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INTRODUCTION TO DATA AUTOMATION THROUGH MACROS

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Annotation: The article presents concepts such as program, software, repetitive information, system software, the main parts of system software: drivers, utilities, network operating systems, virtualization, kernel programs; Application software: office, multimedia programs; Programming languages and hardware tools: programming languages; automation capabilities, macro commands and macros.
Keywords: Software, firmware, driver, virtualization, kernel programs, automation, repetitive information, macros.

The computer is considered a model of human intelligence, because it inputs, outputs, prints, and processes information. However, human mental activity cannot be compared with computer behavior. The machine only accurately executes a sequence of commands given by a person. Such a sequence of commands is called a program. The computer is its executor. So, a program is a statement written in a special computer language of the sequence of actions that must be performed on data to perform a given task. The computer is considered a model of human intelligence, because it has the ability to input, output, store, and process information. However, human mental activity cannot be fully compared with a computer, because the machine only executes a sequence of commands given by a person, such a sequence of commands is considered a program. Software is a set of programs written by a person for a computer. In general, software is a set of instructions, data, or programs used to control computers and perform certain tasks. So, software is programs, systems and applications written to control devices and ensure their operation. Software is used for various purposes and is divided into the following:

1. System Software (or System Software) is a type of computer program designed to run technical and application programs of a computer, which operates on data stored in memory. The main task of system software is to manage the computer system and create an interface between the user and the hardware. It is used to control the functions of the computer, including the disk OS, file management, utilities, operating systems and application software, hardware and ensure its efficient operation. For example:

• One of the most important parts of system software is the operating system. It controls the operation of the computer's hardware and user programs. The operating system provides an interface between the user and the computer and manages system resources (memory, processor and other devices). Some examples of operating systems are: Microsoft's Windows OS, a widely used operating system for computers and mobile devices; Apple's macOS, a system designed primarily for Mac computers; Linux OS, an open source operating system; Android OS, an operating system for mobile devices; and iOS, a mobile operating system developed by Apple;

• Device Drivers are software programs that communicate between hardware devices and the operating system. They help determine how the device works and coordinate its operation with the operating system. For example, a printer driver establishes communication between a printer and a computer; a graphics card driver controls the operation between a video card and a display;

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and a keyboard and mouse driver is needed to connect keyboards and mice to the operating system;

• Utility Software is software programs that are designed to ensure the efficient operation and maintenance of a computer. They are used to manage system resources, analyze, and correct errors. Example: Antivirus programs are used to protect the computer from malware (e.g. Norton, McAfee…), Disk Cleanup programs are used to optimize the memory and disk space on the computer (e.g. CCleaner…), Backup programs are used to back up and restore data (e.g. Acronis True Image), System Monitoring programs are used to monitor system resources, performance and status (e.g. Task Manager, HWMonitor);

• Network Operating Systems are used to connect multiple computers and devices together and ensure that they work together. These systems are used to create and manage networks. Example: Windows Server is a network system developed by Microsoft, a system that allows you to manage the network, create servers and manage users, an open source system used for many servers is Linux Server, an old but well-known system used for network management is Novell NetWare;Bir kompyuterdan bir nechta virtual kompyuterlar yaratish va boshqarish imkonini bruvchi dastur Virtualizatsiya dasturlari (Virtualization Software) hisoblanadi. Misol: virtualizatsiya texnologiyasini taqdim etadi, serverlarni va ish stantsiyalarini virtualizatsiya qilish imkoniyatini VMware dastur beradi, Oracle tomonidan ishlab chiqilgan bepul virtualizatsiya dasturi bu VirtualBox, Microsoft tomonidan taqdim etilgan virtualizatsiya platformasi.bu Hyper-V dasturi;

• A Boot Manager is a program that allows you to choose which operating system to boot when a computer is turned on, if several operating systems are installed. These programs manage the system and help the user choose the desired system. Example: GRUB (Grand Unified Bootloader) boot manager, which is widely used for Linux systems, and Windows Boot Manager is used to manage multiple versions of the Windows operating system.

• The most basic and central part of the operating system is the Kernel Software. It interacts with the computer's hardware and manages other programs and system resources. The kernel is responsible for starting and managing the operating system. Example: The central part of the Linux operating system is the Linux kernel, the Windows NT kernel of the Windows operating system, and the main XNU kernel of macOS and iOS systems.

So, system software includes programs that ensure the operation of the computer and organize the interaction between the user and the hardware. The operating system, drivers, utilities, virtualization programs, and other system components help ensure the effective operation of a computer system.

1. Application Software is any computer program designed for the user, which is designed to meet various needs, that is, programs that allow direct execution of actions. Application software is used to perform certain tasks using computers and mobile devices or other electronic systems. These programs facilitate the user's work, that is, generate new information from non-existent data. For example:

• Office programs help the user perform various work processes: create documents by typing, create spreadsheets, presentations, work with a database, publishing system. In addition, they provide work in online office programs. (Microsoft Office (Word, Excel, PowerPoint, Access, Publisher…), Google Docs, Sheets, Slides);

• Multimedia programs allow the user to work with images, audio and video: Image editing and creation programs (Adobe Photoshop, corel draw…), programs used to view audio and

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video files (VLC Media Player, Windows Media Player, KMPlayer…), music and audio file editing programs (Adobe Audition, Audacity, FL Studio…);

• Internet programs designed for connecting to the Internet and web browsing: Browsers used to view web pages (Google Chrome, Mozilla Firefox, Safari…), Programs for online communication and video conferencing (Skype, Zoom…);

• Business programs that help manage various business processes for companies or organizations (Enterprise Resource Planning systems, Customer Relationship Management systems…);

• Game programs are programs aimed at people's leisure and entertainment activities (PC games, Mobile games: (Angry Birds, Candy Crush, etc.)…);

• Educational programs designed for the reading and learning process (Educational resources and language learning (Khan Academy, Duolingo…) programs).

So the main purpose of applied software is to meet specific user needs, perform specific tasks, and generate new information through the effective use of computers or devices.

Programming languages can also be called hardware programming technology, that is, a set of programs that allow you to create new programs. Programming languages are one of the main tools for communicating with a computer. Programming on a computer is the process of giving various commands to a computer's microprocessor, telling it when and where to change what, and what to input or output. They allow computers to give commands in human language, and thus make it possible to create software, web applications, mobile applications and many other technological solutions. Today, there are many programming languages, each of which is designed to perform a specific task or project. Below you will find the necessary information about them. Popular programming languages include languages such as Python, JavaScript, Java, C #, Ruby, PHP, VBA, Swift and Kotlin. Python - It is an easy-to-learn and versatile programming language, widely used in the fields of artificial intelligence, data analysis, web development and automation.

JavaScript - This programming language is mainly used for creating web applications and plays an important role in enriching the user interface. Java is often chosen for creating applications for mobile programming, especially on the Android operating system.

C# - a programming language developed by Microsoft and is mainly used for creating applications on the .NET platform. Each programming language has its own syntax and programming paradigm. For example, programming languages such as Ruby on Rails or Django provide a high level of abstraction and development speed for web programming. PHP is designed to work with web servers, and many websites and CMS systems are created using this language. Visual Basic for Applications - a computer programming language developed by Microsoft and related. VBA allows you to create macros to automate repetitive word and data processing functions and create special forms, graphs and reports.

Above, the software was divided into three types and some of the programs that work with each software were given names. Now, one of the conditions for the effective application of information technologies in practical activities is the creation of specialized packages of application programs. That is, they should provide automation of capabilities suitable for a particular specialization. Such a package of programs is called an application program package,

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abbreviated as ADP. The ease of access to these programs, ease of use, allows employees of any field to use a personal computer in solving problems related to this field, regardless of the field. Below we will explain in detail:

• In medicine, it is connected to a computer and after entering information about the patient, a diagnosis is made, that is, it analyzes the entered information and makes a diagnosis, the user does not need to know what kind of work process the technique is performing, they only need the diagnosis result;

• There are such programs for geographers that, if the name of a country is entered through this program, the program automatically outputs information about that country: the area of the country, the population, its map, and mineral resources, such programs include Panorama, QGIS, MapInfo Professional, ArcGIS, etc.;

• In physics, it calculates the experiments of physical processes and this calculation process is based on mathematical calculations, that is, once the physical process is completed, there is no need to spend time on performing mathematical calculations, then the mathematical calculations are performed by the program itself. Programs such as LabVIEW, Matlab, StartFlow, Matlab, Mathematica, Octave, Scilab, Maple, Crocodile Physics are used to model physical processes. In addition, knowing programming languages such as C++, Java, Python, you can use their specific libraries to develop solutions to complex problems, model them, and record high-precision results. Using these programs, you can obtain a 2D or 3D image of the process;

• To automate the calculation of mathematical problems on a computer, a set of programs such as Eureka, Gauss, TK Solver!, Derive, Mathcad, Mathematica, Maple and others are used. You can also cite the PhotoMath program, which helps you work out mathematical examples using a smartphone camera, and MathGPTPro - an advanced mathematics learning application based on artificial intelligence for doing homework and learning mathematics. There is another program that works with mathematical equations and functions, this is the Grapish program, which draws a graph corresponding to the equation, that is, finding the values of these processes, determining the coordinates, and drawing the graph - all this is done by an automated program.

These processes can be automated, if the technique itself can do it, this is achieved using macro commands, that is, macros, which allow the automation of the programs behind them. Here it is necessary to emphasize one thing, when using application programs, the tasks being solved are completely automated. It completely frees you from the need to know the tasks necessary for this area and how the computer performs the operations in the information processing process. So, regardless of the field, it is not necessary to know how the program works, the result is important to them. We, those who are engaged in ICT, need to know the process of creating such programs, that is, rational support.

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