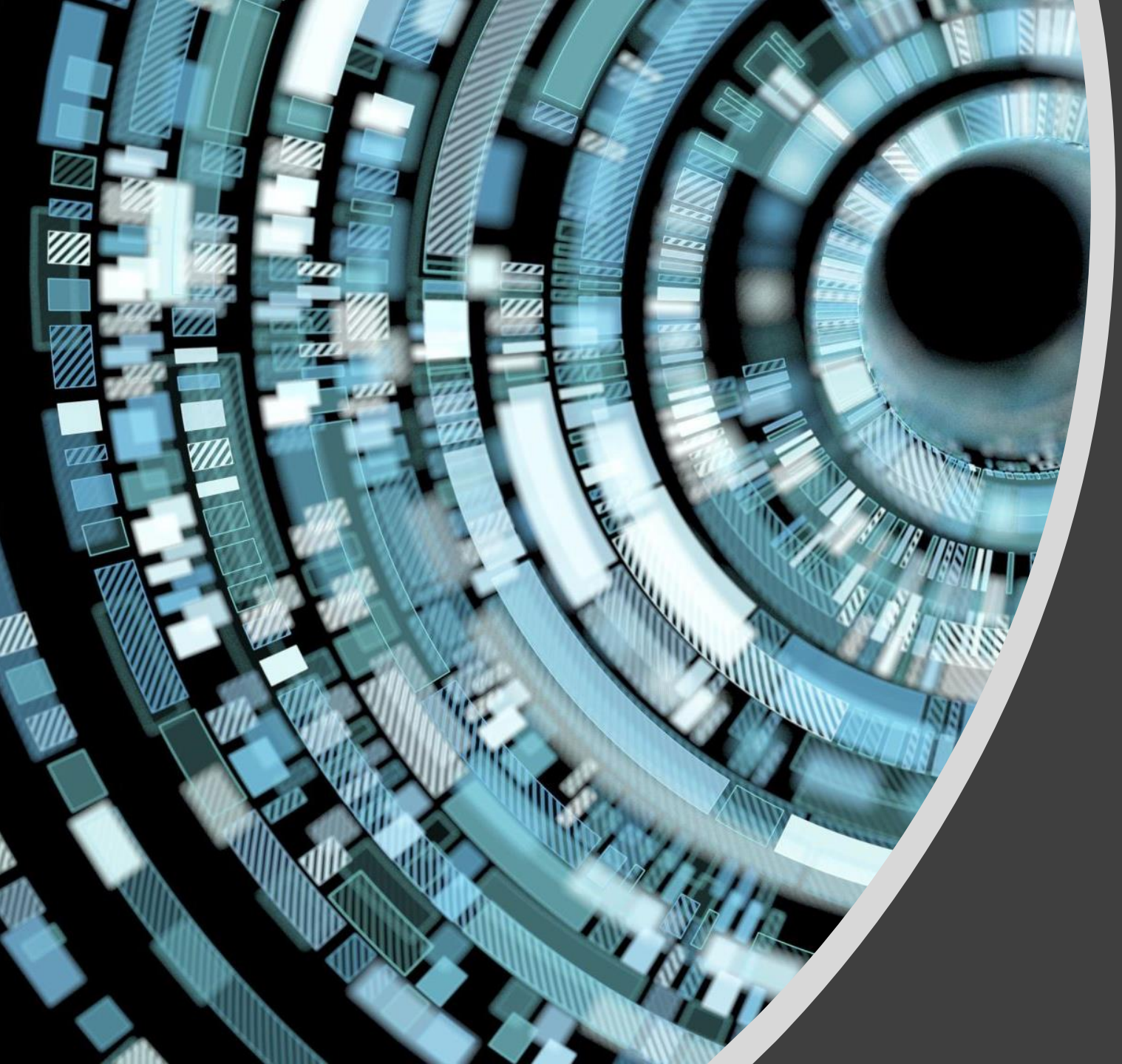


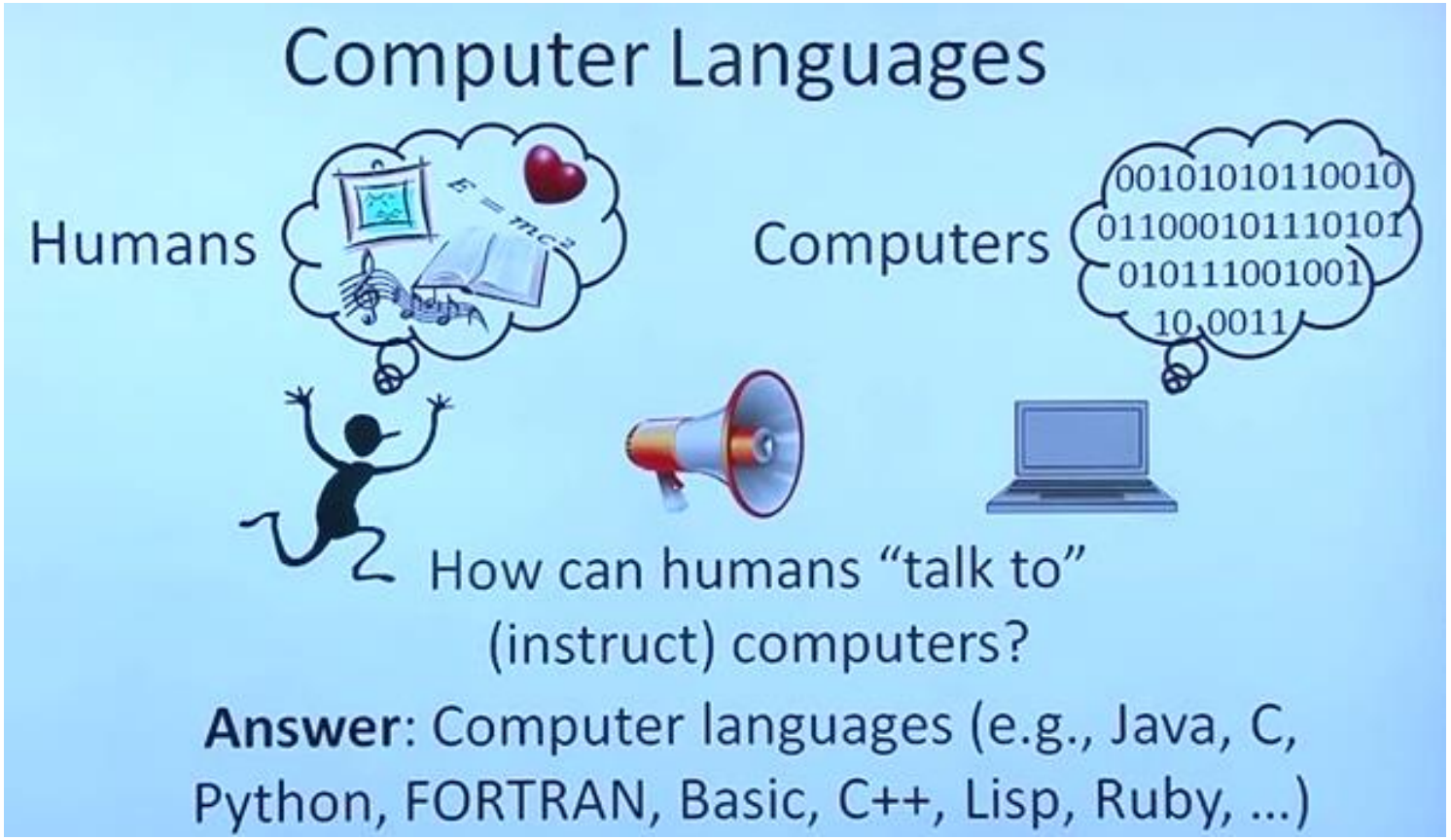
Structured Programming: Introduction

HK Rana

Contents

- Why we need programming languages?
- Some myths on programming languages
- What is C?
- Why C is important?
- C’s features, pros, and cons
- What is the need to explore this language?

Why we need programming languages?



- Programming is using a language that a machine can understand in order to get it to perform various tasks. Computer programming is how we communicate with machines in a way that makes them function how we need.

Some myths on programming languages

1- Programming starts and ends on the computer. You must be continually writing code at the computer to be working.

- In fact, before the coding phase, programmers spend serious time identifying the problem and deciding on the solution.

2- You have to be a mathematician to write code.

- Not mandatory. Knowing the logic, analyze the problems by dividing them into small pieces, show interest, be patient, and know which libraries to use and where to look for answers when stuck.

3- Programming languages are mathematics

- Not at all. We can perform mathematical tasks using programming languages, but it is not mathematics.

4- To be able to write code, you must have an IQ higher than 160.

- No, you don’t need to be a genius. I know many programmers who are not. It is enough that you are an analytical thinker, and you go at it.

Some myths on programming languages

5- It is necessary to memorize all the syntax to become a good programmer.

- Today, it seems that there is no more need to memorize anything thanks to the advanced tools and libraries.

6- Women cannot write good code.

- Of course, they can. Even the first programmer of the world, Ada Lovelace, is a woman.

7- The fastest programmer is the best programmer.

- The most important thing is not to be a 10x programmer, but instead to solve the problem at hand and work effectively.

8- It is sufficient to learn a single programming language and be an expert in it.

- It is excellent that you are an expert in a programming language. However, you may miss the chance to work on some projects because some languages are particularly preferred, and you don’t know that language.

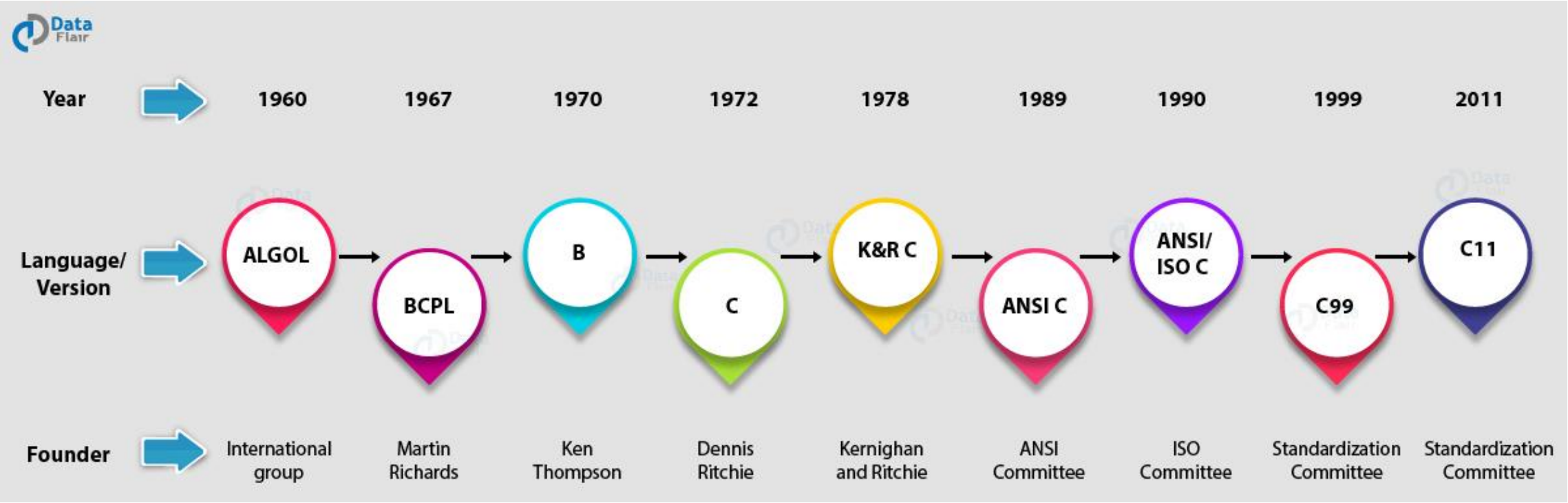
9- You don’t need to communicate with anyone when you are a programmer.

- Except for the times you focus on coding, you often need to communicate with other programmers, project and product managers, and even sales, marketing, and customer relations departments.

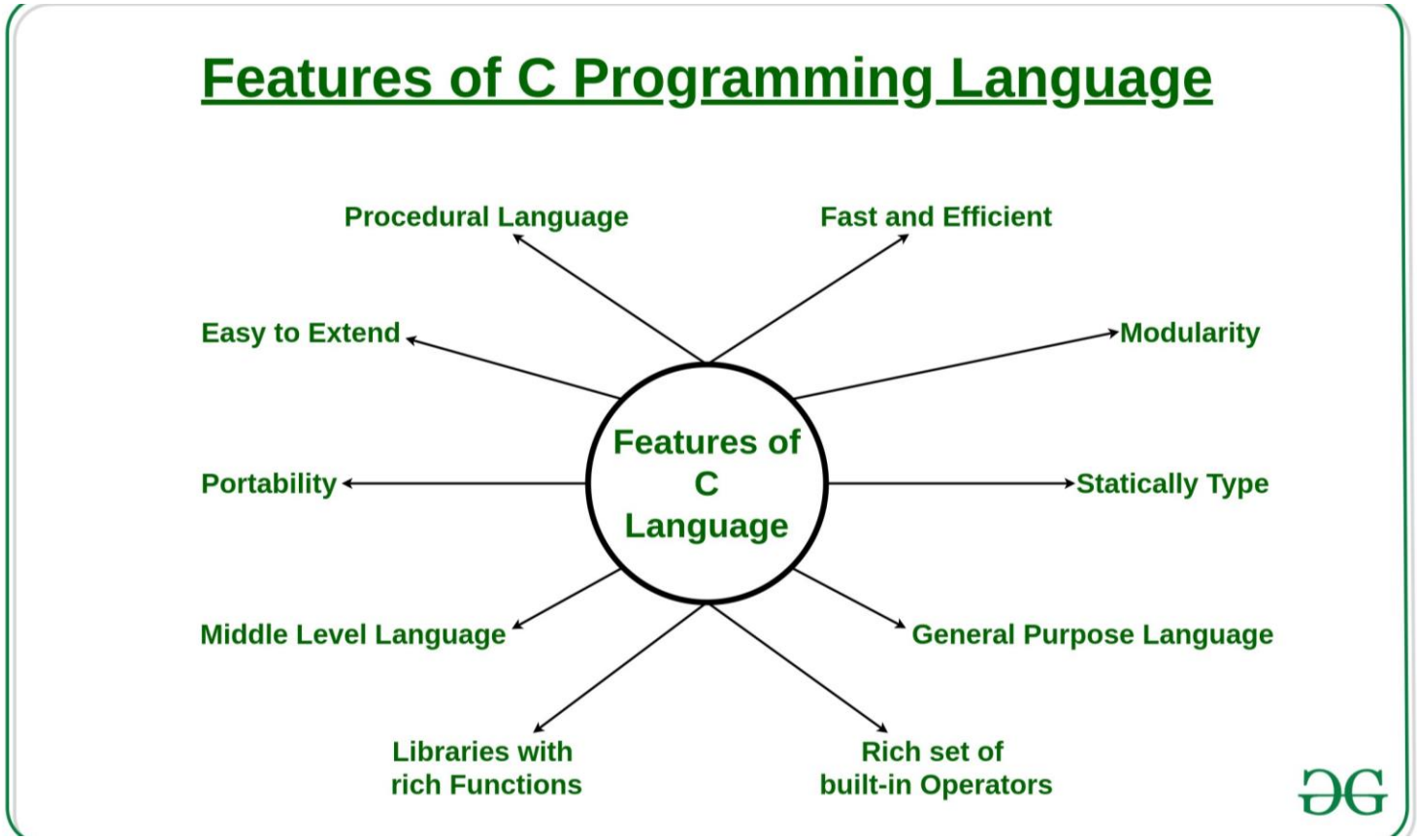
What is C?

- C is a procedural programming language as well as a general-purpose programming language
- Developed by **Dennis Ritchie at AT&T's Bell laboratories in 1972**.
- It **is an amazing and simple language** that helps you develop complex software applications with ease.
- It is considered as the mother of all languages.
- C is a high-level programming language that provides support to a low-level programming language as well.

History of C programming

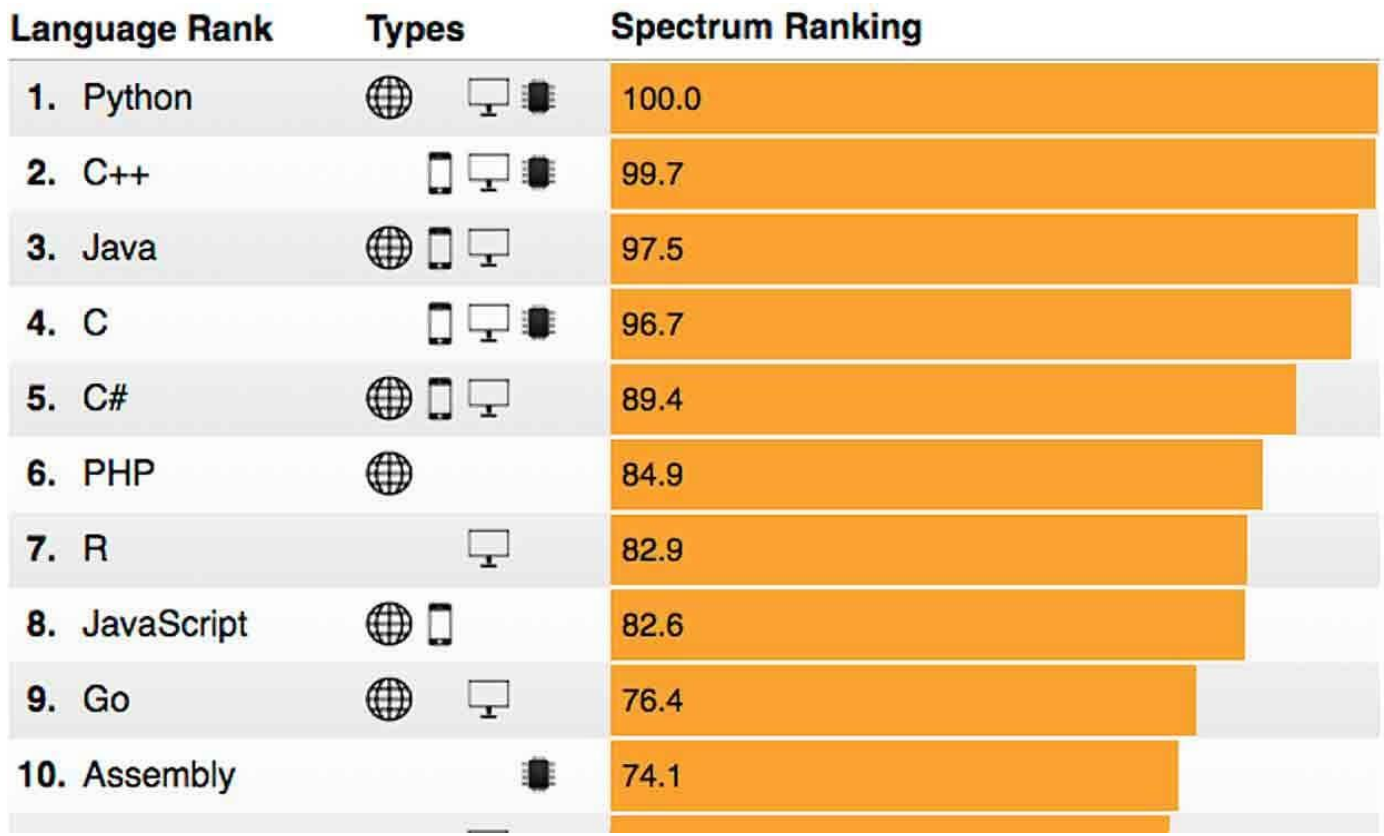


Why C?



- The **C compiler** *supports both assembly language features and high-level language and hence, it is best suitable for writing both system applications and most of the business packages.*
- *It is a portable language and hence, once the code is written, it can run on any computer system. C is basically used for developing Operating Systems. The first Operating System developed using C was Unix.*
- Although, assembly language provides relatively higher speed and maximum control over the program it lacks portability.

Why C?


Language Rank
Types
Spectrum Ranking
1. Python
100.0
2. C++
99.7
3. Java
97.5
4. C
96.7
5. C#
89.4
6. PHP
84.9
7. R
82.9
8. JavaScript
82.6
9. Go
76.4
10. Assembly
74.1

Features of C Programming

- **Simple and efficient –** The syntax style is easy to comprehend. We can use C to design applications that were previously designed by assembly language.
- **Memory Management –** It allows you to allocate memory at the runtime, that is, it supports the concept of dynamic memory allocation.
- **Dynamic Memory Allocation-** When you are not sure about the memory requirements in your program and want to specify it at the run time, that is, when you run your program, you can do it manually.
- **Pointers –** C language provides a pointer that stores the memory address as its value. Pointers are useful in storing and accessing data from memory. We will study this in detail in our upcoming tutorials.
- **Case Sensitive –** It is pretty clear that lowercase and uppercase characters are treated differently in C. It means that if you write “program” and “Program”, both of them would connote different meanings in C. The ‘p’ in “program” is in lowercase format whereas, the ‘P’ in Program is in uppercase format.
- **Compiler Based –** C is a compiler based language, that is, to execute a code we first need to compile it.
- **Structure Oriented/Modular –** C is a structured programming language. This means you can divide your code and task within a function to make it interactive. These functions also help in code reusability.

Advantages of C Programming Language

- **Portable** – It is easy to install and operate and the result file is a .exe file that is easy to execute on any computer without any framework.
- **Compiles faster** – C has a faster compiler that can compile 1000 lines of code in seconds and optimize the code to give speedy execution.
- **User-defined functions** – C has many header files that define a lot of functions, making it easier for you to code. You can also create your functions; these are called user-defined functions (UDFs).
- **C has a lower level of abstraction** – C is a very clear and descriptive language. You can, in a way, directly see into the machine without any conceptual hiding and so learning C first makes the concepts very clear for you to proceed.

Applications of C Language

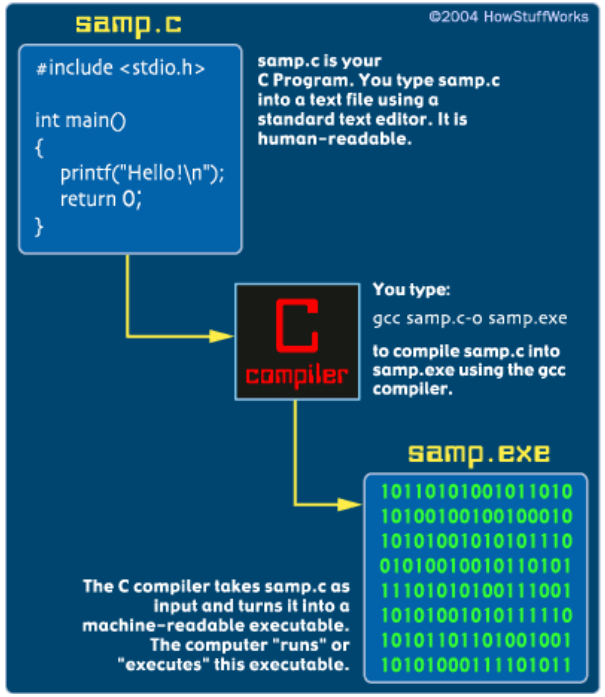
- It is used in the development of Operating Systems and Embedded Softwares. For example, the Unix Kernel was born out of C as discussed earlier.
- It comes in handy when designing a compiler for other programming languages.
- Data structures and algorithms are implemented in C
- It acts as a base language to develop new languages. For instance, C++ was developed from C.
- Computer applications can be developed using C.
- Firmware is designed for electrical, industrial and communication appliances using C.

Career Aspects in C Programming Language

- There are **dozens of jobs available i**f you are clear with your programming concepts.
- Companies that work on embedded programming can be an excellent option.
- If you are interested in **Robotics** and other security devices or electronic devices, you should learn c programming to develop basic algorithms for various microcontrollers.
- You can become a Software Engineer or a Team Leader if you are good at Data Structures.

Companies that Use C

6. What is a Compiler in C?



What is IDE?

Integrated Development Environment or IDE for short is an application or software which programmers use for programming.

It helps a programmer to program easily by providing all comprehensive facilities required for the development of software.

Some renown IDEs for C are (check next slide)

What is IDE? (Contd.)

Relevant links

- Youtube link: https://www.youtube.com/watch?v=GWJqsmitR2I
- Website link: https://www3.ntu.edu.sg/home/ehchua/programming/howto/CodeBlocks_HowTo.html

How to become a good programmer?

1. **Work on Basics**
2. **Start putting question tags (why, how, what) with every set of code you write**
3. **You learn more by helping others**
4. **Write simple, understandable but logical code**

Good code is its own best documentation. As you're about to add a comment, ask yourself, "How can I improve the code so that this comment isn't needed?" ~Steve McConnell

5. **Spend more time in analyzing the problem, you'll need less time to fix it**

If you cannot grok the overall structure of a program while taking a shower, you are not ready to code it. ~Richard Pattis

How to become a good programmer? (Contd.)

6. **Be the first to analyze and review your code**
7. **Don’t dismay yourself by looking at changing technology world**
8. **Work-arounds don’t work for longer time**
9. **Read documentation**
10. **You can learn from others code as well**

рахмат
danke
謝謝
ngiyabonga
teşekkür ederim
spas
Баярлалаа
mersi
kia ora
barka
welalin
tack
mahalo
tapadh leat
спасибо
faafetai lava
vinaka
blagodaram
dank je
misaotra
paldies
grazzi
спасибі
matondo
thank you
gracias
kiitos
dankie
nanni
nandri
dhanyavad
mauruuru
köszönöm
bedankt
хвала
asante
manana
hvala
gràçie
bayarlalaa
dankon
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terima kasih
shukriya
мерси
kam sah hamnida
rahmat
dhanyavadagalu
mercé
diolch
ευχαριστώ
তোমাকে ধন্যবাদ
감사합니다
xièxie
merci