

KEY CONCEPTS OF INFORMATION TECHNOLOGY

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Annotation

The article discusses the key concepts of information technology, including such essential terms as information, data, computers, software, network technologies, the internet, cybersecurity, databases, cloud technologies, and artificial intelligence. Information technology has a significant impact on all aspects of human life, transforming the way we work, communicate, and process data. Understanding these concepts is crucial for IT professionals and the general audience who use digital technologies in everyday life.

Keywords: information technology, data, computers, software, internet, cybersecurity, databases, cloud technologies, artificial intelligence.

Аннотация

В статье рассматриваются основные понятия информационных технологий, включая такие ключевые термины, как информация, данные, компьютеры, программное обеспечение, сетевые технологии, интернет, кибербезопасность, базы данных, облачные технологии и искусственный интеллект. Информационные технологии оказывают огромное влияние на все аспекты жизни человека, меняя способы работы, общения и обработки данных. Понимание этих концепций важно для специалистов в области ИТ и для широкой аудитории, использующей цифровые технологии в повседневной жизни.

Ключевые слова: информационные технологии, данные, компьютеры, программное обеспечение, интернет, кибербезопасность, базы данных, облачные технологии, искусственный интеллект.

Humanity, in its development, has traversed a path spanning several tens of millennia. Throughout this time, humans have learned to transform energy and material objects by recording and accumulating informational representations.

The first information technology consisted of the oral transmission of knowledge from generation to generation. Keepers of knowledge, such as priests and clerics,



emerged. Access to knowledge and information was limited, so it couldn't significantly influence the production process. The invention of the first printing press in 1445 and the beginning of book printing sparked the first information revolution, which lasted for 500 years. Knowledge began to be reproduced on a large scale and could now influence production.

The history of computer development, as the pinnacle of information technology, can be considered to have started in the 17th century. In 1642, the famous scientist Blaise Pascal invented a machine for adding and subtracting large numbers. This technological marvel was bulky and not suited for mass adoption due to its high cost and complex construction. The only existing model of this first calculator remained with its inventor. Nevertheless, Pascal's contribution is undeniable: he was one of the first to attempt to mechanize calculations and create a robot capable of computing for humans.

Some time later, in 1666, Samuel Morland also pondered the challenge of complex calculations and created a mechanical calculator that could add and subtract. Had he developed it further to include multiplication, he would have rightfully earned the title "inventor of the calculator." However, this honor went to Gottfried Leibniz, who built the first machine capable of multiplication. Modern students would hardly carry such a device to school, but for the 17th century, it was a revolutionary invention.

In 1774, Philipp-Malthus Hahn produced and sold a small number of calculators, marking the first commercial success of counting machines. In 1800, the punch card was invented as a data storage medium. By 1820, another commercial success was achieved with the arithmometer by Thomas de Colmar, which sold successfully and remained popular for many years.

Information is data about objects and phenomena in the environment, their parameters, properties, and states, which reduce the existing degree of uncertainty or lack of knowledge about them. Informatics views information as interconnected data that alters our understanding of a phenomenon or object in the surrounding world. From this perspective, information can be seen as a collection of knowledge about actual data and the relationships between them.

In the process of processing, information can change its structure and form. The elements of information and their interconnection are indicators of structure. There are various forms in which information can be represented. The main ones include symbolic (based on the use of different symbols), textual (text is a set of symbols



arranged in a specific order), graphical (various types of images), and auditory forms.

In everyday practice, concepts like information and data are often considered synonymous. However, there is a distinction between them. Data refers to information presented in a form convenient for processing. Data can be represented as text, graphics, or audiovisual content. The representation of data is called the language of informatics, which is a set of symbols, conventions, and rules used for communication, display, and transmission of information in electronic form.

Information technology (IT) has become an integral part of modern life, encompassing all aspects of our activities. IT allows us to process, store, and transmit information using various computer systems, software, and networks. To understand the essence of information technology, it is essential to consider the key concepts that underlie it.

1. Information

Information is data that can be transmitted, stored, and processed. It is the fundamental concept that forms the basis for all technologies related to computers and networks. In the digital world, information is represented as binary data (bits and bytes), allowing computers to process it quickly and accurately.

2. Data

Data are individual facts or figures that can be processed and transformed into useful information. Data can be structured (organized in databases) or unstructured (such as text, images, and videos).

3. Computers

Computers are electronic devices designed to perform calculations and process data. The main components of a computer include the central processing unit (CPU), random access memory (RAM), data storage devices (hard drives, solid-state drives), and peripheral devices (keyboard, monitor, mouse).

4. Software

Software is a set of programs and applications that control the operation of a computer and perform various tasks. There are two types of software: system software (such as operating systems like Windows, Linux, macOS) and application software (office suites, graphic editors, games, etc.).



5. Network Technologies

Network technologies are methods of communication between different devices that allow them to exchange data. The most common network technologies are local area networks (LAN), wide area networks (WAN), and the Internet – a global network connecting millions of computers.

6. The Internet

The Internet is a global network consisting of interconnected computers and servers that exchange data using data transmission protocols. The main protocol is TCP/IP. The Internet provides users access to a vast number of resources, such as websites, email, social networks, and cloud services.

7. Cybersecurity

Cybersecurity is the field that deals with protecting computer systems and data from unauthorized access, cyberattacks, and viruses. As information technology evolves, cybersecurity becomes an increasingly relevant issue, as cyber threats can cause significant harm to both individuals and large organizations.

8. Databases

Databases are organized collections of data managed by database management systems (DBMS). Databases can be relational (organized in tables) or non-relational (such as documents, graphs). They play a crucial role in managing information within companies and organizations.

9. Cloud Technologies

Cloud technologies are a model for delivering computing resources over the Internet. Clouds allow users to store data on remote servers and use various services (such as data processing or applications) without needing to install and maintain software on local computers.

10. Artificial Intelligence (AI)

Artificial intelligence is a branch of information technology that deals with creating programs and systems capable of performing tasks that require human intelligence. AI includes fields such as machine learning, neural networks, natural language processing, and robotics.



Conclusion

Information technology plays a key role in the development of society, transforming the way we work, communicate, and learn. Understanding the key concepts of IT is crucial not only for specialists in the field but also for everyone who interacts with modern digital systems and wants to use their potential effectively.

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