Compiler Construction

Programming Assignment 1

μGo Language Lexical Definition

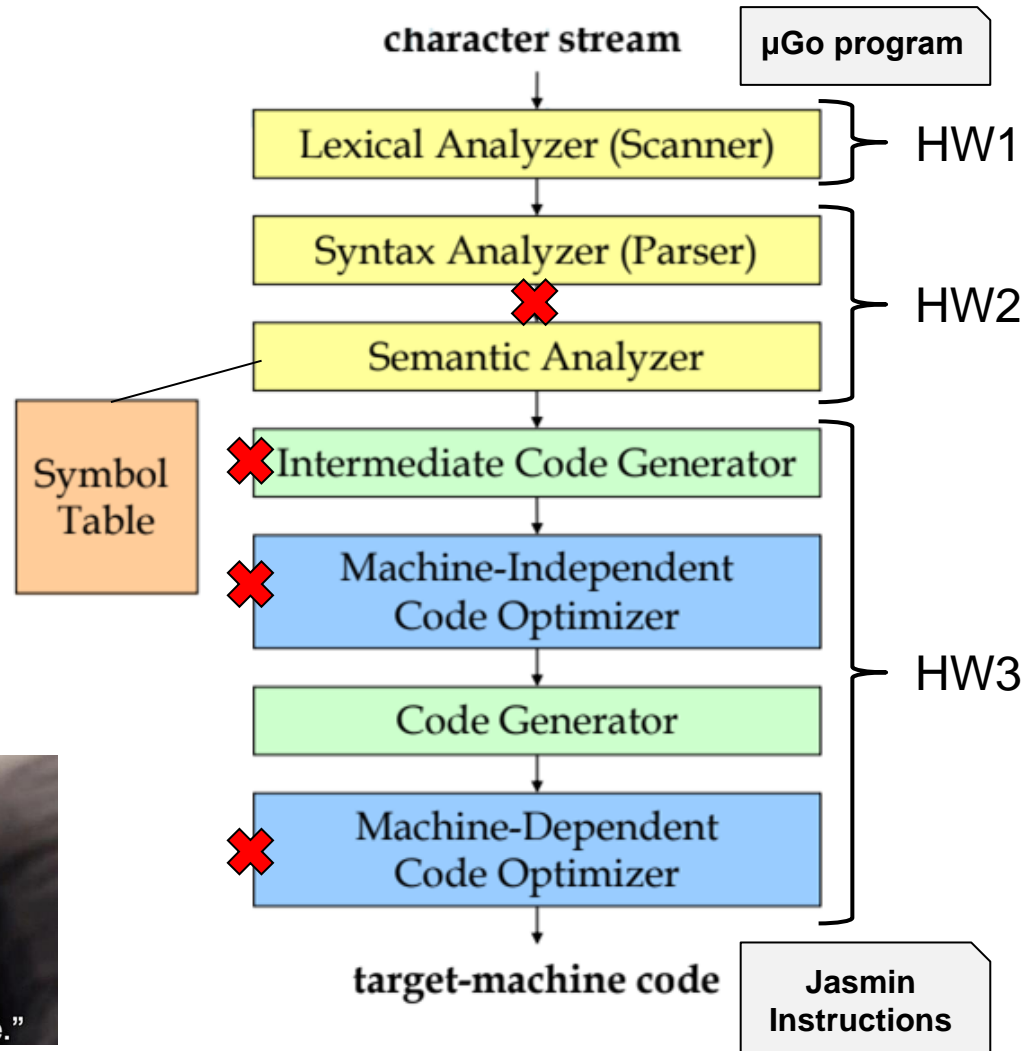# Project Outline

character stream

| Lexical Analyzer (Scanner) |
| Syntax Analyzer (Parser) |
| Semantic Analyzer |

Symbol Table

| Intermediate Code Generator |
| Machine-Independent Code Optimizer |
| Code Generator |
| Machine-Dependent Code Optimizer |

target-machine code

Project Outline

character stream → **μGo program**

Lexical Analyzer (Scanner) — HW1

Syntax Analyzer (Parser)

Semantic Analyzer — HW2

Symbol Table

Intermediate Code Generator

Machine-Independent Code Optimizer

Code Generator

Machine-Dependent Code Optimizer — HW3

target-machine code → **Jasmin Instructions**

"We don't do that here."

Features of µGo Language

- No semicolons (**;**) at the end of a line of code.
- No parentheses for **if** and **for** statements.
- C's **while** is spelled **for** in µGo.
- C's int/float is spelled **int32**/**float32** in µGo.
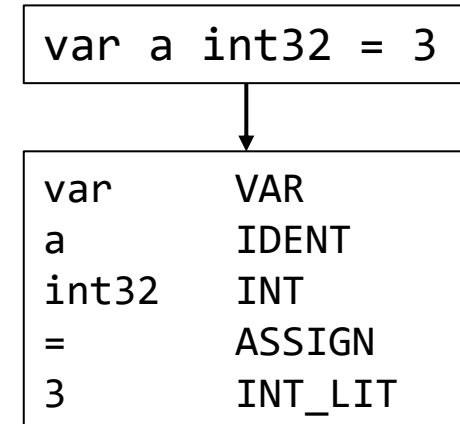- µGo is a *static type* and *strong type* language.
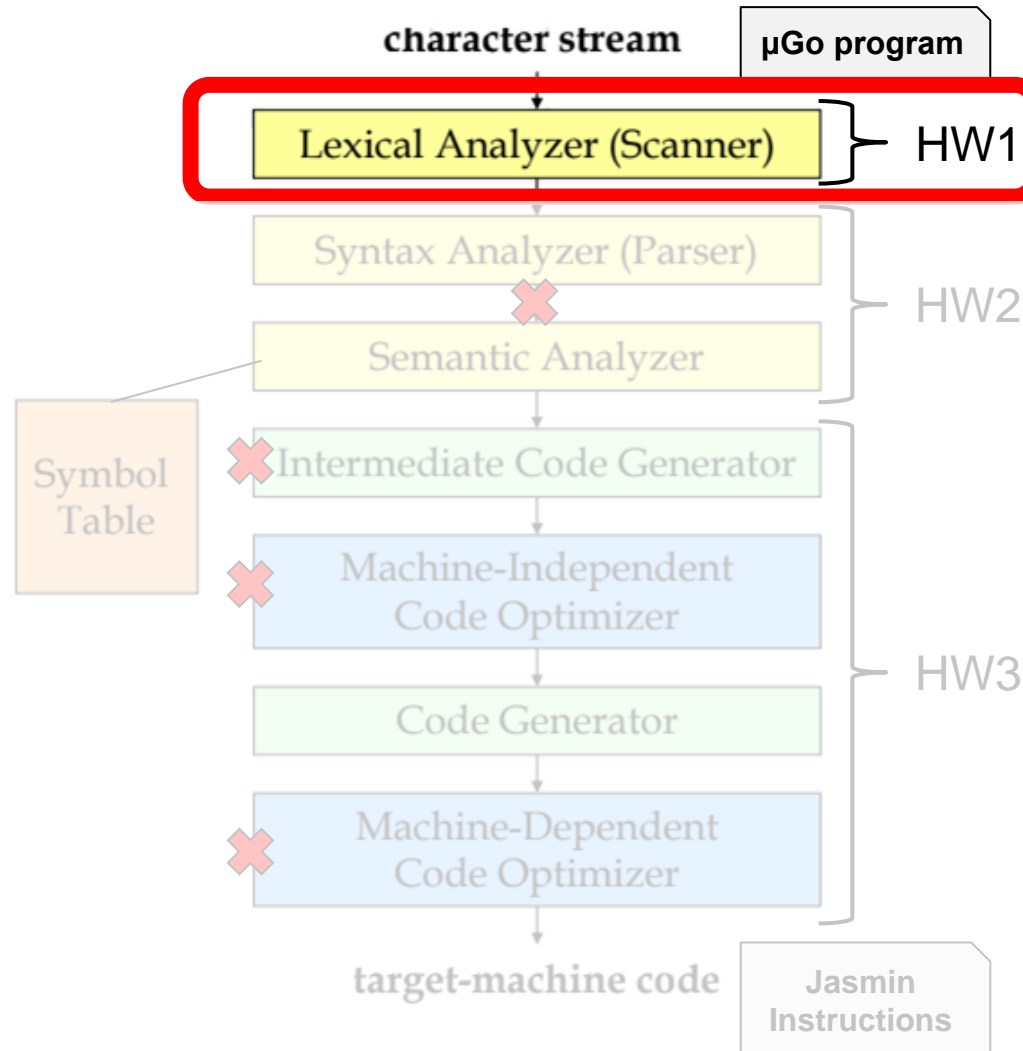
```
var x int32 = 0

if x == 1 {
  println("Hello world")
} else {
  println("Hello, mother father")
}
```
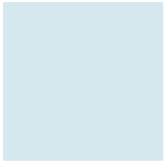
```
var x int32 = 10

for x > 0 {
  println("OuO")
  x--
}
```

Project Outline

character stream

µGo program

Lexical Analyzer (Scanner) — HW1

Syntax Analyzer (Parser)
×
Semantic Analyzer
} HW2

Symbol Table

× Intermediate Code Generator

× Machine-Independent Code Optimizer

Code Generator
} HW3

× Machine-Dependent Code Optimizer

target-machine code

Jasmin Instructions

```
var a int32 = 3
```

```
var     VAR
a       IDENT
int32   INT
=       ASSIGN
3       INT_LIT
```

Assignment Requirements

- Each test case is 10pt and the total score is 110pt.
- You can judge your code locally with judger.

```
~ judge
local-judge: v2.7.1
========================+========
            Sample | Accept
========================+========
    in01_arithmetic | ✔
========================+========
    in02_precedence | ✔
========================+========
         in03_scope | ✔
========================+========
    in04_assignment | ✔
========================+========
    in05_conversion | ✔
========================+========
            in06_if | ✔
========================+========
           in07_for | ✔
========================+========
     in08_type_error | ✔
========================+========
in09_variable_error | ✔
========================+========
      in10_function | ✔
========================+========
        in11_switch | ✔
========================+========
Correct/Total problems: 11/11
Obtained/Total scores:  110/110
```

```
// "Hard Coding" will get 0pt.
main() {
    result = read(answer_file);
    print(result);
}
```

March 25, 2022
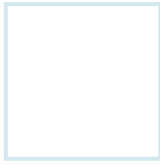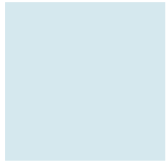
Get judger

- **pip3 install local-judge**

Environment Setup

- For Linux
  - Ubuntu 18.04 LTS

- For Windows (VirtualBox)
  - You may like to install VirtualBox to emulate the Linux environment, or
  - WLS2

- Install dependencies :
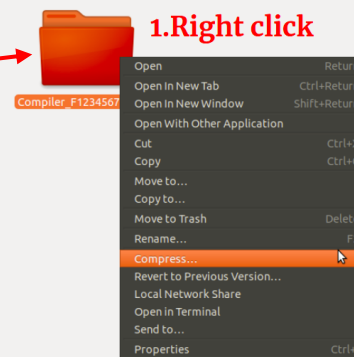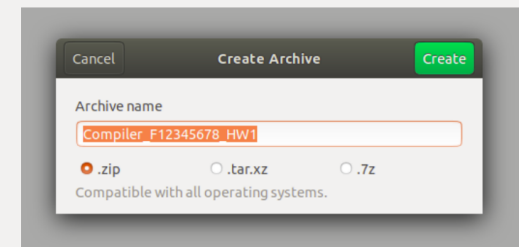 - **$ sudo apt install flex bison git python3 python3-pip**

Submission

- Upload your homework to Moodle.
- The expected arrangement of your codes:
  - Only **.zip** types of compression are allowed.
  - The directory should be organized as:

```
Compiler_StudentID_HW1.zip/
└── Compiler_StudentID_HW1/
        ├── compiler_hw1.l
        └── Makefile
```


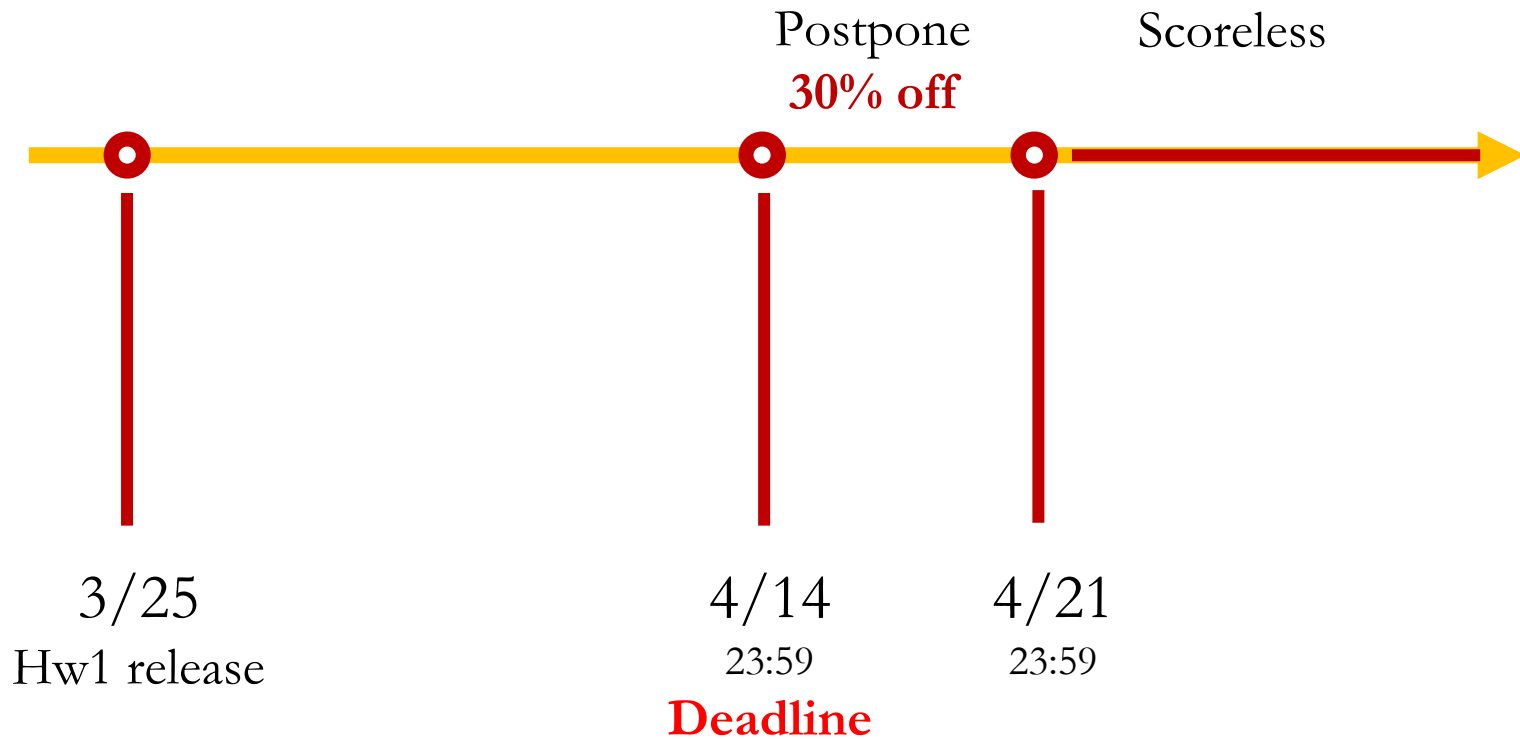 - You will lose 10pt if your programs were uploaded in incorrect format!!!

Deadline

Postpone
30% off
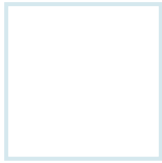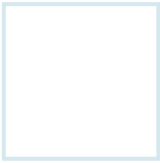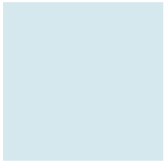
Scoreless

3/25
Hw1 release

4/14
23:59
Deadline

4/21
23:59

How to Mail TAs

- Send mail to asrlab@csie.ncku.edu.tw, not any TA's mail!!
- Email subject starts with "[Compiler2022]"

QUESTIONS ?