A computer only understands its own machine language.
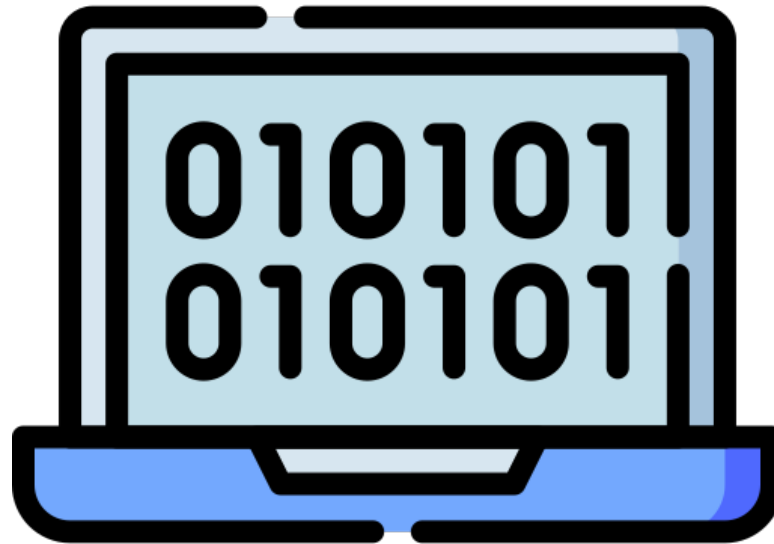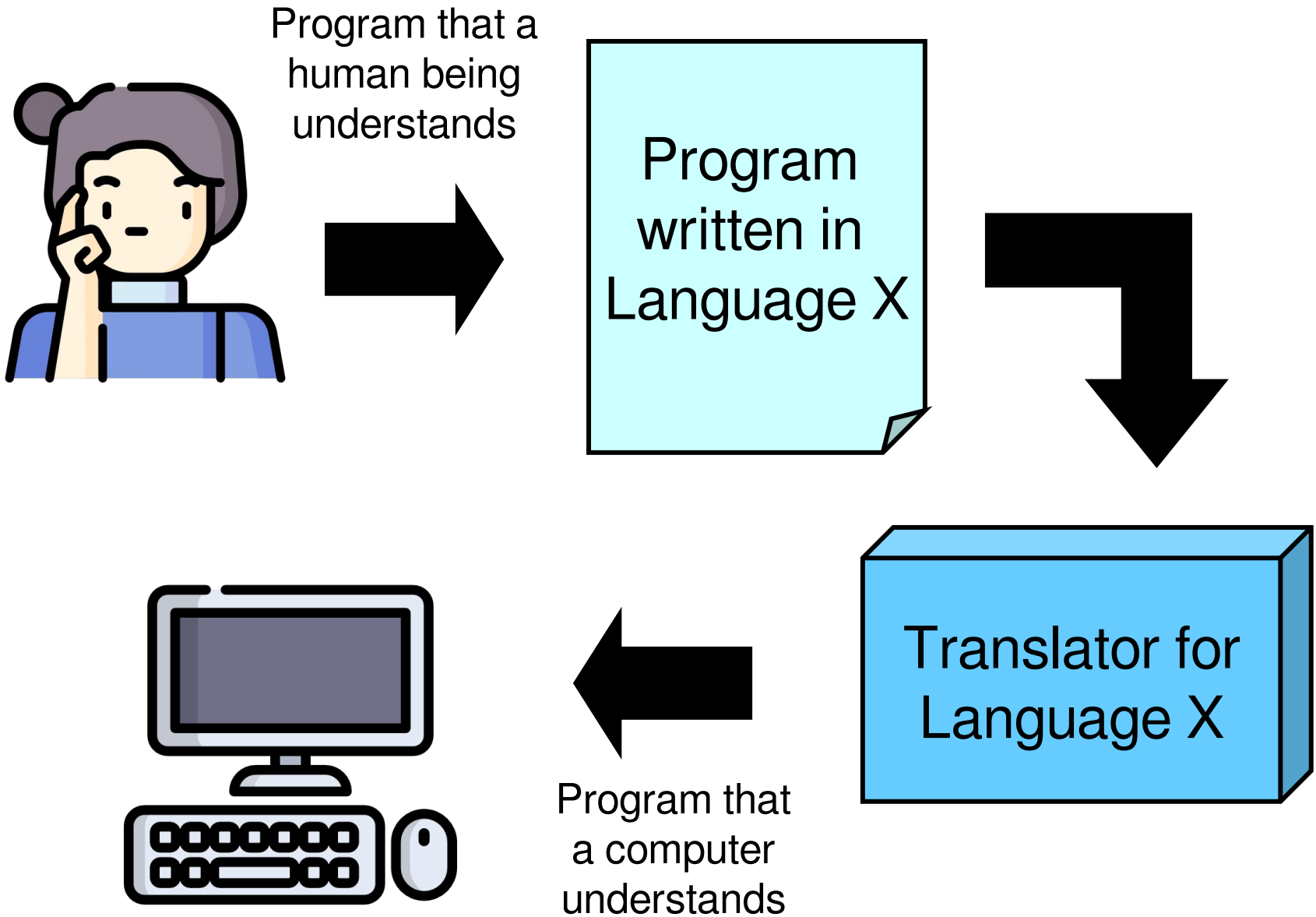
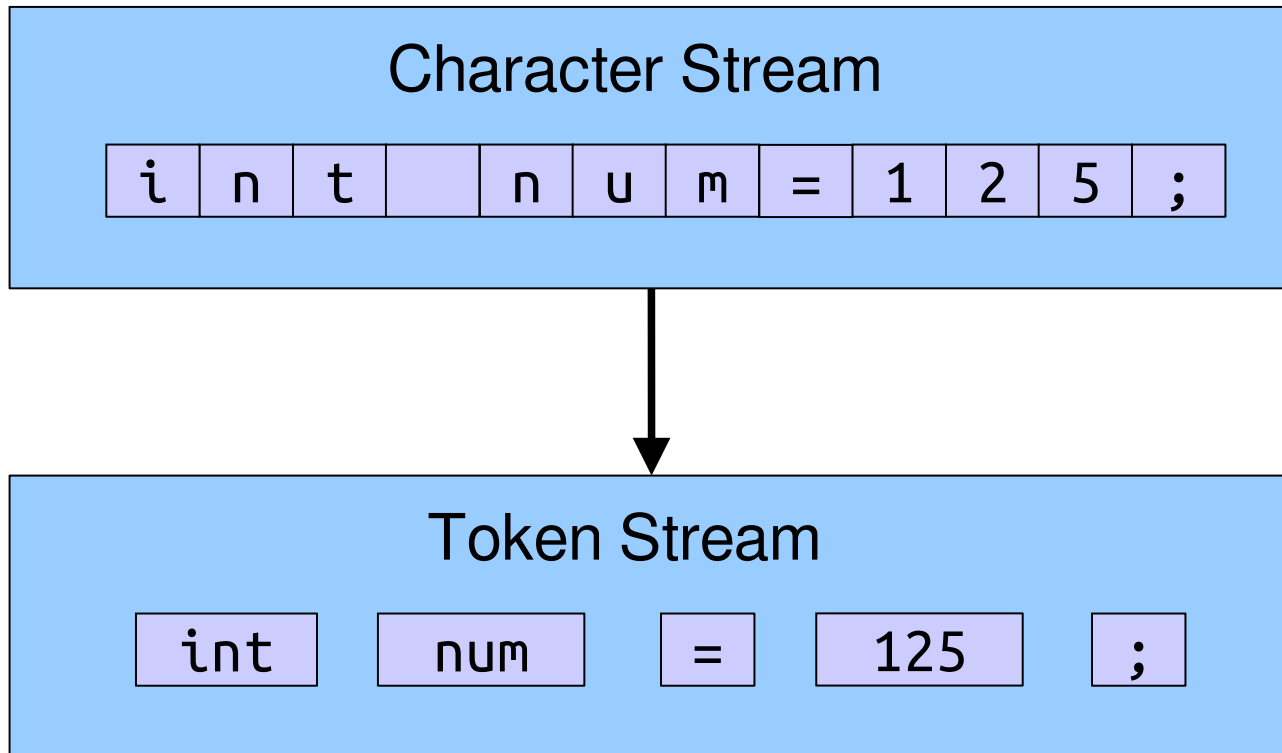Program that a human being understands →

Program written in Language X

Translator for Language X

← Program that a computer understands

Translation Phases

Source Program
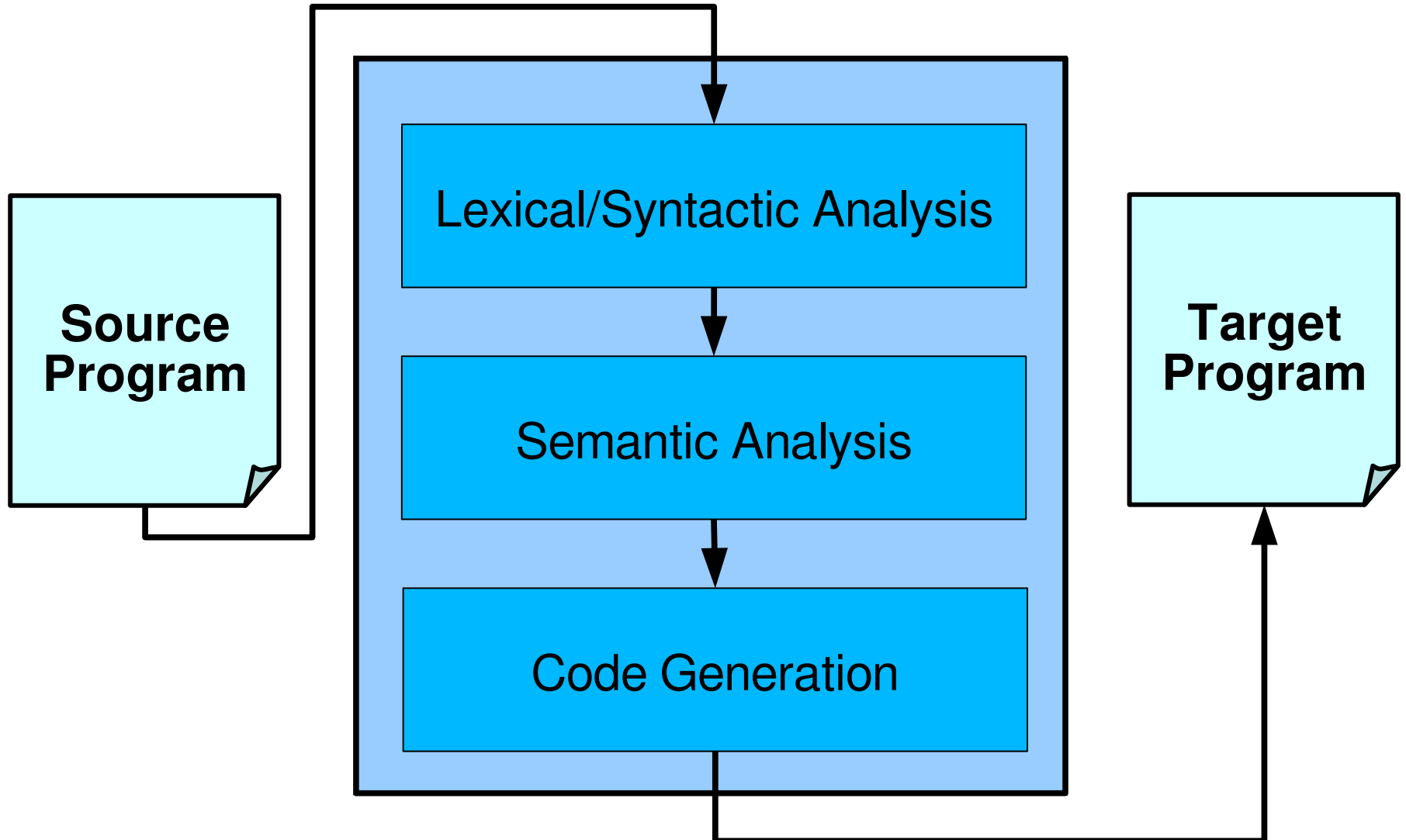
Lexical/Syntactic Analysis

Semantic Analysis

Code Generation

Target Program

Lexical Analysis

Character Stream
i | n | t | | n | u | m | = | 1 | 2 | 5 | ;

Token Stream
int | num | = | 125 | ;

Syntax Analysis

Token Stream

| 12 | + | 25 | * | 30 |

Abstract Syntax Tree

```
        +
       / \
     12   *
         / \
       25   30
```

Semantic Analysis

Abstract Syntax Tree

```
        +
       / \
      x   10
```
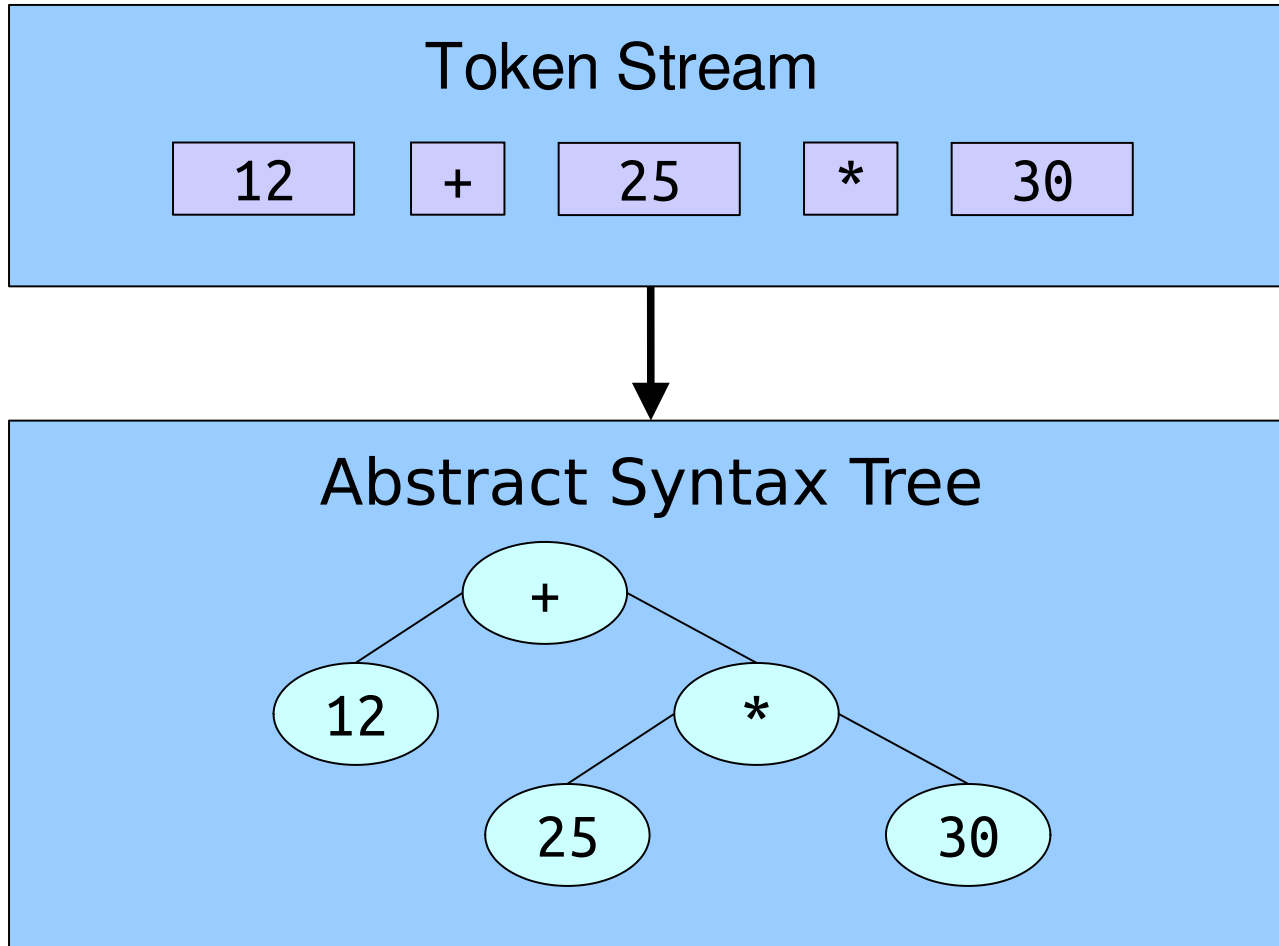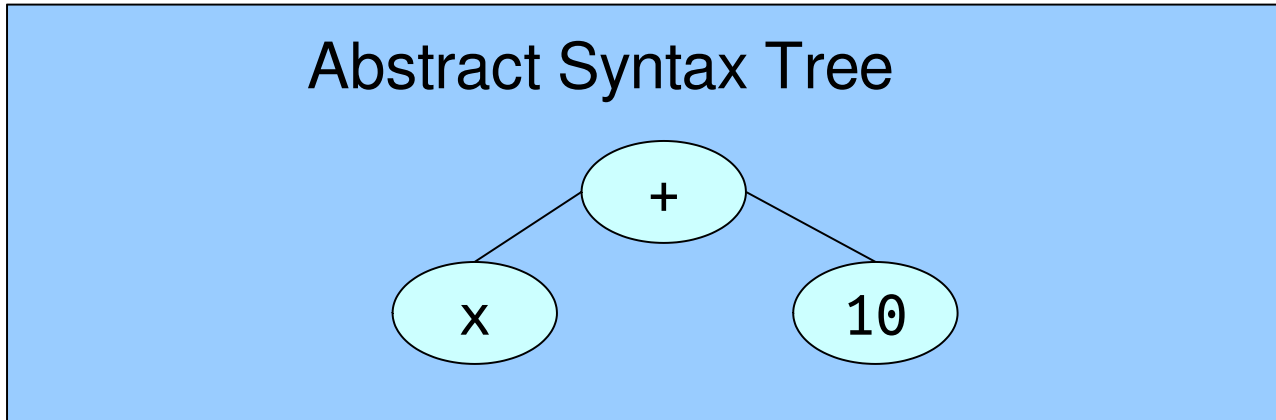
Check that:
- *Variable "x" has been declared.*
- *The type of the operands and the + operator should be numeric.*

Code Generation