archived data. This speeds up the transmission and keeps the data safe. You are familiar with some of the archiving algorithms.

Remote control.

Remote control software allows you to control a computer over long distances (up to several thousand kilometers) from a single computer. Some of these programs will be on the computer you are running and the rest will be on the remote computer. Examples of such programs are Carbon Copy, Norton PC Anywhere, GotoMyPc.

2. Bandwidth of the communication channel. Transmission parameters

How and how fast data is transmitted depends on many factors. Let's take a look at the factors that affect data transmission as we get acquainted with data transmission channels. You need to know the following key factors:

- transmission parameters: frequency and maximum-minimum frequency difference;
- Line structure: point-to-point and multi-point;
- parallel and serial transmission;
- transmission lines: simplex, half-duplex and full-duplex;
- transmission mode: asynchronous and synchronous;
- packet switching;
- protocols;
- multiplexing.

Transmission parameters: frequency and maximum-lowest frequency difference.

Transmission quality depends on two variables: frequency and frequency difference. Twisted pair cable 4000 Gts per second only 1 kbyte can transmit information. 100 MHz coaxial cable during this time 10 Megabytes, 200 trillion. A GTS fiber optic cable transmits 1 gigabyte of data takes

There are two types of transmission:

Line Structure, or Communication Lines: point-to-point and multi-point.

- Point-to-point. The sender and receiver of information in this way devices are directly connected to each other. For example, a terminal and a central computer thus connected. This is private (per user) is a method of transferring data from one device to another in a stored manner. This line can be public or private.
- Multi-dot. It's a single line, multiple communications connects devices to a single computer. In this line, usually a single device, for example, a terminal can transmit (receive) data at any time.

Serial and parallel connection.

Data is transmitted in two ways: as a set of serial and parallel signals in appearance.

- Serial data transmission. In this method, the bits are one by one, one on top of the other then transmitted. Serial transmission is often via twisted pair telephone lines is done. This method is also available on many lines, modems, and mice applied. A modem card (p lattice) that connects to a computer is usually serial port.
- Parallel data transmission. In this transmission, the data is fragmented aaaseparated, these parts are transmitted simultaneously via separate lines. In parallel lines data is transmitted much faster than in consecutive lines. But in this way the cable length can be up to 15 feet (5 meters). That's why data is transmitted, for example, from the processor to the printer.

Transmission routes and modes

Data flow directions: simplex, half-duplex and full-duplex. Information between two computers connected to share data exchange takes place in three different ways: simplex, semi-duplex, and full duplex.

-Simplex transmission. In this type of transmission, the data flows in one direction only. An example of this is traditional television: information is always there transmitted from the transmission station to the television antennas. In the opposite direction what signals are not transmitted. Some computerized data collector devices operate on the same principle (e.g., earthquakes) seismograph that measures the parameters).

-Half duplex transmission. In this way, the information flows in both directions can be transmitted, but at the same time only through one of these routes can be transmitted. This method is the most widely used for data exchange.

-Full duplex transmission. In this way, the information flows in both directions at the same time can also be

transmitted via Talking on the phone is like that possible. This method of information exchange is used in large computer systems applied. This method is used in some new modem types and when working with programs such as Microsoft Net meeting.

In local area networks, information is usually in separate sections transmitted, they are called different packets, frames or blocks in different sources. The main reason for the use of packages is that they are usually one on the network there are several communication sessions at the same time ("Tire" and "ring" in topologies), i.e. between two pairs of subscribers at a time interval of two and more data can be transferred. Only parks can distribute network time between subscribers transmitting information.

### Reference

1. Decree of the President of the Republic of Uzbekistan No. PF-5953 of March 2, 2020 "On the State Program for the implementation of the Action Strategy for the five priority areas of development of the Republic of Uzbekistan in 2017-2021 in the" Year of Science, Enlightenment and Digital Economy ";
2. Decree of the President of the Republic of Uzbekistan No. PF-6079 of October 5, 2020 "On approval of the Strategy" Digital Uzbekistan - 2030 "and measures for its effective implementation";
3. Statement No. 2 of the meeting of the Cabinet of Ministers of the Republic of Uzbekistan on April 2, 2021 "Coordination Commission for the implementation of the Strategy" Digital Uzbekistan - 2030 ";
4. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 373 of June 15, 2021 "On measures to further improve the rating system for the development of the digital economy and e-government";
5. Nishanov A.X., Babadjanov E.S. Increasing the use of electronic services (iGov - consultation-discussion-monitoring system) // Monograph. Tashkent University of Information Technologies named after Muhammad al-Khwarizmi. ISBN 978-9943-7283-4-1.Tashkent. LESSON PRESS – 2021. –p 302.