Lab5

NYCU Go Programming 2024

2024/11/05

Wasm

- WebAssembly (Wasm) is a binary instruction format originally designed for the web. It represents a standard that allows developers to run high-performance, low-level code directly in web browsers at near-native speeds.
- 主流瀏覽器皆有支援 (https://webassembly.org/roadmap/)
- 有很多程式語言可以編譯成 Wasm (C/C++, C#/.NET, Rust, Java, Python, Go)
- 可以用 Golang 寫 function 給前端使用

Compile golang to Wasm

Linux:

```
$GOOS=js GOARCH=wasm go build -o lib.wasm main.go
$cp "$(go env GOROOT)/misc/wasm/wasm_exec.js" .
```

Windows:

```
($go env GOOS GOARCH)
$go env -w GOOS=js GOARCH=wasm
$go build -o lib.wasm main.go
$go env -w GOOS=windows GOARCH=amd64
$copy "$(go env GOROOT)/misc/wasm/wasm_exec.js" .
```

在 js 註冊 function

func FuncOf(fn func(this Value, args []Value) any) Func

FuncOf returns a function to be used by JavaScript.

func Global() Value

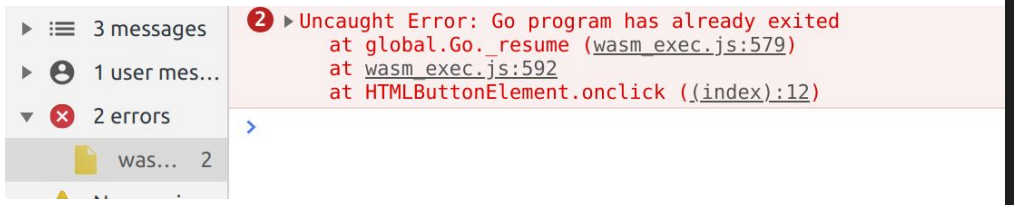
Global returns the JavaScript global object, usually "window" or "global".

func (v Value) Set(p string, x any)

Set sets the JavaScript property p of value v to ValueOf(x).

```
 9 > func MyGolangFunc(this js.Value, i []js.Value) interface{} {…
26   }
27
28   func registerCallbacks() {
29       js.Global().Set("function_in_frontend", js.FuncOf(MyGolangFunc))
30   }
```

因為還要呼叫註冊的 function，不能讓程式結束




```
1   package main
2
3   import (
4       "fmt"
5       "math/big"
6       "syscall/js"
7   )
8
9   func CheckPrime(this js.Value, i []js.Value) interface{} {…
26  }
27
28  func registerCallbacks() {…
30  }
31
32  func main() {
33      fmt.Println("Golang main function executed")
34      registerCallbacks()
35
36      select {} // block the main thread forever
37  }
38
```

Web Server

```go
package main

import (
    "log"
    "net/http"
)

func main() {
    log.Fatal(http.ListenAndServe(":8086", http.FileServer(http.Dir("."))))
}
```

Lab5:Web Prime Checker

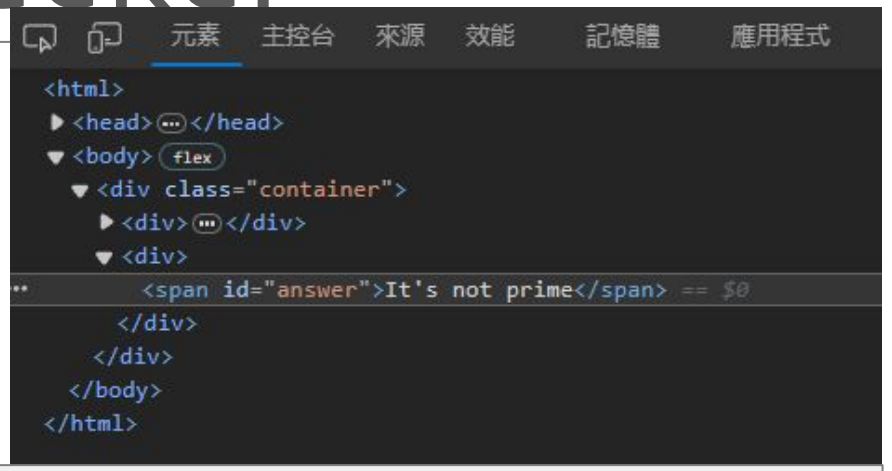
- 一個可以估算數字是否為質數的網頁(只會用小於2^64的正整數進行測試)，檢查結果需在3秒內出現

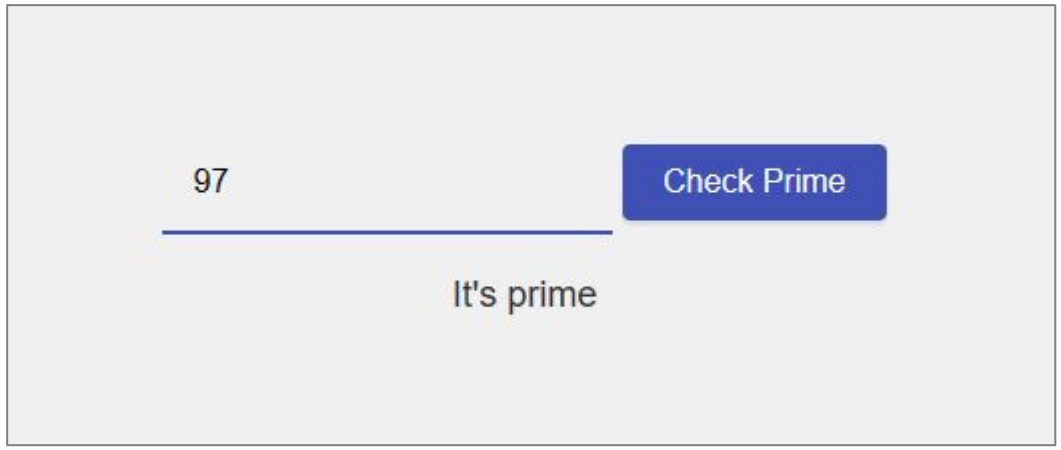
- 程式碼只能修改 wasm/main.go ，並把前端要用到的 CheckPrime 編譯成 lib.wasm

- 可以使用 math/big 中的 ProbablyPrime(0)

Lab5:Web Prime Checker

輸出請按照格式將結果顯示在 answer 裡面





Lab5:Web Prime Checker

- .github
  - workflows
    - lab5.yml
- lab5
  - .gitignore
  - go.mod
  - server.go
  - wasm
    - main.go
    - ~~lib.wasm~~
  - index.html
  - ~~wasm_exec.js~~
  - validate.py
  - requirements.txt

```
$ go run .
$ python validate.py
```

Hint

- 取得前端 element 的 value:
  - `str := js.Global().Get("document").Call("getElementById", "the element id").Get("value").String()`
- 更改 element 的文字:
  - `js.Global().Get("document").Call("getElementById", "the element id").Set("innerText", "whatever")`
- Ctrl+Shift+R perform a hard reload of a web page