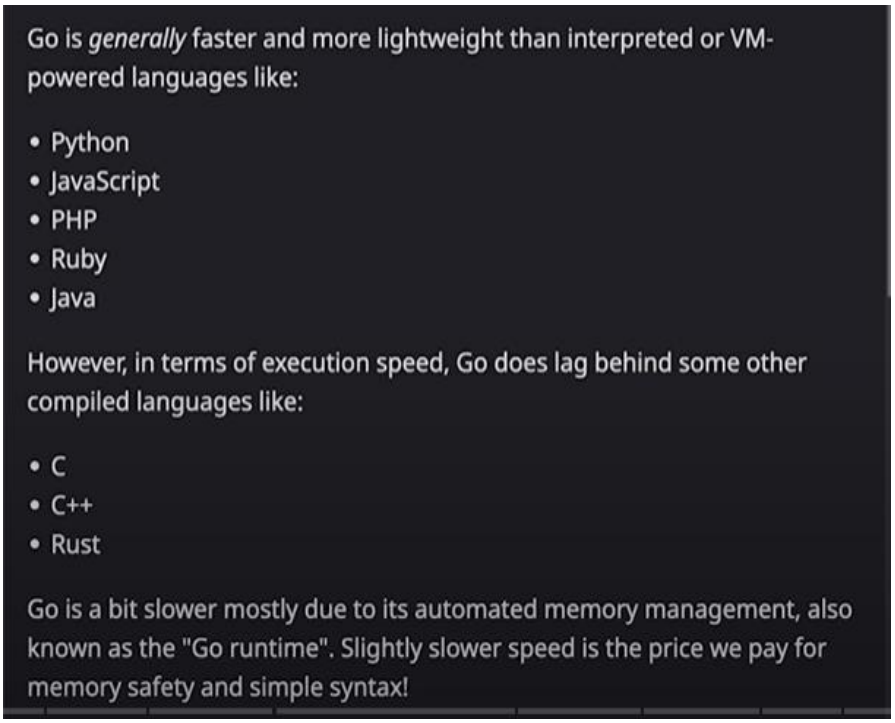
GO LANG

Go, also known as Golang, is an open-source programming language created by Google in 2007

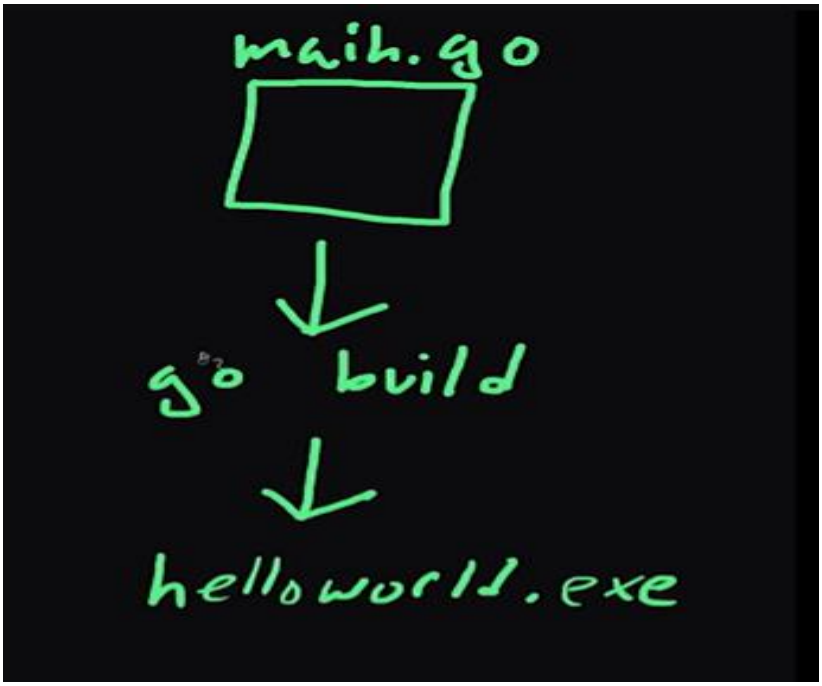
INTRODUCTION:

- statically typed, compiled high-level programming language
- Compiles faster than the interpreted and compiled languages.
  Execution Speed is little bit slow due to memory management
- Simple syntax



COMPILATION:

- Converting human readable code to machine code/ instruction set (Binary) which is understandable to computers CPU.
- Compiler does the conversion of human readable code to machine code.
- Basically when you run go build it will generate the executable file and it can be run on any other OS without needing to install go tools .
- For example, if you would want to run a python program , you must run using the command `python main.py` hence python must be installed in-order to do so.



COMPILED Vs INTERPRETED:

- Compiled programs can be run without access to the original source code, and without access to a compiler. Its more memory efficient and faster
- With Python and JavaScript the code is interpreted at runtime by a separate program known as the "interpreter". Distributing code for users to run can be a pain because they need to have an interpreter installed, and they need access to the original source code.

Examples of compiled languages

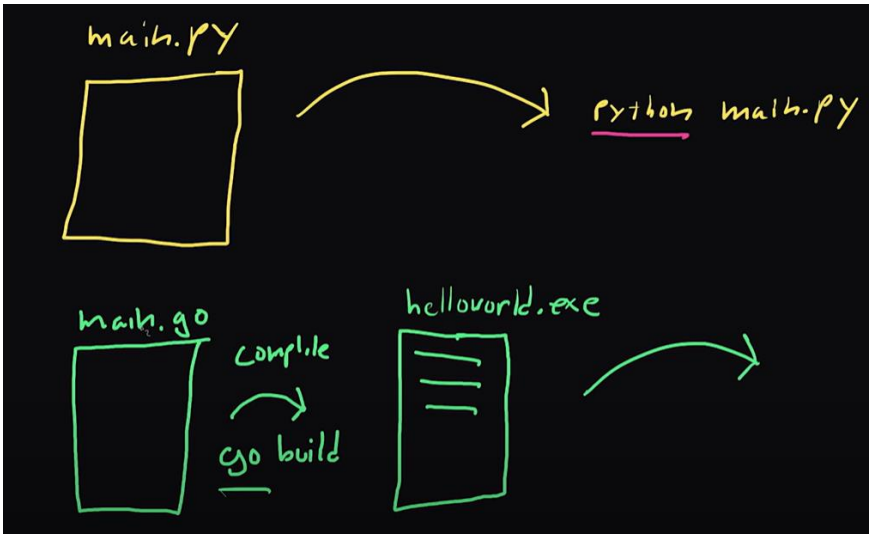
- Go
- C
- C++
- Rust

Examples of interpreted languages

- JavaScript
- Python
- Ruby

CODE DISTRIBUTION:

- When in case of interpreted languages like Python, human readable code gets converted to machine code while the program is running unlike GO programming language.
    - And one must be aware of how to run the python file
    - And source code accessible to the customer
    - And Python should be installed on their machine to run
- In case of GO, customer will be given an executable (exe) file to run, which is a precompiled one. And thereby customer will not have access to source code.
- Distributing natively complied programs are easier
- Interpreted programs will have Runtime dependency. e.g python



DEPLOYMENT:

- Runtime dependencies are required to be installed on server for Interpreted languages . e.g javascript requires Node.Js
- In case of Compiled languages, just a pre-complied binary is required to be added on server

SAMPLE GO PROGRAM:

Main function is the entry point of the program.

```go
package main

import "fmt"

func main() {
    // single-line comments start with "//"
    // comments are just for documentation - they don't execute
    fmt.Println("hello world")
}
```

GO FEATURES:

- Statically typed language -> strong typing
- Lightweight
- **MEMORY MANAGEMENT:**
    - **Two factors:**

    1) *Speed of computations* that can be measured with CPU.
    2) *Memory that is required* on RAM to achieve the computations

- GO doesn't use entire VMs to run its programs - so is the power of memory efficiency
- Each Program includes a small amount of extra code called as Go Runtime that's included in executable.
- **GO Runtime**: Used to clean-up the unused memory
    - Rust and C++ programs use slightly less memory than Go programs because more control is given to the developer to optimize memory usage of the program.
    - The Go runtime just handles it for us automatically