



IJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 Issue: V Month of publication: May 2021

DOI: <https://doi.org/10.22214/ijraset.2021.34185>

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Generation Z Students: Why Python Programming is their Best Bet...

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Abstract: Computers have become an integral part of one's life. From the time, the programmable computers were invented in 1940s, the knowledge and usage of the computer programming has undergone a paradigm change. Newer programming languages and simplified programming codes have made the art of programming more user-friendly. With artificial intelligence and cloud computing being an integral part of everyone's software armamentarium, the digitalization, especially the programming languages, have brought people around the whole business world, closer.

Python is a programming language, that has become one of the much sought-after language in the recent past. The ease of usage, beginner friendly programs, scalability and reproducibility have made it a popular language amongst the programmers all over the world. In this manuscript, I shall highlight the user-friendly nature of Python language and also discuss how this language is best suited for Generation Z students across the world.

Keywords: program, python, computer, software, javaScript

I. INTRODUCTION

It is needless to say that computers are ubiquitous and indispensable in today's fast paced world. But how many of us would know that the use of computers today is far different from what its inventors envisaged them to be? In the early 1820s, just before the beginning of the first industrial revolution, a decrease in need for mathematicians who were used as human calculators was observed. This was because of the invention of the 'Difference engine' in 1822 which was able to calculate polynomial functions in lesser time. This inspired Charles Babbage to invent the Analytical engine (1834) which was the first machine that relied on basic arithmetic logic. This in turn led to further innovations in the 20th century even though the project was left unfinished. This is why Charles Babbage is credited to be the Father of computers. But these days, computers have become an integral part of everyone's lives and we use them to talk text, study, watch movies and TV shows and listen to music.

Programmable computers were first invented only in the 1940s. They were the result of a culminated effort of all the computer scientists spanning over centuries. It was the ENIAC which was developed using binary and Boolean logic and was meant to be a direct successor of the Turing machine. It was the most advanced computer of that time and was capable of many calculations per second. With this invention the first-generation of computers were born [1].

It is this rich history that motivates and inspires me and many of the computer scientists to learn and advance in the field of computer science to make life easier and simple for the human race. In this manuscript we will be discussing about programming in general and the growing need (amongst the Generation Z students) for learning Python as a programming language.

II. WHO BELONGS TO GEN Z?

From the late 1800s till date, every 15 to 20 years is classified as one generation. Fig 1 illustrates the various generations that we have seen over the past century. The Millennial generation that preceded the Gen Z is also called as Generation Y.

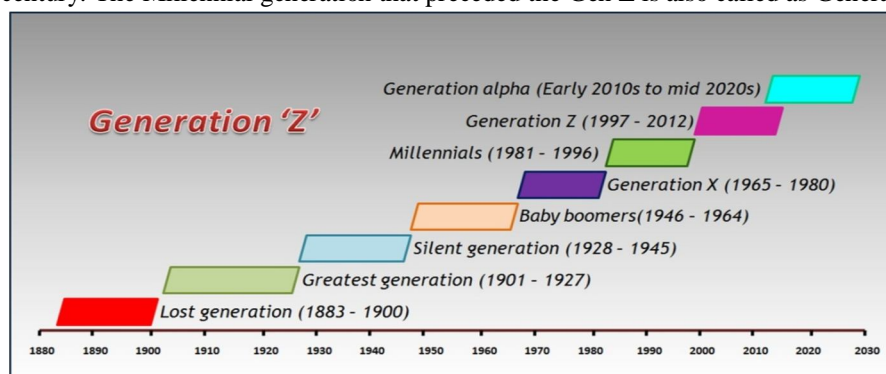


Fig 1: Summary of various generations in the past 150 years

Gen Z is a collective cohort consisting of all those who are born between the late 1990s and the early 2010s. This group of members falls between the Millennial and the Gen alpha generations [2]. The peculiarity of this Gen Z is that they grew up with portable digital devices and easy access to internet around them. Turner called them as, “Digital natives”, as they grew amidst a rapidly changing digital technology [3]. An informal term that describes Gen Z members is, ‘Zoomers’.

There is still a lack of consensus on who all belong to the Generation Z. Many accept those borne after 1993 as Gen Z. Randstad Canada describes those born between 1994 and 2010 as Gen Z. McCrindle Research centre, Australia defines those born between 1995 and 2009 to be belonging to this generation. McKinsey, in his article on Generation Z and its implications for companies, describes those born between 1995 and 2010 to be belonging to this generation. Forrester, in his research on Gen Z, called those born after 1997 to be Gen Z members.

Teaching Generation Z students has got its own inherent challenges too. Cilliers, in his study on the challenges faced in teaching this generation students, observed that the main challenge was to adopt newer strategies beyond the traditional teaching-learning methods [4, 5].

III. WHAT EXACTLY IS PROGRAMMING?

Programming is a way of communication with computers. It is basically writing instructions in a language that is easily understandable to any digital device which is very much similar to vocal languages used by humans. And just like how we have many different languages to communicate with each other, we have many different programming languages too. Some of these are explained below.

For example, if you want to host a server using the internet that is accessible to all, you need to use a Database to store all the data that you want to share. And often we deal with billions and trillions of data in the world. In order to make things simple and retrieve data almost immediately, we use query languages connected to a database manager. One of the most common and popular is MySQL.

Creation of a website is not so difficult. All websites today have 3 major components, these are HTML, CSS and JS. HTML (Hyper Text Markup Language) allows us to write code and display it as a website. But it only comes with basic webpage designs. In order to make a website more attractive and appealing, we use CSS (Cascading style sheets) which offers much more styling techniques. Finally, implementation of JavaScript enables the webpage to have sliding, rolling and popup animations, which further enhances the interactivity to a website. We have programmers who are involved in Machine learning, Artificial intelligence, Data analysis, Software development, Full stack developing, Ethical hacking, Database managing, and much, much more.

IV. MY EXPERIENCE (AS GEN Z) WITH PROGRAMMING

I was always fascinated by the digital world. I would look up to websites and wonder how these might have been created. And all that curiousness finally got an answer when I was in my first year of high school. We were taught the fundamentals of creating a webpage using HTML and I immediately got drawn into it. When I created my first webpage, I felt a door that led to infinite possibilities open up in front of me. I spent many hours practicing and remembering the code for making a proper webpage and I enjoyed it.

And then in the second year of high school, we learnt CSS which gave us the power to manipulate and design the webpage elements in whatever way we wanted to. At this point we all felt like programming Pros until I was introduced to C. Yes, it’s the letter C. Its one of the oldest programming languages that is still implemented in many of the existing operating systems such as Microsoft windows, Linux, Mac operating systems and are found in embedded systems.

I was thrown overboard by how different it was from HTML and CSS. This is how I got a glimpse of what real programming felt like. And I was at first overwhelmed by the complicated code structure of the language. But soon it got better as I learnt to write few basic programs.

But it wasn’t until my 3rd year of high-school, did I get into python. After learning a bit of C-language, we were taught core-python after a long break due to the global pandemic in 2020. Python did not seem that difficult at first but it did take a while for me to get used to actual programming.

V. PYTHON AND ITS LOGO

Python is a programming language, invented by Guido Van Rossum in 1991. Various programming paradigms are being used in this language. The logo of Python was designed by Tim Parkin and is the registered trademark of Python Software Foundation. Fig 2 depicts the logo of python.



Fig 2: Python logo with the emblem and transcript.

The speciality of this logo is its instantly recognizable visual identity. The logo is an iconic emblem, with an image on the left and the transcription on the right. The image comprises of coloured (blue and yellow) twin snakes, with a broad head and short tail, each facing opposite directions (cranial and caudal). The inspiration for this logo is said to have been derived from the ancient Mayan drawings. The transcription on the right of the logo is all in lowercase, with the upper horizontal bar of the alphabets ‘T’ and ‘H’ being diagonally slit.

VI. HOW NOT TO GET INTIMIDATED BY PROGRAMMING USING PYTHON?

If you are new to programming or if you have just started to code, then chances are that all this might seem too much to comprehend. But the most important analogy to remember that was cited earlier is that these programming languages are just like vocal languages. One will definitely get better if he/she really wants to speak in that language. All these are really and truly interesting to learn. And finally, we all have an ace up our sleeves. And that ace is PYTHON.

Python is a beginner friendly language that anyone and everyone can learn. According to popularity ranking, python is the fastest growing, one of the most popular languages, fastest growing and most demanded by companies [6]. Many companies such as Netflix, Google, Facebook, Instagram, Spotify etc. have some or most of its code written in python. What makes it interesting is that its code structure is the most simple and comprehensible than all the other languages out there. Compared to other programming languages like JavaScript, C++, Java, Pearl, etc., Python is far more superior in terms of processing speed and the time taken to write a program.

And also, Python has it all. One can create webpage applications, software applications, automated chat bots, web scrapping tools and much more. But where python shines the most is when it comes to Machine learning, Artificial intelligence through neural networks and Data visualization. These concepts require an in depth understanding of how computers systems and the language itself work and hence we will not be discussing about them in this manuscript.

In my opinion python is the best beginner-friendly language and we can venture out later on once we are familiarized with basic programming concepts. Programming is not difficult in any way. It is quite tough to understand what exactly is happening behind the scenes but once we figure it out everyone can code like a champion. Following is an example that illustrates the simplicity and ease of coding in python language.

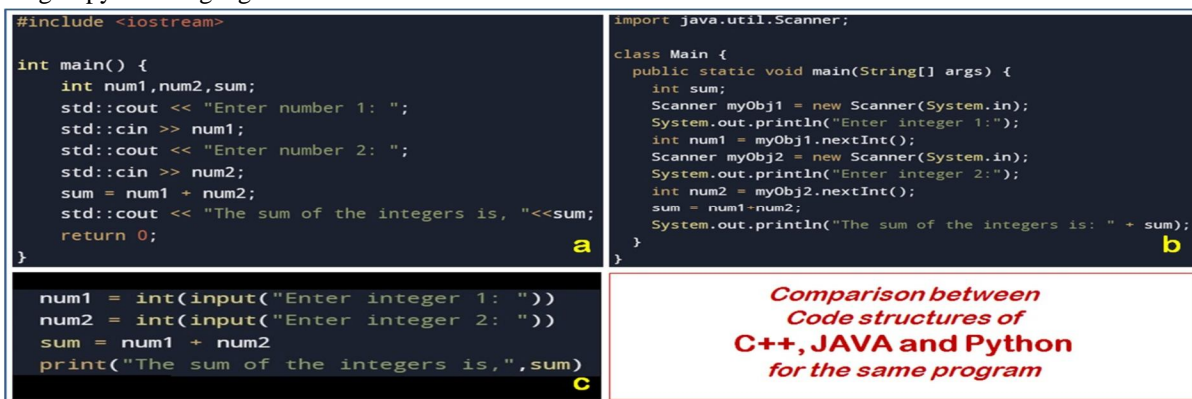


Fig 3: Comparison between the code structures of three different coding languages, namely C++ (3a), JAVA (3b) and Python (3c)

The above figure illustrates the ease of programming in python language. A simple mathematical calculation involving addition of two inputted integers is shown in Fig 3. Though all 3 different languages arrive at the common fixed output, the programming with python is simple, straight-forward, less time consuming, less cumbersome, user-friendly and appears elegant.



VII. CONCLUSIONS

The Gen Z members appear to be the most competitive and competent of all generations. Their ability to pick up newer developments and innovations quicker than their elder peers makes them more unique and distinctive. This generation is more ambitious and striving to achieve greater heights. Python programming, because of its ubiquitous nature, user-friendly application, simplicity and scalability makes it arguably one of the most popular and most preferred object-oriented programming language. Being one of the most versatile, dynamic and durable language, Python programming makes it best suited for generation Z students.

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