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Compilers 1

Part1

Use the command **make** to clean, compile and execute the code.

There are many comments in the code that explain everything.

Grammar

```
goal -> term exp

exp -> '+' term exp
    | '-' term exp
    | e

term -> number termTail

termTail -> '*' '*' number termTail
          | e

number -> digit numTail
        | '(' term exp ')'

numTail -> number
        | e

digit -> '0' | '1' | '2' | '3' | '4' | '5' | '6' | '7' | '8' | '9'
```

In order to have precedence for ******, I always first check for ****** and if the lookahead doesn't match I go and look for **+** and **-**. I achieve this in the term where I always have a termTail after a number. termTail is looking for ****** and then is calling expr that is looking for **+** and **-**.

I took this logic from the presentations

I treat the **()** as a number because eventually the **()** will be evaluated in a number if everything is fine inside them.

In order to have multidigit number I use the logic of the numTail. I made number type of String in my code and the single digits are being concatenated with each other and in the end the number is a long String that is being parsed into an Integer to make the **+**, **-** and ****** operations.

Part2

Use the command **make** to clean, compile, execute the parser and at the end the output Java code will execute.

I have made in the jflex those macros.

- If = (if){WhiteSpace}*{()

finds an if with any space between that ends with (

- Variable = [a-zA-Z][a-zA-Z0-9]*

finds a variable

- Function = {Variable}{WhiteSpace}*{()

finds a variable with any space between that ends (

In the cup all the functions declarations must be before any calls.

Arguments

I have separate the cases where the arguments of an function are valid.

- for the arguments in the declarations of a function can be **only variables**.
- inside a functions body there can be **variables, Strings, function call** and an **IF** as arguments of an function call.
- functions calls in the main can have as arguments **Strings, function call** and **IF**.

IF

- An **IF** can have as operator only a **prefix** or a **suffix**.
- Inside an **IF** can be another **IF**.

Prefix Suffix

- a prefix b == b.startsWith(a)
- a suffix b == b.endsWith(a)
- left or right from prefix or suffix can be everything that is a string.