# The way of the Program

# What is a Program?

- **Program** - a set of instructions (commands) given to a processor (computer)
- Instructions have a sequence
- Programmer's goal is to write a program that computer understands, and solves a specified problem.
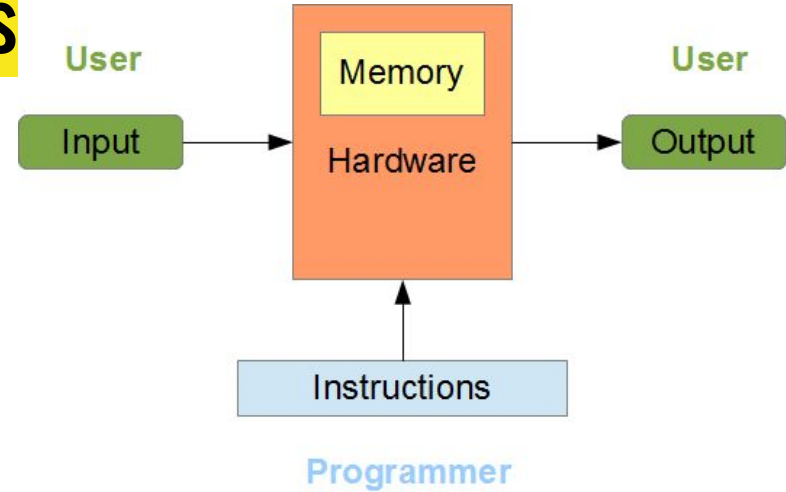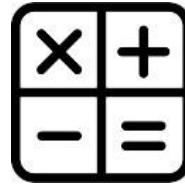
**Ex:**
- Solving a mathematical equation
- searching for text
- processing an image
- playing a video
- etc.

# Basic Principles and Instructions

- Input / Output
- Math
- Conditional Execution
- Repetition

User
Input

Memory
Hardware

User
Output

Instructions

Programmer

Is the weather cold today?

TRUE
Wear something warm.

FALSE
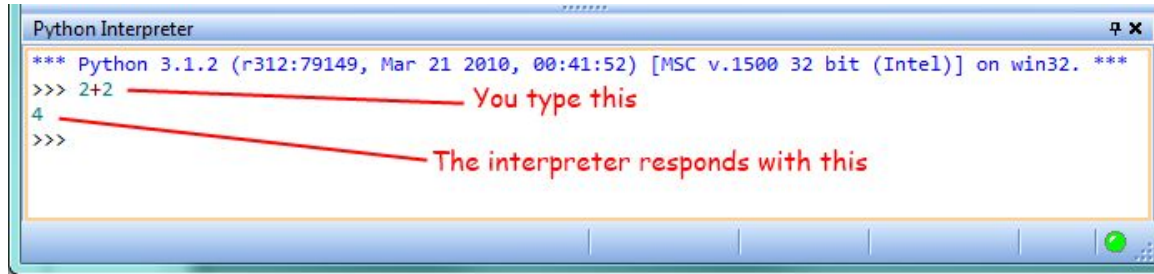Don't wear something warm.

```
Do
    {
        Eat biscuit
        biscuits = biscuits -1
    }

While (biscuits > 0);
```

# Running Python

- The Python **interpreter** is a program that reads and executes Python code.
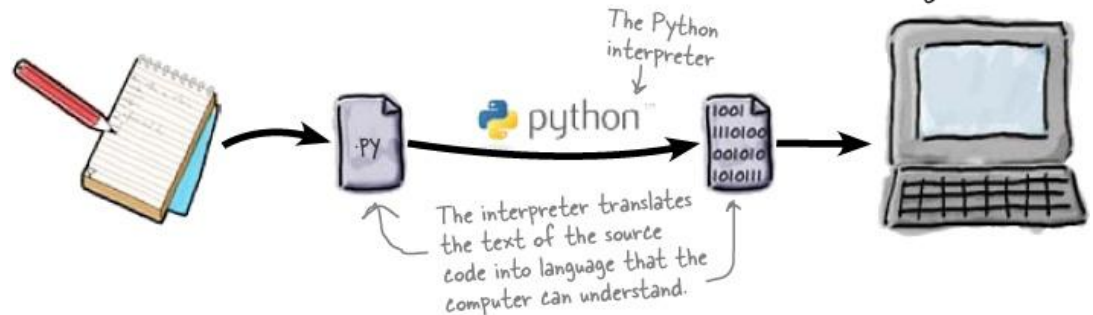
# The First Program

```
>>> print('Hello, World!' )
```

- **Print statement**: displays a result on the screen
- *Print* is a function
- *Hello, World!* is the text to be displayed, and comes in quotations (' ')

**Result:**

```
Hello, World!
```

# Arithmetic Operators

- +, -, *    Addition, subtraction, multiplication

- /          Division

```
>>> 84 / 2
42.0
```

- **         Exponentiation, power

```
>>> 6**2 + 6
42
```

# Values and Types

- **Values:** *2*, *42.0*, and *'Hello, World! '* .
- **Types** (category of values)**:** integer, floating-point number, and string.

**Ex:**

```
>>> type(2)
<class ' int' >
>>> type(42.0)
<class ' float' >
>>> type(' Hello, World! ' )
<class ' str' >
```

- *Class* is same as category

# Debugging

- The process of tracking down **bugs** (errors), and removing (fixing) them.