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CURRENT PROGRAMMING LANGUAGES

Abstract: Several thousand programming languages have been created for writing software. Some of them are universal, and some are intended for a specific range of tasks. Regardless of this fact, not every programming language can now be used to write full-fledged software, as they become obsolete and become a thing of the past. It is for this reason that this article will consider modern programming languages.

Key words: programming languages, program code, software development, modern programming languages.

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Introduction

When talking about a programming language, we are talking about a "system of formal signs, the main purpose of which is to write computer programs." The basis of a programming language is the definition of the composition of lexical, syntactic and semantic rules, on the basis of which the appearance of the program is formed, as well as the composition of actions that will be performed by the computer when managing this program [10].

The basic classification of programming languages divides them into low-level and multi-level.

A low-level programming language is close to development in the format of machine code, on the basis of which either a real or virtual processor is controlled. Machine commands for convenience work in the format of mnemonic notation. This allows the programmer to work with text commands, and not with a set of zeros and ones. When writing a program, special attention is paid to the main features of the processor, for the

implementation of which the writing of program code. The most famous low-level development language is assembler [2].

A high-level programming language designed for faster software development, as well as for the development of user-friendly programs. The main feature of the existence of this group of development languages should be called abstractions, in which various semantic constructions are introduced, thanks to which an excellent description of the data structure is achieved, as well as operations on them. Due to the abstraction of a huge procedure for writing program code, porting software. Using the development of high-level languages, it is possible to implement software that can function under various operating systems [9]. To identify the popularity of the corresponding languages in programming, two different ratings are used - this is the TIOBE rating and the IEEE rating. Based on various provisions, they present a rating of the popularity of "programming languages", on the basis of which one can say with confidence which

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languages are currently in the greatest demand. These include:

1. Python
2. C++
3. Java
4. C
5. C#
6. JavaScript
7. Golang (Go) [7].

Below we will briefly describe these programming languages, as well as their areas of application, for what needs these languages are most often used, etc.

One of the most popular and widespread programming languages in recent years is Python. It tops all ratings for the reasons that it is free, has open source code, has a fairly simple command syntax identical to the English language, and has a fairly high level of abstraction. This makes it not only popular, but also easy enough to learn. And at the same time, Python is used to develop completely different applications - software of various types, web applications, for training artificial intelligence, data analysis, etc. Using Python, packages for working with graphics and 3D animation, games of various scales, scientific computing applications are implemented, and even sites such as YouTube contain program code written in Python. The advantages of this development language include its high performance, ease of both reading and writing program code, a large amount of documentation, a developed community, compilation of written program code directly during its execution, easy debugging, easy integration with web services, ease of scaling and testing software. The disadvantages of the Python programming language are slow execution of program code, high load on RAM, the inability to implement mobile applications, as well as front-end applications, the inability to organize work with databases, there are runtime errors associated with dynamic changes in variable types, as well as the lack of support for multithreading [8]. C++ is one of the fairly old development languages, and is most often used to implement low-level systems - file systems, operating systems, etc. This programming language has a low degree of abstraction, which makes learning it and working with it somewhat difficult, but at the same time this language is quite fast, stable and efficient. It is for these reasons that this programming language is used when writing resource-intensive programs [6]. Java is also a popular language and has long been at the top of the ratings. Its scope of use is quite extensive - these are desktop applications, and programs for smartphones and cell phones, etc. Despite the fact that the Java language is based on the C++ language, it is easier to learn and use. The fundamental idea in the development of Java was to

create a programming language, the code of which can be executed on different devices. Now it is most often used when writing applications for Android. It is the versatility and flexibility that make Java a popular and highly paid programming language. The advantages of this development language include high performance and reliability, no platform dependence, a large number of ready-made libraries, an automated version of the implementation of memory allocation and garbage collection mechanisms, a built-in stack distribution system, a high level of security of program code, support for distributed computing and multithreading. The disadvantages of the Java language include the lack of templates, which leads to limitations in the creation of data structures, as well as the fact that memory management requires the allocation of a large number of resources [5].

C# is the successor of the C and C++ programming languages, which was developed to organize development for the .NET platform. For ease of use and study, it was closer to the English language, and many complex tasks were largely abstracted. Using this language, software products and games are written for operating systems of the Microsoft family. The advantages of this language include the ease of learning and understanding, full integration with .NET libraries, a large number of library functions and data types, high speed of compilation and execution of program code. The disadvantages of this language include the fact that it allows the use of pointers in potentially unsafe blocks, the language has a lower level of flexibility compared to C++, and to eliminate errors in the written code sometimes requires significant experience in development [4]. The next most popular is the scripting language JavaScript, the development of which can be called the process of development of the Internet. This language is most often used as a language on the client side of websites and web applications. Most often, these are interactive applications - pop-up windows, forms, and even browser games. Despite this, this language can also be used to write scripts that run on the server platform. So, recently, the use of the NodeJS runtime environment has become popular, which allows you to run scripts written in JS on the server side. A striking example is the formation of dynamic content of a web page on the server side, with its subsequent sending to the user's browser. The advantages of this language include the ease of learning, a wide range of applications, high speed of execution of program code, reduces the load on the server, since it is executed on the client side, receives regular updates, has a large number of resources, a high level of compatibility with other programming languages, as well as excellent support from the developer community. The disadvantages include the fact that it is interpreted

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differently in different web browsers, which significantly complicates the writing of universal program code. Also, web browsers can disable code execution for the reason that it is often used to implement pop-up advertising messages, and they can have malicious content [9]. The Golang (Go) language can be called a developing alternative to the PHP language, as it is often used to write the server part of a website, or as an API for various large systems. It is intended primarily for working on large projects, and contains a simple and modern structure with the familiar syntax of a programming language. The language has support for multithreading, and has an extensive toolkit for data processing. It is easy to learn, minimalistic, has static typing, a high level of compatibility and high speed of code execution, which is one of the advantages of this language. The disadvantages of this language are a low level of versatility, the absence of a graphical library, not such a large number of manuals and a community of developers that is just beginning to develop [3]. The PHP scripting programming language is most often used to organize the work of the server part of websites and web applications. Despite the fact that Python and JavaScript are also actively used for web development, PHP does not lose its popularity, and the number of vacancies for developers using this development language does not decrease on the labor market. And all this despite the fact that it was not originally planned to be implemented as a programming language - it was a set of tools with the help of which their creator organized support for his own home page.

The positive aspects of the PHP language are the simplicity of writing program code, flexible capabilities for working with databases, a large number of different frameworks, a large number of books and manuals, the presence of a large number of tools for developing and testing code. The disadvantages include the low speed of writing program code compared to other options, it cannot be used to write large applications, has shortcomings in terms of security, does not have support for a large number of applications. Swift is a development language created by Apple in 2014 to organize with their platforms and for writing software for Mac OS X, iOS and Linux operating systems. Its syntax is similar to English, it has high performance and code optimization, allows you to write cross-platform applications. The advantages of this programming language include the ease of learning and writing software, high performance, and support for dynamic libraries. However, this language also has

disadvantages, such as lack of support for the first versions of Apple operating systems, a low level of interaction with third-party tools. Ruby is an object-oriented programming language, has a simple syntax, and can be used for a wide range of different tasks, such as writing a script, processing text, or creating a prototype of a new program. It is easy to learn from scratch and has a large number of developed web frameworks, as well as software products created with its help. The advantages of this development language are the ability to quickly create software or websites, easy-to-understand syntax, ease of learning, a large number of guides, and a developed community of specialists. The disadvantages of this language are its low prevalence and low speed of program execution. Kotlin is the name of a programming language that was released in 2016, and since 2019 has become the preferred language for developing mobile applications for the Android operating system at Google. The language is compatible with Java and has support for functional programming languages. Despite the fact that the language is quite young, its advantages include reliability, low program writing time, full compatibility with the Java language, easy-to-read program code, and flexible mechanisms for debugging program code. The disadvantages of the Kotlin language are unstable compilation speed, low popularity, and, accordingly, a small number of developers working with this language. Perl is a high-level scripting language. This language was developed in 1987, and initially its functional purpose was intended to perform text processing procedures and perform manipulations with texts, but as it developed, this language began to be used in various fields, such as system administration, web development, etc. At the same time, this language allows you to create software products for various operating systems, is a functional and at the same time universal language, has good syntax and can be easily learned. However, for beginners, the code in this development language is difficult to read, it is slow to execute multitasking applications, the language contains poor argument handling, and there are no shells for the language interpreter [9]. In conclusion, it is necessary to note the fact that there are quite a lot of relevant development languages now, the most famous and widespread ones were given in this article. At the same time, the question of using a particular programming language remains only with the developer or the project manager, and it is decided strictly individually.

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