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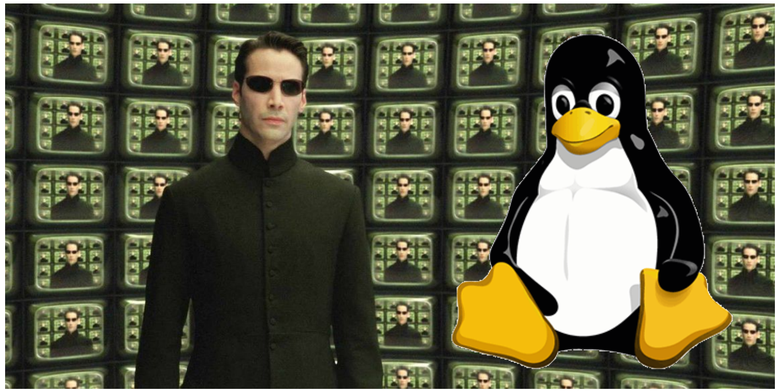
CSCI 120
Introduction to Computer Science and Programming II
Lecture 1: Your First Python Programme



Jetic Gū

Overview

- Focus: Basic Python Syntax
- Architecture: Modern Computers
- Core Ideas:
    1. How Programming Languages Work
    2. Console: a most important IO device

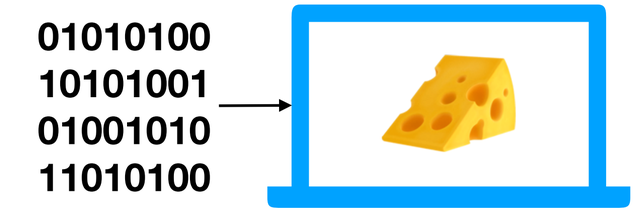
Computers, Programmes, and Consoles

Finally...

P1
Programming

What are Programming Languages?

- A computer is a machine that reads binary code
  - All information stored, processed, displayed inside the computer is binary
  - Computer executes binary instructions to do things (Programme)
- Programming Language
  - Used to describe computer programmes
  - "They don’t look like binary?"



Concept

P1
Programming

What are Programming Languages?

```
# Python Programme
# Author: Jetic
def func():
    ....
```

Code

Concept

P1
Programming

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Code

01010100
10101001
01001010
11010100

Binary Instructions

Concept

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Programming

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Translate

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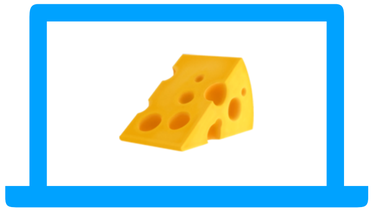
Binary Instructions

Instructs



Concept

P1
Programming

What are Programming Languages?

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Translate

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Binary Instructions

Instructs

- Translation process
  - **Compilation** (C, C++, etc.)
    1. you run a **Compiler** programme that compiles code, into a programme
    2. you run the compiled programme
  - **Interpretation** (Python, Java, etc.)
    1. you run an **Interpreter** programme which interprets code directly

Concept

P1
Programming

Basic Computer Programme

- Any computer programme can be interpreted as a **function**
  - It takes input
    from files, keyboard, mouse, webcam, etc. (Input devices)
  - It produces output
    to files, monitor, speaker, remote devices, etc. (Output devices)

Concept

P1
Programming

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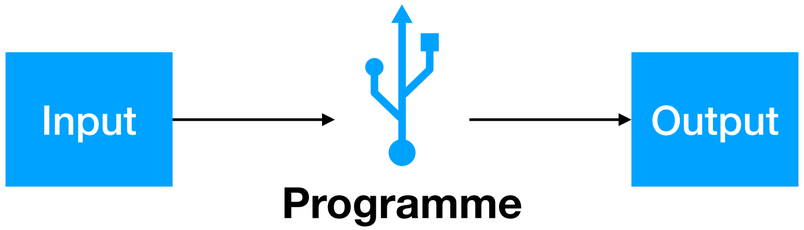


Concept

P1
Programming

Basic Computer Programme

- Input/Output Devices
  - Files, keyboard, mouse, webcam, monitor, speaker, remote devices, etc.
  - Console

Concept

P1
Programming

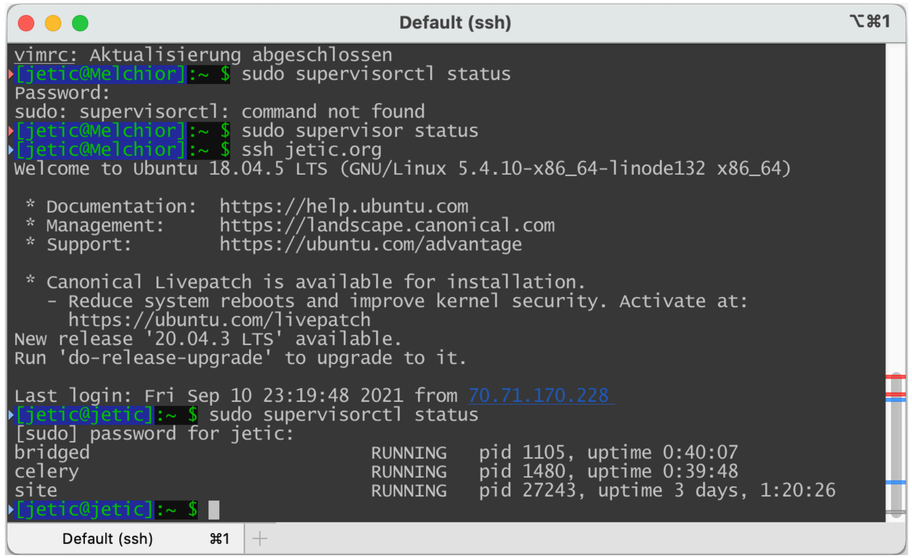
Console

- Graphical User Interface (GUI): Friendly, Beautiful, Easy-to-Use

Example

P1
Programming

Console



- Graphical User Interface (GUI): Friendly, Beautiful, Easy-to-Use
- Before there was GUI, there was console, and still is

Example

P1
Programming

Console

- Consoles are used by all CS professionals
- All programmes still have console interfaces, even ones with GUI
- Interaction with the Console
    1. You type instructions to run a programme
    2. The computer runs the programme
        - You type input ⟶ **Where are your inputs going to?**
        - Computer prints output onscreen ⟶ **Where are the outputs going to?**
    3. Programme exits, go back to step 1

Example

P1
Programming

Console I/O

- Standard Console Input/Outputs
  - `stdin`
    Standard input device. Everything you type in console, everything
  - `stdout`
    Standard output device. By default it is printed onscreen
  - `stderr`
    Standard error reporting device[1]. By default it is printed onscreen

Example

1. You will encounter `stderr` in a later course, for CSCI120 we only care about `stdin` and `stdout`, as well as file I/O

Your First Python Programme

Syntax

- Syntax: also called grammar
- Human languages are ambiguous, Programming Languages are not
- Programming Languages have strict rules like syntax, so that the same code always mean the same thing on different machines

Concept

Basic Python Syntax

- By default, one instruction per line
  - You cannot have multiple instructions on the same line
  - You can split an instruction into different lines, we'll see that later
- If a line starts with character `'#'`, it is considered a line of comment
  - Comments are used to help humans read the code
  - You can also use `'#'` to start commenting after an instruction

Concept

print function

- Try these, they all print **a new line** to `stdout` (onscreen)
  - `print("Hello World")`
  - `print("This is a line")`
  - `print('This is another line')`

print function

- These won’t work
  - ```
    print(Hello World)
    # When you try to print a string, it must be enclosed in quotes
    ```
  - ```
    print("This is a line')
    # Although you can use single quote or double, you cannot mix them
    ```
  - ```
    print(This is another line’)
    # Don’t forget the other half of your quote!
    ```
    ```

print function (cont')

- print("Keep typing after this word ", end="")
  # this will not start a new line after printing to stdout

- print("This is a line\n", end="")
  # Character '\n' is called a newline control character, when you print it, it will create a newline manually
  # Character '\' always indicates a control character, for example '\t' is a tab

- print("1st line\n2nd line\n3rd line")
  # Printing two lines

P2
Your First Step

Your First Python Programme

```
print("Hello World!")
```

- Print `Hello World!` to `stdout`
- This is Lab0's first question
- Why did your programme fail?
  - The OJ checks your output to `stdout` character by character, any mismatch will cost you.

Concept