



PROGRAMMING LANGUAGES: TRENDS AND PROSPECTS

Avazova Dilraboxxon Axrorjon qizi

*1st year student of the Faculty of Foreign Languages,
Department of Philology and Language Teaching: English
Language Department, Fergana State University.*

*Senior Lecturer (PhD) of “ Information Technology ” department at
Fergana State University*

Fakhriddin Urinboevich Toshboltaev

Abstract: This article provides general information about the history of the development of programming languages, their main types, the capabilities of modern languages, and technological trends. The role of programming languages in the digital development of humanity, the specific advantages and areas of application of each language are highlighted, and the importance of modern knowledge and skills for programmers is also emphasized. The article provides useful information on studying the capabilities of modern programming languages and how to choose them.

Keywords: Programming languages, high-level languages, low-level languages, Python, Java, JavaScript, Go, Rust, artificial intelligence, technological progress, digital innovations, object-oriented programming.

Аннотация: В статье даны общие сведения об истории развития языков программирования, их основных типах, возможностях современных языков и технологических тенденциях. Освещена роль языков программирования в цифровом развитии человечества, уникальные преимущества и области применения каждого языка, подчеркнута важность современных знаний и навыков для программистов. В статье представлена полезная информация об изучении возможностей современных языков программирования и о том, как их выбирать.

Ключевые слова: Языки программирования, языки высокого уровня, языки низкого уровня, Python, Java, JavaScript, Go, Rust, искусственный



интеллект, технический прогресс, цифровые инновации, объектно-ориентированное программирование.

Programming languages are one of the main tools of the modern information technology world. Although the first computer programs were written in machine code and assembly language, over time, high-level programming languages, including Fortran, Cobol, C, Java, Python, have emerged and made programming more convenient for humans. Currently, programming languages are divided into different types according to level, style, and area of application, for example, there are low-level languages (assembler), high-level languages (Python, Java), imperative and declarative programming styles. The choice of programming language directly affects the efficiency and security of the system, therefore, aspects such as its expediency, speed, and platform independence are important when choosing a language. Low-level languages are very close to machine code, and they allow you to fully control computer resources. For example, assembler and C languages are widely used for system programming. The C language is famous for its efficiency and simple syntax, and many systems, including operating systems and games, are created in the C programming language. But the main disadvantage of these languages is that they require a very deep technical knowledge from the programmer. High-level programming languages, on the other hand, are easy for a person to read and write, they allow you to create a program without thinking about how the system works. Languages such as Python, Java, JavaScript are examples of high-level languages.

Python is distinguished by its simplicity, clear syntax and a powerful set of libraries. The Python programming language is widely used in the fields of artificial intelligence and data analysis. Its powerful libraries, such as NumPy, Pandas, TensorFlow and PyTorch, significantly simplify the creation of complex statistical analysis and machine learning algorithms. Python is also used in web programming, automation and system programming. Java, on the other hand, is based on the principle of "write once, run anywhere" (Write Once, Run Anywhere), which allows Java programs to run on any platform. Java is the most suitable programming language for



enterprise systems, and its strong class system and security have made it a widely used language. Java is also known as the main programming language for developing Android mobile applications.

JavaScript is the basis of web programming, and is used to create dynamic web pages that run in the browser. Currently, it is also used on the server side through Node.js. The JavaScript programming language is distinguished by its asynchronous features, which makes it ideal for web applications that require high performance. Applications created using JavaScript are fast, user-friendly and dynamic, which creates an interactive experience on the web.

Modern programming languages, such as Go and Rust, deserve special attention in terms of efficiency, security and system resource management. Go was developed by Google and is mainly used for projects related to server-side applications and cloud technologies. Go is highly efficient, but its syntax is very simple and easy to learn. Rust is a language focused on creating safe and efficient code, and is used to create system applications and applications that require high performance. The biggest advantage of the Rust language is that it minimizes memory errors and ensures system security.

Today's modern trends in programming languages include artificial intelligence, data analysis, cloud technologies, and mobile application development. Python is one of the leading languages in these areas, as its libraries and modules are widely used in these areas. New languages such as Kotlin and Swift have emerged for mobile application development. Kotlin is replacing Java, especially in creating Android applications, because it is easy in terms of syntax and provides security. Swift is the best choice for developing mobile applications that run on Apple platforms. Programming languages are constantly being updated and integrated with modern technologies. Learning and working with these languages is essential for programmers to succeed in today's competitive world. As programming languages evolve, new approaches, styles, and techniques emerge, requiring not only technical knowledge but also creative and analytical thinking.

**REFERENCES:**

1. Toshboltayev , F. (2023). Pedagogical facilities and informational technologies integration provision in contemporary education. Scientific Journal of the Fergana State University, (3), 21. Retrieved from
2. Toshboltayev , F. (2023). Model for the development of the methodological preparation of computer science teachers based on the integration of pedagogical and information technologies. Scientific Journal of the Fergana State University, (3), 172. Retrieved from
3. Tashboltaev, F.O. (2022). Features of improving the methodical training system of future teachers. Journal of Pedagogical Inventions and Practices, 15, 113-115.
4. Sebesta, R.W. Concepts of Programming Languages. – Pearson, 2016.
5. Aho, A.V., Lam, M.S., Sethi, R., Ullman, J.D. Compilers: Principles, Techniques, and Tools. – Pearson, 2006.
6. Lutz, M. Learning Python. – O'Reilly Media, 2013.
7. Horstmann, C.S. Core Java Volume I – Fundamentals. – Prentice Hall, 2018.
8. O'zbekiston Respublikasi Innovatsion rivojlanish vazirligi materiallari, 2024-yil.
9. Qodirov A.A. Axborot texnologiyalari asoslari. – Toshkent: «O'zbekiston», 2022.