CAPABILITIES OF MODERN PROGRAMMING LANGUAGES

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ABSTRACT

This article discusses the history and evaluation of modern programming languages, the advantages of programming languages today.

Keywords: FORTRAN, C ++, C #, Java, Turbo PASCAL, PROLOG.

INTRODUCTION

As we all know, normal spoken language consists of four basic elements: signs, words, phrases and sentences. A programming language contains similar elements, except that words are called elementary constructions, expressions, sentences - operators.

A programming language is a formal notation system, a language for writing computer programs.

Any form of programming language is made up of a set of rules:

• Characters specified for a specific language (letters, numbers, special characters, etc.) that can be used when writing an alphabetic program.

• Syntax - the rules for constructing special constructions from alphabet symbols, with the help of which an algorithm is created.

• System of rules for interpretation of semantic-language structures.

Any computer program is implemented using alphabetic characters using syntactic and semantic rules.

Programs for first-generation EHMs were written by programmers in machine code language. It was a very difficult and time-consuming process. A lot of time passed between writing the program code and using the program in practice. Elimination of the above shortcomings could be done only by developing and optimizing the programming process.

In 1936-1938, the Z1 car was created by Konrad Tsuze. It was the world's first computing machine created in a programming language. This machine weighed 500 kg and occupied the entire room. The machine could do about 5 multiplications in 1 second. In this machine, numerical coded commands, program code are "perceived" only by scientists. Such a "device" that eases the work of programmers has been replaced by partial programs. In August 1944, a program for calculating sin(x) was written for the Mark-I relay machine under the direction of Grace Hopper (a female programmer, a US naval officer).

In 1949, John Mouchly (one of the inventors of the ENIAK EHM) developed the Short Code system, which served as the basis for the first versions of high-level programming languages. In 1951, a new programming language and the V-O compiler were first created under the leadership of Grace Hopper. The new language made it possible to do programming in a language close to English. About 30 English words were used in this compiler. In 1958, the V-O system was renamed Flow-Matic and focused on commercial data processing.

In 1952, the assembly language was created. Its logical instructions are more understandable than machine code, but not precise enough. Today, Assembler is used only in programming for microprocessors if it is a question of every millionth of a second.

Due to the extremely complex and detailed machine language codes, the first high-level languages began to be developed in the mid-1950s.

In 1954, local newspapers reported that FORTRAN (FORmula TRANslation) was being created by John Backus at IBM's headquarters in New York. This language is BNF (Beckus Normal Form), which is used to describe the syntax of many programming languages. Calculations in this language are in the natural-scientific field, specializing in scientific formulas.

In 1958, John McCarthy, the founder of artificial intelligence, developed the LISP programming language. A key element in the LISP language is the description of recursive discrete functions, and it has been proven that any type of algorithm can be explained using a number of recursive and function set tools. The basic ideas of this programming language were later used in LOGO, a language developed for children at the Massachusetts Institute of Technology in the 1970s under the guidance of Seymour Papert.

In 1960, a team led by Peter Naur created the Algol programming language. In European countries, ALGOL was a popular language focused on mathematical tasks, like Fortran, and it used content programming, which was considered an advanced technology for that time. For the first time in the program code, it was possible to use commands similar to English words, and the programs became more understandable.

In 1960, under the guidance of Grace Hopper, COBOL (Common Business Oriented Language), a high-level business programming language with complete machine independence, was created. This language specializes in commercial and production-economic application.

3rd generation programming languages appeared in the 60s and 70s of the last century. Long-lived languages include BASIC, which was developed at Dartmouth University in 1964 under the leadership of John Kemeny and Thomas Kurtz. According to the developers, this language is simple, easy to learn, and specializes in performing uncomplicated calculations. In 1991, the first version of the Visual BASIC programming language was created.

In 1971, the Swiss professor Niklaus Wirth created the PASCAL language and named it Pascal after the French physicist and mathematician Blaise Pascal. PASCAL was originally designed as a learning language, and its widespread use in practice began with the Turbo PASCAL version on personal computers.

In 1972, the PROLOG language was developed in France to solve the problems of artificial intelligence. The PROLOG language provides the ability to formally describe various ideas, discuss logic, and make the computer answer questions. In the 1990s, it was planned to produce fifth-generation computers called "Artificial Intelligence", and LISP and PROLOG were chosen as suitable programming languages for artificial intelligence.

In 1973, the C ("Si") programming language was created by the American programmer Dennis Ritchie, who at the same time developed the UNIX operating system together with Kenneth Thompson. The C programming language is a universal programming language with a very large set of operators. This programming language is high-level, content (structural), and is

used to create not only operating systems, but also translators, system and application programs. C is a simple language base with a standard library containing math and file functions. This language focuses on procedural programming. The main disadvantage of C is the lack of tools for functional programming. It has greatly influenced the development of languages such as C++, C#, Java, and Objective-C.

S++ (plus C) was developed by Björn Stroustrup in 1986, a name that reflects the evolutionary nature of changes in the C language. It originated when Björn Stroustrup of Bell Labs came up with a series of improvements to the C language for his needs. Stroustrup decided to extend the C language with features available in the Simula language, and the possibilities of object-oriented programming were derived from this language. New features have been added to the language, such as virtual functions, function and operator overloading, references, constants, user control over free memory management, improved type checking, and a new annotation style. The resulting language was no longer an extended version of classic C ("C classes") and was renamed "C++".

Working with existing programming languages has always been done from the login console. Earlier programming languages did not have such easy and convenient formulas as today. Thanks to visual programming, an instrumental environment has been developed that allows you to design and program Windows formulas quickly and easily.

Based on the Pascal programming language, Delphi is recognized as a versatile and easy-to-learn language. At the same time, it is convenient to use when creating complex applications, including working with the Internet, databases, and enterprise applications. The Delphi environment provides visual user interface design, object-oriented Object Pascal (later renamed Delphi), database access tools. The Delphi language has significantly surpassed Basic and even C++ in its capabilities. As a result, the Delphi environment made it easier for programmers to create professional programs. The Delphi environment is actually the best programming tool for the Windows operating system. One of the brightest and most powerful versions is Borland's Delphi 7. Modern versions of the XE generation of Delphi have not only an improved development environment in terms of convenience, but also a significantly improved Object Pascal language, which allows you to create applications for Microsoft Windows, Mac OS, IOS and Android .

The basics of programming have been taught in schools since 1985, starting with a simple algorithmic language, but in the last few years, students in grades 9-11 have been taught to write simple programs in Pascal, Visual Basic, and Delphi.

Since 2015, with the increasing popularity of the Python programming language, computer science has begun to write sample programs, as practice shows that C4-type tasks are easier to write in Python.

Therefore, the Python programming language is being taught as the main language in Informatics departments of several prestigious universities. Python's user base is huge and growing. It's used by companies like Nokia, Google, and even NASA for its easy syntax, and it's supported by a large community of OS developers. The fact that Python supports multiple programming paradigms, including object-oriented programming, functional Python programming, and parallel programming models, makes it a flexible choice.

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