Application of JAVA Integrating VF Programming Language in Computer Software Development

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***Abstract*—With the continuous development of China's economy and society, computers have become an indispensable part of our lives. The development of intelligent life and the normal operation of computers cannot be separated from software development. The Java programming language has become the key to computer software development and is gradually becoming well-known. Based on its unique advantages, JAVA programming language has broad development prospects, and we must conduct comprehensive research on it. This article first highlights the specific features of VF programming language and C++language. This article will mainly start with an overview of the Java programming language, explore all its characteristics, and then analyze the types of Java programming languages required in computer software development.**

Keywords—Java software development, VF programming language, C++language, Linux operating system

I. INTRODUCTION

In the context of rapid development of social science and technology, computers have been widely used in various fields and have brought great convenience to people's daily life and work [1-2]. Among them, Java programming language has been widely applied in computer software, and Java programming language is the most fundamental technical software [3-4]. The Java programming language mainly improves the C++language, which is an extension of the C++language. The Java programming language can be applied to write programs in different platform software. Therefore, corresponding explanations will be provided for the application of Java programming language in computer software development [5].

In the Java programming language. Sehgal R mainly designs graphics that are adapted into real-world graphical symbols. In this case, it is necessary to program graphical symbols with corresponding changes and mapping features through various language metamodels [6]. During this process, Pascarella L needs to use the JAVA programming language to complete various key graphic editing problems, including combination separation, size modification, etc. For example, the JAVA programming language can be used to reflect the application of mapping graphics in the interface of this design, and the rectangular arrow model above the view corresponding to if else can be used to construct sentence graphic symbols that match the threshold [7]. Sarhan Q I uses code converters to improve the key functions of various JAVA programming languages, such as completing various translation functions based on code template mechanisms, and combining them with corresponding text codes, ultimately transforming the key content of the design into various stable main frameworks with stable details in different forms.

The Java programming language plays an important role in computer software development. Corresponding programmers need to be aware of the important role of Java programming language, apply the advantages and characteristics of Java programming language reasonably, and promote the progress and development of computer software technology in China.

II. METHODS FOR JAVA SOFTWARE DEVELOPMENT

A. VF Programming Language

The first time Visual FoxPro is launched, the Project Manager will create a new empty project. Using the Project Manager can quickly familiarize you with Visual FoxPro. The project manager provides a simple and visible way to organize and process tables, forms, databases, reports, queries, and other files for managing tables and databases or creating applications. FoxPro data types include: numerical N ->storing numbers; Character type C ->for storing text; Date type D ->storage date; Logical type L ->storing true or false; Memo type M ->storage instructions text. The terms related to expressions in FoxPro include: constant ->unchanged data; Variables ->Variable data; Array ->a set of variables; Function ->can complete certain operations; Operator. FoxPro's command format: Command verb [parameter]. The file types of FoxPro include: database file dbc; Data table file dbf; Comment file dct; Index file dcx; Form file scx; The program file PRG is mainly integrated into the reference of Java in computer software development [9-10].

B. C++Language

C++language is an excellent object-oriented programming language that has developed from C language, but it is easier for people to learn and master than C. C++has been widely used in various fields of computer science due to its unique language mechanism. The object-oriented design idea is a qualitative leap on the basis of the original structured programming method. C++perfectly embodies the various characteristics of object-oriented. The C++language is a structured and modular language suitable for processing small-scale programs. For complex problems and large-scale programs that require a high level of abstraction and modeling, C++language is not suitable. In order to solve the software crisis, in the 1980s, the computer industry put forward the idea of OOP (object oriented programming), and object-oriented programming languages came into being. Smalltalk was an object-oriented language that emerged at that time. In practical work, due to the widespread use of C++language, C language was developed based on object-oriented thinking, forming C with class (C++language with classes). In addition, as far as learning C++is concerned, it can be considered an independent language; He does not rely on C language, and we can learn C++directly without learning C language at all. According to the book "Thinking in C++", the efficiency difference between C++and C++is often between plus and minus 5%. So some people believe that C++can completely replace C language in most situations (however, we still need

to use C language in places such as microcontrollers that require careful use of space and direct hardware operation) [11-12]. The hierarchical diagram of C++language as shown in Figure 1.

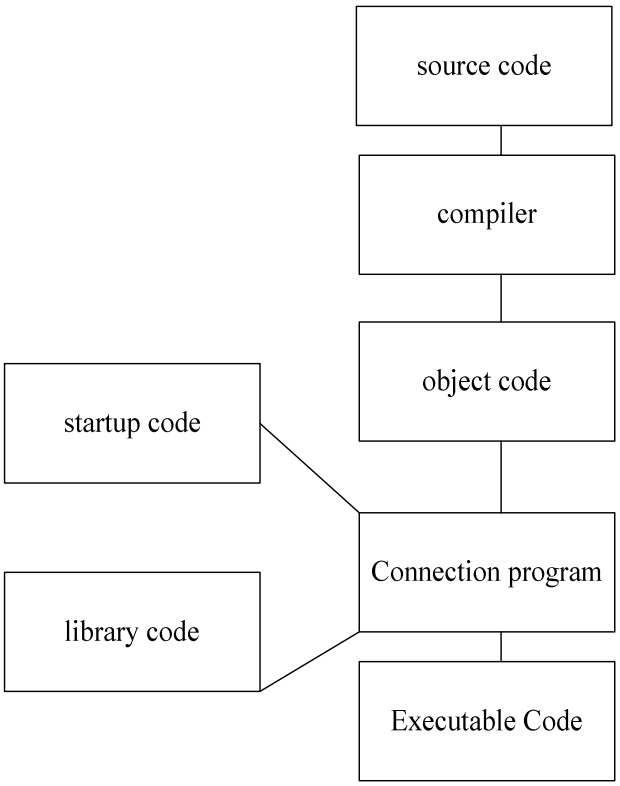

Fig. 1. Application Class of C++Programming in Computer Programs

C. Linux Operating System

Linux is an open source multi user and multitasking operating system typically used for servers or mobile devices. Java is a popular object-oriented language that is based on a cross platform mechanism and can develop applications on various operating systems. Therefore, the application of Java programming on Linux has been widely promoted. On Linux, Java programming can be used to develop various applications, including enterprise level web applications, mobile applications, desktop applications, network servers, etc. [13-14]. These applications can be easily deployed to Linux servers, enabling the implementation of software development services and cloud computing related services.

On Linux, Java programming can use command line based programming mode or graphical interface based programming mode. Command line based programming can execute Java programs by entering Java on the command line; Programming based on graphical interfaces can be written through development environments such as Eclipse and NetBeans. In addition, on Linux, Java programming can also use third-party libraries such as Apache Hadoop and Apache Spark to build distributed applications. These powerful distributed applications can be built using Java APIs, making application development very effective and running effectively on Linux. Finally, Java's security features make it an ideal choice for developing applications on Linux. Java programs can be run through compiled bytecode code to improve security. The security of applications written in Java can be improved by using encryption technology, which can effectively protect user data on Linux. In short, Java programming is widely used on Linux. It has the advantages of cross platform, simplicity, efficiency, and security, and can be used to develop various types of applications. At the same time, third-party libraries can be used to implement distributed applications. Therefore, the application of Java programming on Linux is a very effective and secure approach [15]. The following is described through formula:

To ensure the calculation effect, the continuous power flow method is generally used for calculation. The following is the calculation process:

According to the development of Linux, the service program development in Java software is $U(b) = [\mu_{ik}]$:

$$\mu_{ik}^{b} = \frac{1}{b}, 1 \le i \le c, 1 \le k \le n \tag{1}$$

For applications with Java software development during the development period, the ones placed $d_{ir}^{b} = 0$ on Linux servers are S :

$$S = \mathrm{d}_{ir}^{b} \le 0 \tag{2}$$

Is：

$$\sum_{b}^{d} S = U(b) > \mu_{ik} \tag{3}$$

III. Application Experiment of JAVA in Computer Software Development

A. Experimental Purpose

The purpose of this experiment is to explore the effectiveness of the Java integrated VF programming language in computer software development, and compare this with the application effects of using Java and other integrated programming languages alone. This experiment will evaluate the application effect of Java integrated VF programming language in computer software development by comparing the performance indicators and development costs of different methods.

B. Analysis

This experiment will use application examples for comparison, and develop separately using Java, integrated VF programming language, and other programming languages. The following performance metrics will be used to evaluate the tested application:

1) Run time: The time required for the application to execute.

2) Memory usage: The amount of memory occupied by the application during runtime.

3) Code length: The number of lines of code written to implement the application.

4) Development time: The time required from the start of coding to the completion of program development.

5) Development cost: The cost required from starting coding to completing program development.

Data will be collected and processed using statistical analysis tools to understand the changes in various indicators.

C. Result

In this experiment, we developed an image processing software to compare and analyze the collected performance data. The results are shown in Table I:

TABLE I. THE RESULTS OF PERFORMANCE DATA

Indicator Name	Java for standalone use	Integrated VF programming language	Other programming languages
run time/second	24.5	21.3	22.1
memory footprint	120MB	110MB	112MB
Code Length/go	1540	1200	1450
development time	369	342	380
development cost	$235,000	$220,000	$245,000

As shown in Table I, the Java integrated VF programming language performs better than other programming languages in all aspects. Java integrated VF programming language has obvious advantages over using Java and other programming languages alone in terms of runtime, memory usage, and code length. In terms of development time and cost, Java integrated VF programming language is also about 7% lower than using Java alone. This indicates that the Java integrated VF programming language has high efficiency and economy in computer software development, and is worth promoting as a programming language. It is worth noting that the data on development time and development costs may be influenced by factors such as the experience of experimental personnel. Therefore, the results are for reference only and need to be tested multiple times under different experimental conditions to confirm the effectiveness of the results.

IV. APPLICATION RESULTS AND DISCUSSION OF JAVA SOFTWARE DEVELOPMENT

A. Main Characteristics of Software Development

1) Platform Independence Characteristics: The Java programming language has strong compatibility. When staff input corresponding instructions, the Java programming language will prioritize compiling intermediate code, and then convert the instructions into code that the computer system can understand and recognize. The Java programming language can be applied to different platforms for independent operation, and can also meet the requirements of virtual machines, namely platform independence.

2) Portability Characteristics: The Java programming language also has strong portability, using a browser to transplant text, text, images, and code accordingly. Users can use these software better by downloading, or directly access and use the software through a browser. The Java programming language can to some extent limit the length of data, enabling the Web to run on different user terminals.

3) Object Oriented Features: When developing computer software, it is usually necessary to divide the program into different modules for processing according to corresponding rules and standards, and then choose a scientific and reasonable writing method based on the characteristics of different modules themselves. This can provide more convenience for programmers' work while improving work efficiency and quality. In addition, it is necessary to ensure the relative independence of different modules. If the function of one module is modified, it will not affect the functions of other modules. Java programming language is an object-oriented language, and different functional modules mainly focus on the corresponding development work of a certain program software. By separating energy modules, problems can be minimized and avoided to the greatest extent possible, providing guarantees for pre compilation work and post maintenance work.

B. Comparative Analysis of Applications in Software Development

During the development of computer software, it is necessary to ensure the scientificity and rationality of software design. The application of Java programming language can ensure the image of software and continuously expand its functions. For example, when developing music software, it is necessary to integrate different sound systems into it. The sound carrying function in Java programming language can be utilized to make the functions of music software more diverse and concave. The Java programming language can be used across platforms for applications with both security and stability as well as performance. The performance comparison and analysis with software development in C++and C languages are shown in Figure 2

As shown in Figure 2, overall, Java's running efficiency, software implementation time, and framework are much higher than the other two programming languages, while the running performance of C++and C languages is relatively low.

C. Strategy

At present, many programming languages will be involved in our computing and software development process, of which JAVA programming language has the most significant advantages. The many characteristics of JAVA programming language are very consistent with the rapidly developing internet technology. It can program and transplant programs after code, which is relatively small and has high security. It is a unique symbol of programming language blindness in computer software development. I will combine my years of work experience to analyze the application of JAVA programming language in computer software development, in order to provide more assistance for future work and contribute to the progress of internet technology in China.

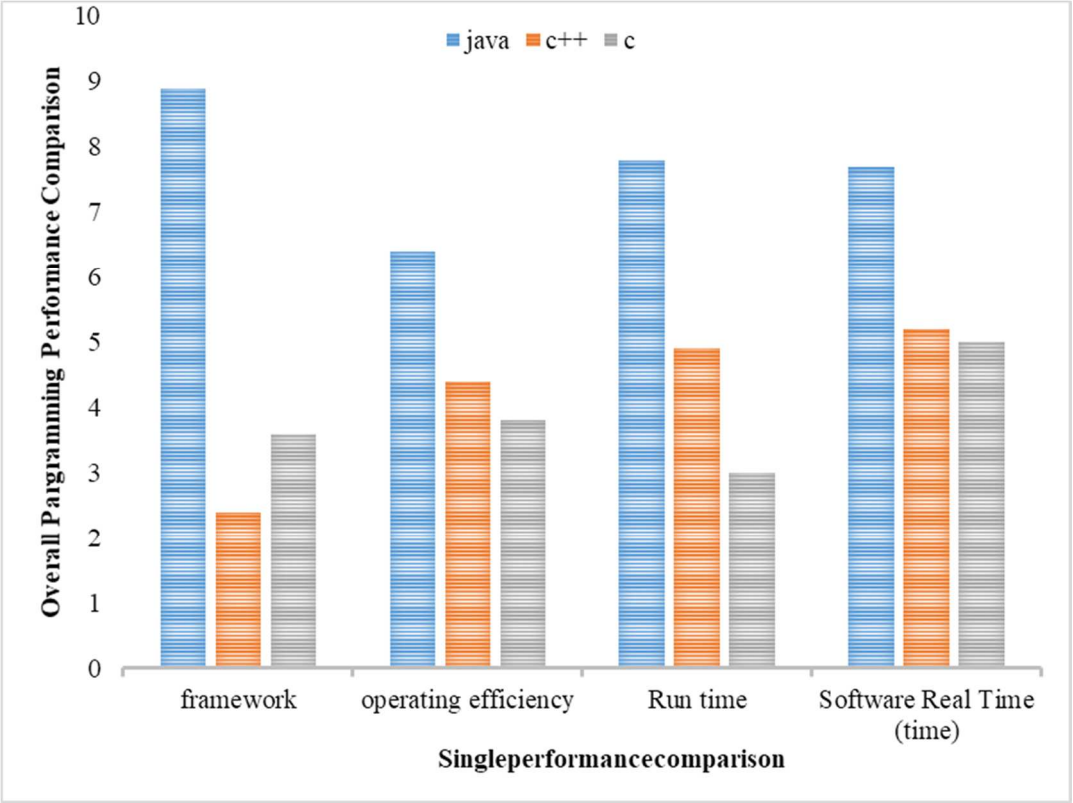

Fig. 2. Performance Analysis Chart

V. JAVA INTEGRATED VF PROGRAMMING LANGUAGE

A. Java Language Features

Java language is a standardized object-oriented programming language, widely regarded as a representative traditional programming language. It can not only be used for web development, but also for desktop applications, mobile applications, embedded applications, and other fields. The Java language has high reliability, portability, scalability, and security. The cross platform nature of Java virtual machine (JVM) can run on different operating systems and hardware platforms. Java syntax is simple and easy to learn, and the code structure is clear and easy to understand. Due to the high-speed automatic memory management mechanism of the Java language, Java programs written can achieve high performance and scalability.

B. Java and VF Programming Language Integration Solution

The integration solution between Java and VF programming languages adopts Code generation technology to convert VF programming language into Java code. This integration solution can use the API of the VF programming language in the Java IDE, generate Java code, and then run the code to obtain the functionality of the VF programming language. The Java language has the advantages of being easy to develop and learn, which can promote a wide range of developers to master the VF programming language faster. In addition, the VF programming language can also use Java's Standard library and built-in methods, and use Java's high-quality internal structure and performance to obtain high-quality code and reduce Software bug.

C. Application of Code generation technology

Code generation technology is a method of generating code that can automatically convert reference models into computer recognizable code. The integration solution between Java and VF programming language allows developers to use the API of VF programming language. Afterwards, Code generation technology will analyze the code based on the provided text and automatically generate the structure of the code. However, high-quality code generation tools require strong compression algorithms, optimization algorithms, and reliability to meet complex generation requirements, while maintaining high levels of accuracy, efficiency, and reliability. The application of this technology can accelerate the coding process and improve quality, readability, and maintainability, but it also requires careful use to minimize unnecessary code generation to ensure code efficiency and reliability.

VI. CONCLUSION

With the continuous progress of science and technology in China, JAVA, a computer high-level programming language, is used more and more in the research and development of related software. Moreover, as a product designed for external hardware, JAVA language has become increasingly widely used in different fields of computer software development in the Internet due to its strong security, convenience, and high independence, as the Internet continues to move forward. Therefore, in the process of research and development of relevant software, we can effectively use the simple and convenient features of high-level programming language JAVA to strengthen external equipment, and also use the security of programming language to ensure the stable operation of visual design. At the same time, we can use the independence of JAVA programming language to promote the independent and high-

speed operation of each application system in the process of computer software development, And then jointly promote efficient development of computer software.

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