Go Language

What is Go (Golang)?

- A programming language designed at Google
- A static typing language
- Simple syntax similar to C language
- Memory safe, garage collection, structural typing (like a duck typing), concurrency
- Rich standard libraries

What are applications of Golang?

- System programming (alternatives to C/C++)
- Backend servers

Notice

- This lecture provides fundamental codes that are needed for TDD (Test-Driven Development) with Golang.
- We skip the detailed syntax of Golang (Google it! or ask to ChatGPT).

Hello World

Project Initialization

Start by creating a new project directory and initializing a Go module:

```
mkdir hello
cd hello
go mod init hello
```

- `mkdir hello`: Create a new directory named `hello`.
- `cd hello`: Change into the `hello` directory.
- `go mod init hello`: Initialize a new Go module named `hello`. This creates a `go.mod` file that defines the module's name and its dependencies.
- Note: Visual Studio Code opens the current directory as a workspace, so you can open the `hello` directory in VS Code.

Write a code for Hello World

- Create a file `hello.go`

```
package main

import "fmt"

func main() {
    fmt.Println("Hello world")
}
```

- Execute the following command in Terminal

```
go run hello.go
```

- Output

```
$ go run hello.go
Hello world
```

Explanation

- `package main` and `main` function are required for the entry point of program execution (same as `main` function of C language). The `main` function should be placed in `main` package.
- `import` declares what libraries (packages) are used in the code.
  - `fmt` is a library for formatting and printing
- `fmt.Println` indicates the function `Println` in the library `fmt`.There is no way to omit the name of library, i.e., `fmt.Println` cannot be written by `Println`.
- `go run` provides an execution of code similar to a script language, but it involves both compiling and executing.
  - `go build`: the command for compiling

A minimum checklist: To write codes with Golang

This is a minimum checklist to learn Golang. Ask ChatGPT or Google for more details.

- Check the fundamental types of Golang; `int`, `float64`, `string`
- Check the declaration of variables; the usage of `var` and `:=`
- Check the slice and its methods
- Check the type definition and the structure; `type`
- Check the declaration of methods for a type; methods, receiver and pointer receiver

Summary

- Go is a programming language designed at Google, known for its simplicity and efficiency.
- It is statically typed, memory safe, and has a rich standard library.
- The lecture provides a basic introduction to Go, focusing on the "Hello World" program and essential concepts.
- Students are encouraged to explore more about Go's syntax and features through online resources or ChatGPT.