MangaCC

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Transform Ideas into Executable Brilliance.

Used Tools and Technologies

Tool	Description
Flex	Lexical Analyzer Generator
Bison	Parser Generator
React	Frontend framework used for GUI
NodeJS	Backend framework
Github Actions	CI to generate Binary and push it to backend directory

Language Descriptions

Tokens

1- Variable and constant Declaration

```
int x;
int x = 5;
const int x = 5;
string x = "Hello";
string x = "c";
```

- Available types
  - int
  - float
  - string
  - bool

2- Mathematical and Logical expressions

- Mathematical operator
  - +, -, *, /, %,
- Logical operator
  - ==, !=, >, <, >=, <=
  - and , or , not , xor

3 - Assignment statement

```
x = 5;
x = "Hello";
x = 5.5;
x = true;
```

4 - If else statement

```
if (x == 5 and y == 10) {
  x = 10;
} endif
```

```
if (x >= 5 or y <= 10) {
  x = x +1 ;
} else {
  x = x - 1;
}
```

```
if (x < 5 and y > 10) {
  x = x + 1;
} else if (x > 5) {
  x = x - 1;
} else {
  x = 0;
}
```

5 - While loop

```
while (x < 5) {
  x = x + 1;
}
```

6 - Repeat until

```
repeat {
  x = x + 1;
} until (x == 5);
```

7 - For loop

```
for (int i = 0; i < 5; i = i + 1) {
  x = x + 1;
}
```

8 - Switch case

```
switch (x) {
  case 1:
    x = 1;
    break;
  case 2:
    x = 2;
    break;
  default:
    x = 0;
}
```

9 - Function declaration

```
int func1(int x, int y) {
  return x + y;
}
```

```
void func2(int x) {
  x = x + 1;
}
```

```
int func3() {
  return 5;
}
```

10 - Function call

```
int x = func1(5, 10);
func2(5);
int y = func3();
```

11 - Block structure

```
{
  int x = 5;
  {
    x = x + 1;
  }
}
```

12- Comments

```
// This is a comment
```

13- Print

```
print("Hello World");
print(x);
print(5);
print(5+6);
```

14- Enum

```
enum Color {
  RED,
  GREEN,
  BLUE
}
enum Color c = RED;
```

How to run

- There is a script named **build.sh** that generates the parser and lexer and takes test file from you as input argurmnt.
- You can run the script by typing the following command in the terminal:

  ```
  ./build.sh if_test.c
  ```

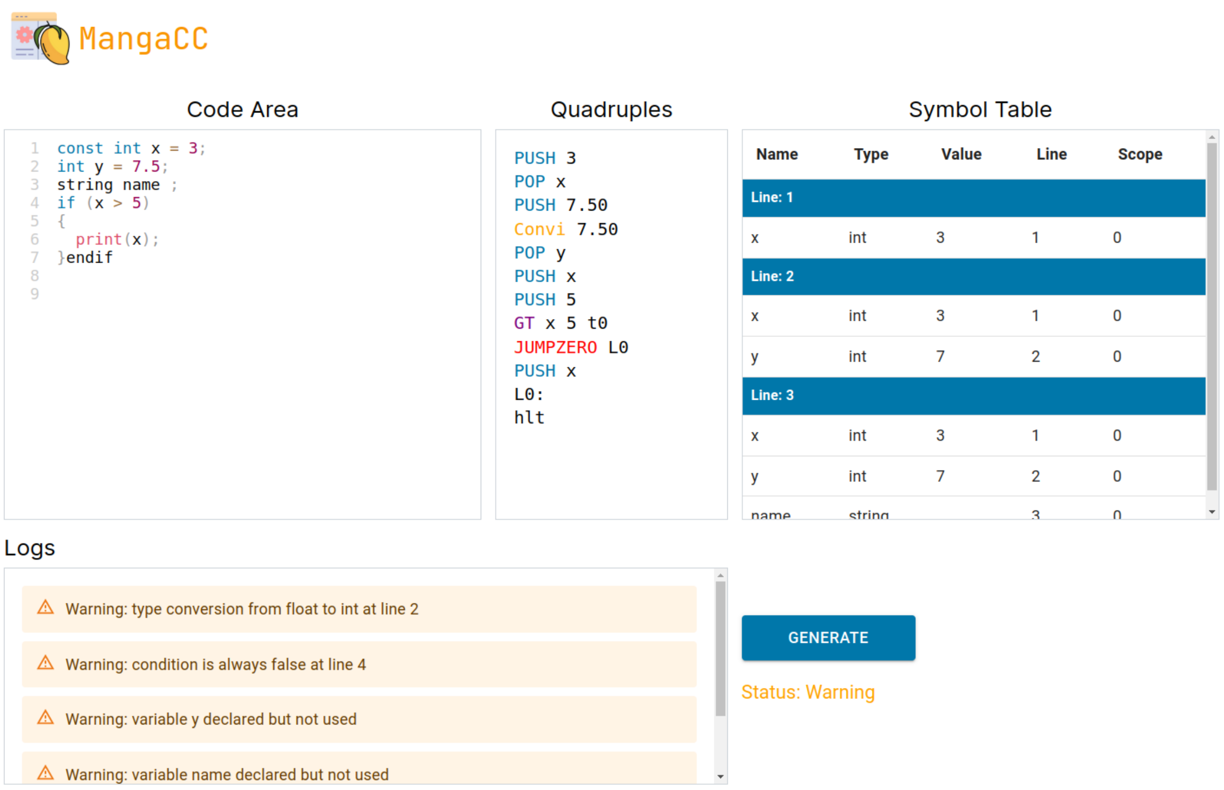
- Note: the test file should be in the test_cases folder.
- Errors and warning will be printed to the terminal.
- Symbol table will be generated in a txt file named **symbol_table.txt**.
- The quadruples will be generated in a txt file named **quads.txt**.

Quadraples Description

Quadraple	Description
PUSH (value)	Pushing (value) to stack
POP (ID)	Pop value from stack to the (ID)
NOT	Getting complement of value
ADD (arg1) (arg2) (result)	Adding (arg1) (arg2) and save value to (result)
SUB (arg1) (arg2) (result)	Substracting (arg1) (arg2) and save value to (result)
MUL	Multiply (arg1) (arg2) and save value to (result)
DIV	Divide (arg1) (arg2) and save value to (result)
MOD	Calculate the modules of (arg1) (arg2) and save value to (result)
AND	Perform logical and between (arg1) (arg2) and save value to (result)
OR	Perform logical or between (arg1) (arg2) and save value to (result)
XOR	Perform logical xor between (arg1) (arg2) and save value to (result)

Quadraple	Description
EQ	Check the equality of the two operands and store the comparsion result in temp reg
NE	Check the inequality of the two operands and store the comparsion result in temp reg
LT	Check if the first operand is less than the second and store the comparison result in temp reg
GT	Check if the first operand is greater than the second and store the comparison result in temp reg
LE	Check if the first operand is less than or equal the second and store the comparison result in temp reg
GE	Check if the first operand is greater than or equal the second and store the comparison result in temp reg
JMP L():	Unconditional Jump to label
JUMPZERO L():	Jump if the zero flag from previous command is zero
JMPNONZERO L():	Jump if the zero flag from previous command is non-zero
Convi (var/value)	Convert float to integer
Convf (var/value)	Convert integer to float

Bouns



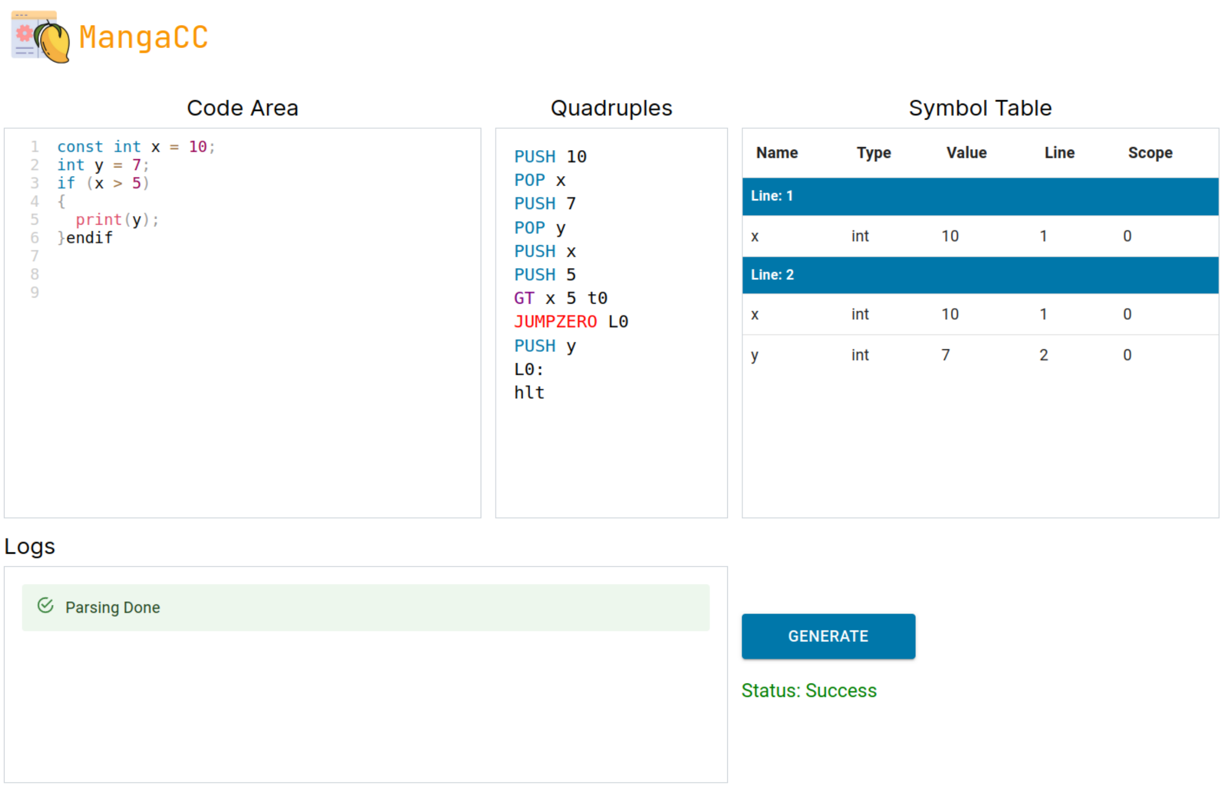
```
const int x = 3;
int y = 7.5;
string name ;
if (x > 5)
{
  print(x);
}endif
```

```
PUSH 3
POP x
PUSH 7.50
Convi 7.50
POP y
PUSH x
PUSH 5
GT x 5 t0
JUMPZERO L0
PUSH x
L0:
hlt
```

Name	Type	Value	Line	Scope
Line: 1				
x	int	3	1	0
Line: 2				
x	int	3	1	0
y	int	7	2	0
Line: 3				
x	int	3	1	0
y	int	7	2	0
name	string		3	0

```
⚠ Warning: type conversion from float to int at line 2
⚠ Warning: condition is always false at line 4
⚠ Warning: variable y declared but not used
⚠ Warning: variable name declared but not used
```

Status: Warning



```
const int x = 10;
int y = 7;
if (x > 5)
{
  print(y);
}endif
```

```
PUSH 10
POP x
PUSH 7
POP y
PUSH x
PUSH 5
GT x 5 t0
JUMPZERO L0
PUSH y
L0:
hlt
```

Name	Type	Value	Line	Scope
Line: 1				
x	int	10	1	0
Line: 2				
x	int	10	1	0
y	int	7	2	0

```
✓ Parsing Done
```

Status: Success