How do Programming Languages work
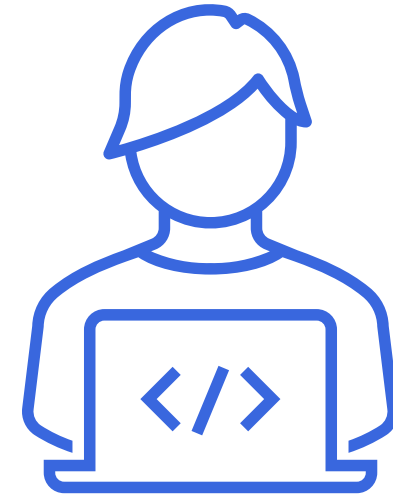
How do programming languages work?

A programming language
- formal language
- human-understandable
- produces machine code output

Each computer program is written in a programming language.

How do programming languages work?

Key Ingredients

Syntax

- formal rules (similar to grammar rules in spoken languages)

Comments

- help you and other to understand the code
- no effect on program result

Keywords

- reserved word which cannot be used as variable or function name
- reserved for compiler/interpreter

Miscellanious

- variables, conditional statements, loops, functions and modules

How do programming languages work?

Key Ingredients

Comments

Variables

Function

```python
#%%
# wikipedia: In cryptography, a Caesar cipher, also known as Caesar's cipher, the
shift cipher, Caesar's code or Caesar shift, is one of the simplest and most widely
known encryption techniques. It is a type of substitution cipher in which each letter
in the plaintext is replaced by a letter some fixed number of positions down the
alphabet. For example, with a left shift of 3, D would be replaced by A, E would
become B, and so on. The method is named after Julius Caesar, who used it in his
private correspondence

def caesar(text, offset = 3, mode='encrypt'):
    """Encrypt or Decrypt Caesar Chiffre

    Args:
        text (str): The text to en/decrypt
        offset (int, optional): The offset in the alphabet. Defaults to 3.
        mode (str, optional): can be either 'encrypt' or 'decrypt'. Defaults to
        'encrypt'.

    Returns:
        str: encrypted/decrypted text
    """
    ALPHABET = 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'
    result = ''
    text = text.upper()

    for i in range(len(text)):
        letter_pos_in_alphabet = ALPHABET.index(text[i])

        letter_pos_with_offset = (letter_pos_in_alphabet + offset) % 26 if
        mode=='encrypt' else (letter_pos_in_alphabet - offset) % 26
        result = f"{result}{ALPHABET[letter_pos_with_offset]}"
    return result
Zelle ausführen | Oben ausführen | Zelle debuggen
#%% test encrypt
caesar(text='hello', offset=3, mode='encrypt')
```

How do programming languages work?

Compiler and Interpreter

Interpreter

| Source code | Interpreter | |

Compiler

| Source code | Compiler | | Executor | |