Syntax

Definition: The syntax of a programming language is **the set of rules** that define the combinations of symbols that are considered correctly structured constructs.

ex) Dear friend, give me a pen so I can show you!

- This is syntactically correct in English, but it is not a program in Java.

```
class Foo {
    public int j;
    public int foo(int k) {
        return j + k;
    }
}
```

- This is syntactically correct in Java, but not in C.

The syntax is often specified using **context-free grammar** (CFG) which is a set of recursive rules used to generate patterns of string.

- Able to describe all regular expressions and more but cannot describe all possible languages.
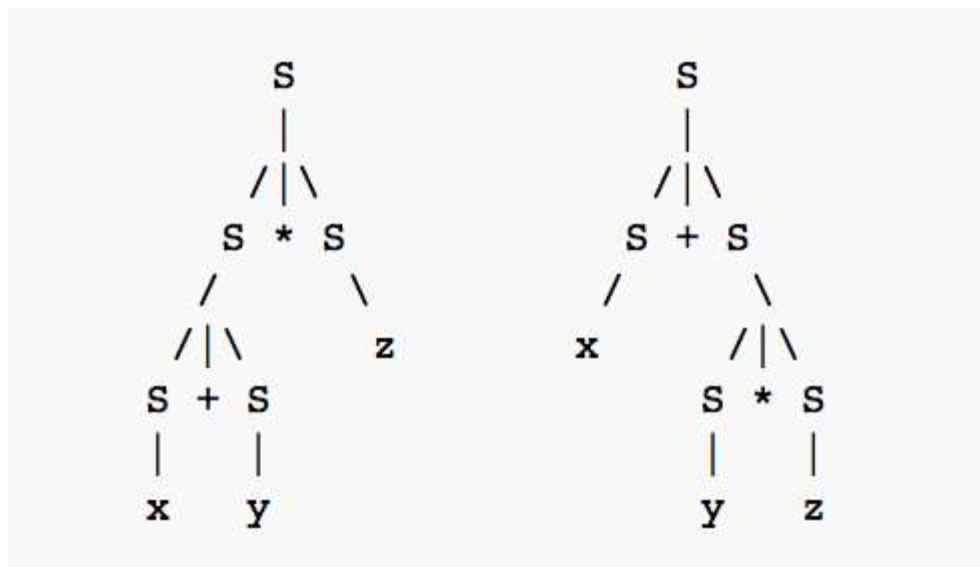

Figure 1. Context-free grammar

The most basic elements of CFG are **("words")** which are specified through **regular expressions**.

Ex) Grammar for the algebraic operation

```
expr → NUM
     | '(' expr ')'
     | expr '+' expr
     | expr '-' expr
     | expr '*' expr
     | expr '/' expr

NUM  → [0-9]+ ( '.' [0-9]+ )
```