<u>Basics of Programming Language</u>

🔸 Java is a high-Level, general purpose and object-oriented programming language.
   a. High-level: as it is easy to use and learn.
   b. General purpose: used to develop any kind of programs
   c. Object-oriented: as it deals with objects and classes.

🔸 <u>**Why learn JAVA?**</u>
   - High-level
   - General purpose
   - Object-oriented
   - Very popular
      o A huge online community for getting help.

   - Java can be used in android development.
   - Java is C-based language.
      o Can learn C/C++/C# easily.

🔸 <u>**What is Program (Software)?**</u>
   - Set of Instructions that tell a computer what to do.
   - We use programs to interact (or talk) with computers.
   - To write program we use Programming Languages.

🔸 <u>**What are Programming Languages?**</u>
   - Languages used to write programs.
   - Computers are machines and they do not understand human languages.
     So, programs are written in a language that a computer can understand.
     That language is known as Programming Language.

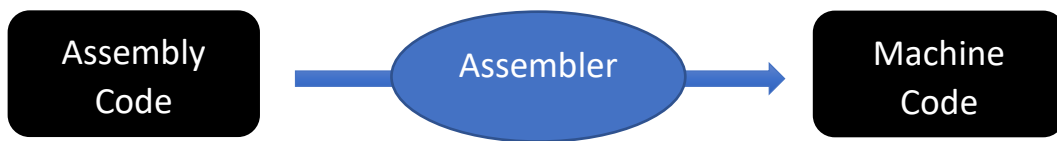## 🞜 What is Machine Language?

- A computer's native language.
- It uses zeros & ones (0 & 1)
    - That's why it is known as Binary Language.

- For Example:
    - To add 2 and 3 and get the result, the instruction in binary is: `1101101010011010`

- From the above example, we can say it is very hard to use.
- It is also Machine Dependent i.e.; it will work on one machine may not work on other.

- IMPORTANT POINTS:
    - Every Instruction should be written in machine language before it can be executed.
    - But we will write instructions in high-level languages which must be translated to machine code instructions.

🞜 What is Assembly Language?

- It was developed to make programming easier before High-level language were introduced.
- It is also machine dependent.
- In this, Keywords were introduced.
    - For Example:
        - To add 2 and 3 and get the result:
            `Add 2, 3, result`

          The above instruction means add 2 and 3 and store the result in 'result'.

        - The above instruction can not be executed as it is not Machine Code.

- A program called 'Assembler' translates assembly code to machine code.

What is Assembler?
- Converts 'Assembly Code' to 'Machine Code'.

Assembly Code	→ Assembler →	Machine Code

What is High-Level Language?
- A new generation of Programming languages
- Uses English Words that's why easy to learn and use.
- Machine independent i.e., your program will run on different machines.
- Each instruction in high-level languages is called 'Statement'.
- A program written in a high-level language is called a 'source program' or 'source code'.
- For Example:
  - To add 2 and 3 and get the result:
    - In Java,
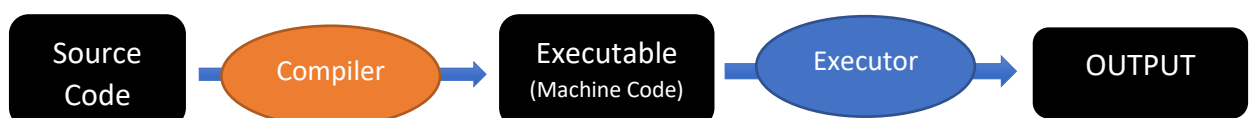   ```
      result = 2 + 3;
      ```
      This is a statement.
    - Every statement (or instruction) must end with a semi-colon (;).
    - This instruction can also not be executed. This must be translated into machine code first.

- A 'Compiler' or an 'Interpreter' is used to translate source code to machine code.

## What is a Compiler?
- Translates all the 'Source Code' into 'Machine Code'.
- All the codes are taken and translated at once.

| Source Code | → Compiler → | Executable (Machine Code) | → Executor → | OUTPUT |
|---|---|---|---|---|

## 🔸 What is an Interpreter?

- Translates each statement into machine code and executes it right away.
- Translated line by line.

```
Statement  ───►  Interpreter  ───►  OUTPUT
```

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