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The Crucial Role of Programming Languages in Today's World

Kaustubh Khangate

kaustubh1864@gmail.com

K.J. Somaiya Polytechnic, Mumbai,
Maharashtra

Anuj Kishor Rahatwal

anuj_r@somaiya.edu

K.J. Somaiya Polytechnic, Mumbai,
Maharashtra

Paras Vishal Kanade

paras.kanade@somaiya.edu

K.J. Somaiya Polytechnic, Mumbai,
Maharashtra

ABSTRACT

The research paper explores the evolution and crucial role of programming languages in shaping the digital era, emphasizing their significance in diverse fields such as technology, education, innovation, and global connectivity. Additionally, it delves into the current trends in programming languages, with a focus on Python and JavaScript, and highlights the importance of mobile application testing in ensuring a seamless user experience. The conclusion underscores the integral role of programming languages in our technologically-driven society.

Keywords: Programming, Technology, Mobile, Applications, Digital, Transformation

I. INTRODUCTION

Programming languages form the foundation of the digital era, playing a pivotal role in shaping the technological landscape. The evolution of programming languages is a captivating journey that spans decades, reflecting the dynamic needs of computer science, software development, and the broader global society.

The origins of programming languages can be traced back to the mid-20th century when computers were in their infancy. Machine language, consisting of binary code understood by computers, was the earliest form of programming. However, it was complex and not practical for most programmers.

This led to the development of assembly languages, which used mnemonics and symbols to represent machine code instructions, making programming more accessible. As the need for higher-level abstractions grew, the first high-level programming languages like Fortran and Lisp emerged in the late 1950s and early 1960s. These languages introduced concepts such as loops and conditional statements, making programming more efficient and readable.

Growing Significance in Contemporary Society:

In the contemporary world, programming languages have transcended their origins in computer science laboratories to become indispensable tools in various facets of society. The ubiquity of software and digital technologies underscores the growing significance of programming languages. Here's how:

Technology Proliferation:

Programming languages power a vast array of technologies, from mobile applications and web development to embedded systems and artificial intelligence. The versatility of languages allows developers to cater to diverse technological needs.

Digital Transformation: In the era of digital transformation, businesses leverage programming languages to automate processes, analyse big data, and enhance customer experiences. This has redefined industries and business models.

Education and Skill Development: The importance of programming languages in education is evident as coding becomes a fundamental skill. Schools and online platforms teach languages like Python as part of the curriculum, empowering individuals with problem-solving and computational thinking skills.

Innovation and Research: Programming languages play a crucial role in fostering innovation. They enable researchers to implement and test new algorithms, simulate scientific experiments, and contribute to advancements in fields like healthcare, finance, and space exploration.

Global Connectivity: The interconnectedness of our world relies on programming languages to maintain and enhance global communication. Social media platforms, communication tools, and e-commerce systems are all built on the foundation of programming languages.

II. DEVELOPING MOBILE\PC APLICATIONS

The most widespread operating systems for mobile phones are:

- Android (Google)
- iOS (Apple,
- Windows (Microsoft)

In the world, currently the most used are Android OS (Figure 1). With the advent of Android OS 2010, the distribution was growing to 72.88% in 2017 and the Apple iOS is using about 19.37% [3]. The present mobile phones are increasingly used because they are cheaper, which contributed to the development of a large number of mobile apps compared to iOS mobile phones.

Apps that are created for mobile devices such as mobile phones and tablets can be divided into three main groups:

1. Native apps,
2. Web apps and
3. Hybrid apps.

The differences between these types of apps are as follows:

Native app must be downloaded and installed only on certain OS. They can be used in the installation on a mobile device in offline mode. This app are used for informational and productivity purposes. The most used are calendar, contacts, calculator, email, mobile games, GPS and weather information.

Web apps are apps that can be accessed on the Internet by using the appropriate browser. Download and installation of these types of apps is not necessary, because the apps are on the web server and can always be used when accessing the Internet. The number of android app are growing so fast (Fig. 2). The main reason is that a large number of people have Android smartphones, so they can use Android apps.

Hybrid apps are a combination of native and web apps. They are usually created using standard web tools such as HTML, CSS and JavaScript. These apps must be downloaded and installed on mobile device, in order to provide a possibility to be used.

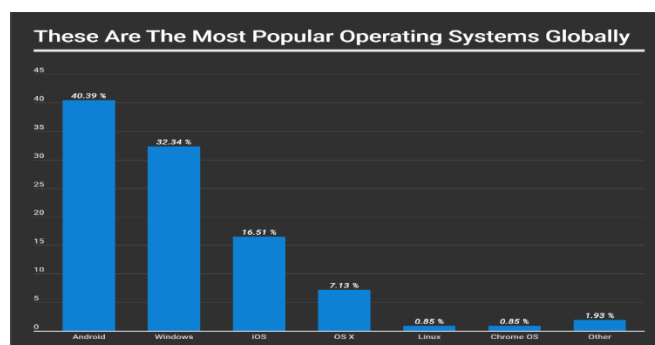


Figure 1: The share of Mobile & PC operating systems worldwide

Current Trends in Programming Languages:

In the fast-paced world of technology, programming languages evolve, and some become more popular than others. Understanding these trends helps us stay updated with the tools and languages that are widely used in today's tech landscape.

Python: Python is like a superhero in the programming world right now. It's known for being easy to read, write, and understand. Many big companies, including Google, Instagram, and Spotify, use Python for their software. One of the reasons for its popularity is its versatility. You can use Python for web development, data analysis, artificial intelligence, and even make cool games.

JavaScript: JavaScript is the language that makes websites interactive and dynamic. If you've ever seen a website with moving elements or a popup message, that's probably thanks to JavaScript. It's like the magic wand of the web. JavaScript has been around for a while, but it's still incredibly important. With the rise of web applications, JavaScript's popularity has skyrocketed.

Coding Languages for the Web: HTML and CSS are the dynamic duo of web development. HTML is like the backbone – it structures the content on a web page. CSS is the stylist – it makes things look good. They are not as powerful as Python or JavaScript, but they are essential for building websites.

Mobile App Development: When it comes to building apps for our smartphones, languages like Java (for Android) and Swift (for iOS) take the spotlight. These languages allow developers to create the apps we use every day, from social media to games.

Data Crunching with SQL: For those who love dealing with data, SQL is a go-to language. It's like a super organized librarian for databases. SQL helps manage, retrieve, and update data in databases, making it crucial for businesses and organizations that deal with large amounts of information.

- Mobile Application Testing: Ensuring Apps Work Like Charm

Imagine using a mobile app, and suddenly it crashes or doesn't do what it's supposed to. That's where mobile application testing comes in – it's like giving apps a checkup to make sure they're healthy and work smoothly. Let's dive into what this testing thing is all about.

1. What is Mobile Application Testing?

Mobile application testing is like quality control for mobile apps. Before an app lands on your phone, it goes through a series of tests to make sure it behaves well, doesn't have bugs, and provides a great user experience.

2. Why is it Important?

Think of testing as the superhero shield that prevents apps from causing trouble. It's crucial because:

- User Satisfaction: Testing ensures users have a smooth experience. No one likes apps that crash or freeze.
- Bug Detection: It finds and fixes bugs – those pesky issues that make apps misbehave.
- Compatibility: Testing ensures the app works on different devices and operating systems. What works on an iPhone should work on an Android too!
- Security: It checks for security loopholes, making sure your data stays safe.
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3. Types of Mobile Application Testing:

- Functional Testing: This checks if the app does what it's supposed to. Like, does the 'Send' button in a messaging app actually send messages?
- Performance Testing: It tests how fast the app is, how much memory it uses, and if it can handle many users at once.
- Usability Testing: This checks if the app is easy to use. Can your grandma navigate through it without getting confused?
- Compatibility Testing: Ensures the app works on different devices, screen sizes, and operating systems.
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4. The Testing Process:

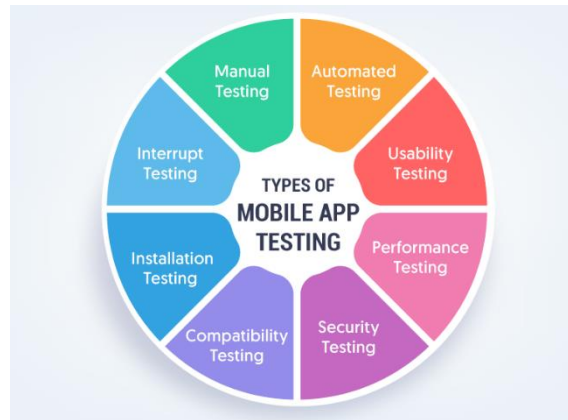
- Planning: Testers figure out what to test, how to test it, and on which devices.
- Execution: They run the tests, clicking buttons, entering data, and checking if everything works as expected.
- Analysis: Testers review the results, identify problems, and figure out how to fix them.
- Reporting: They document everything – what worked, what didn't, and how to make it better.
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5. Tools Used in Mobile App Testing:

- Appium: Used for automated testing on both Android and iOS.
- XCTest and Espresso: Tools specifically for testing on iOS and Android, respectively.
- Selendroid: An open-source automation tool for Android.
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6. Challenges in Mobile App Testing:

- Device Fragmentation: There are tons of different devices out there. Testing on all of them is like testing a recipe in every type of oven.
- Operating Systems: Apps need to work on various versions of Android and iOS. Each version can have its quirks.
- Network Conditions: Testing how the app behaves with slow internet or in places with low network coverage.



III. CONCLUSION

In the journey through the evolution and significance of programming languages, it becomes clear that these languages are not just tools for developers; they are the backbone of our digital existence. The historical perspective unveils a timeline marked by innovation, from the birth of machine languages to the rise of versatile high-level languages. The contemporary relevance of programming languages is not confined to the realms of computer science; they permeate every aspect of our technologically driven society.

IV. REFERENCES

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