VU VRIJE UNIVERSITEIT AMSTERDAM

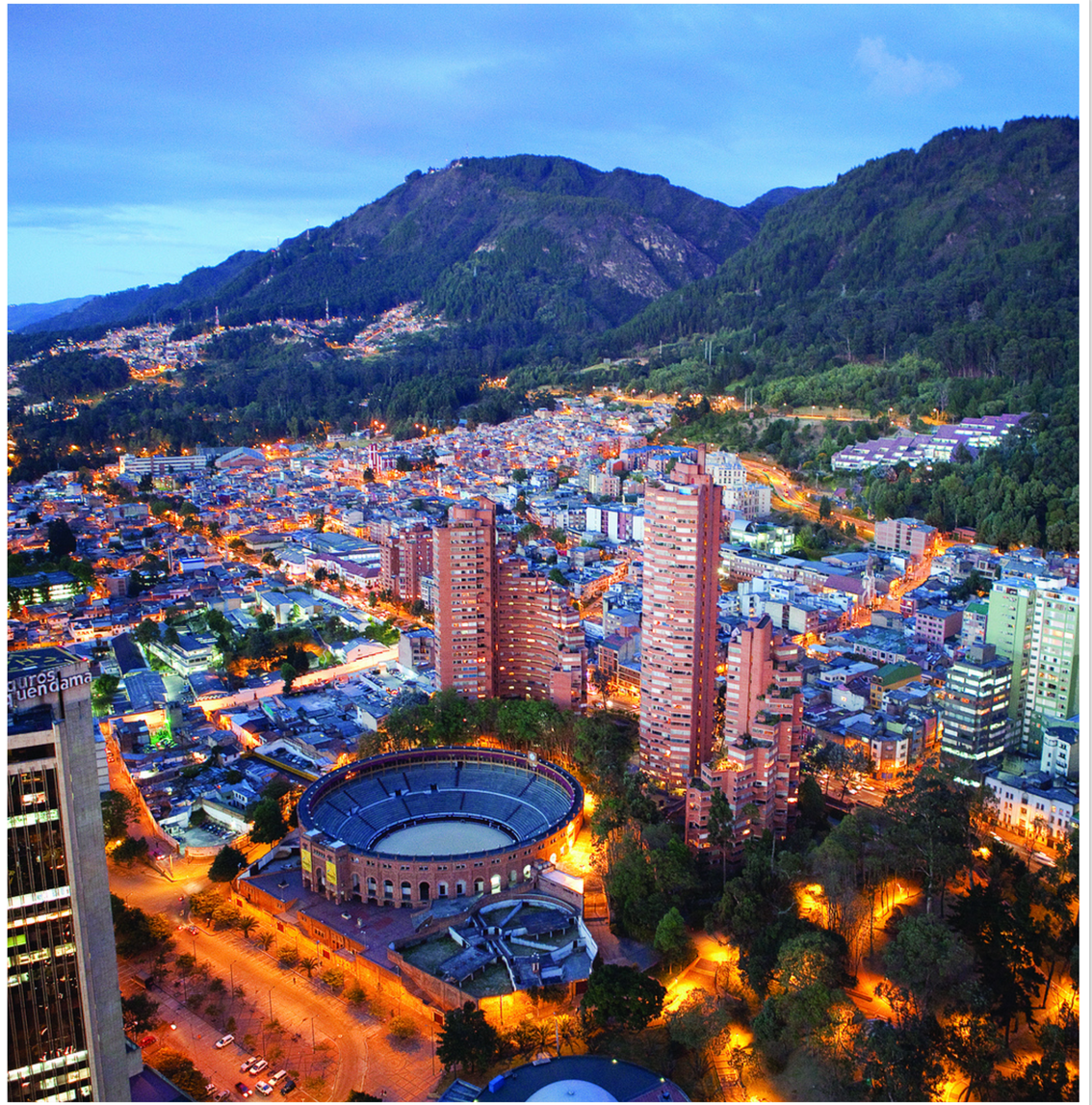
Introduction to Python Programming

First lecture

Mauricio Verano Merino, 7. September 2022

Mauricio
Verano Merino

- Bogotá, Colombia
- PhD at TU Eindhoven (software language engineering).
- Researcher at Siemens (Leuven)
- Assistant Professor at VU
- Research:
  - Programming
  - Creative coding
  - Domain-specific languages



Introduction Programming Team

Lecturer

Mauricio Verano Merino

Junior Lecturers

Bülent Ündes

Banno Postma

TAs

- Yuyu Bai
- Nicole Tabarini
- Matilda Knierim
- Kacper Sawicz
- Dat Nguyen
- Kosmas Galanis
- Luke de Jeu
- Zsófia Katona
- Ariana Vargas Pastor
- Ioan Bogdan Florea
- Daan van Duin
- Gergő Pandurcsek
- Radu Stefan Mistreanu
- Selem Moneer
- Julia Gao Rui Dong Teerhuis
- Benedetta Manzato

This course's objectives

- Learn some general algorithmic techniques to solve problems by means of a computer program.
- Learn basic programming concepts (types, expressions, variables, among others).
- Learn to define and reuse functions.
- Read technical documentation.
- Judge whether a given program solves a problem or not.
- Use notebooks and a professional IDE.
- Read large data sets and clean them for analysis purposes.

Class structure

- FAQs from previous classes.
- Routine: Quiz to activate previous knowledge. (e.g Mentimeter, Quizziz, Kahoot, etc).
- Lecture objectives: What are you going to learn?
- Lecture development:
  - Theory + practice
- Consolidation Quiz: What did you learn?
- Homework: There will always be homework. ¯_(ツ)_/¯

Methodology

- **Preparation:**

  We will used a Flipped Learning methodology.
  You will read and prepare for class.

- **Lecture:**

  During the lecture we will discuss concepts and we will solve practical exercises. You will need to take notes and participate using your phone.

- **Practical sessions:**

  These will be led by the Junior Lecturers and TAs.

- **Assignment or Exercise:**

  Every week you will need to complete exercises in order to keep up with the class topics.

Communication Channels

We are a very big class, so please follow this instructions to ensure a proper class development.

- **Submissions:**

  Canvas

- **Questions/comments/doubts/etc:**

  Slack:

  - #assignments: assignment related questions
  - #exercises: exercises related questions
  - #lectures: lecture related questions
  - #technical-support: issues with tools and installation

- **Personal issues:**

  Email junior lecturers (@Banno, @Büllent)

Examination

- Practical assignments: 20% final grade
- Mandatory mid-term exam: 20% final grade
- Final exam: 60% final grade

  A minimum grade of 5 is required to pass the course.

- [Bonus]

  Five out of seven exercises-with a score of at least 80% and a grade of 5 or higher in any of the exams : 5% final grade.

Plagiarism is forbidden and can result in a disciplinary process.
Work individually for the exercises and assignments.

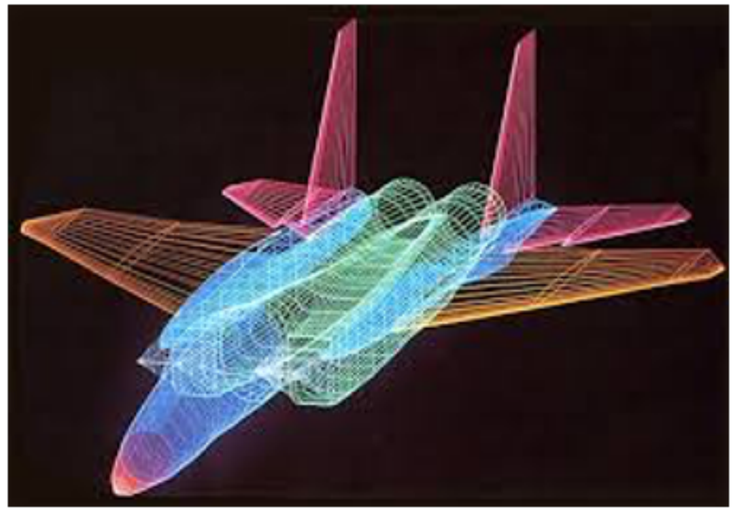
Mentimeter

https://www.menti.com/a11i7aocft

Introduction

Computer Science

- Young discipline but processing information is old.
- Relevant to many disciplines.



https://swing.tennis

https://timrodenbroeker.de/an-ode-to-the-gif/

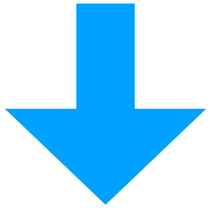
Introduction

Software

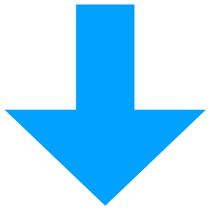
Nowadays it is imperative:

- To create products.
- To operate devices.
- To provide services on the web.
- To solve computational problems.
- To make tools for software development.
- To analyze massive amounts of data.

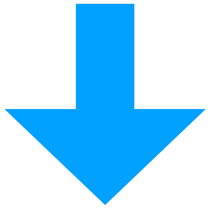
Programming Language



Syntax



Pragmatics



Semantics

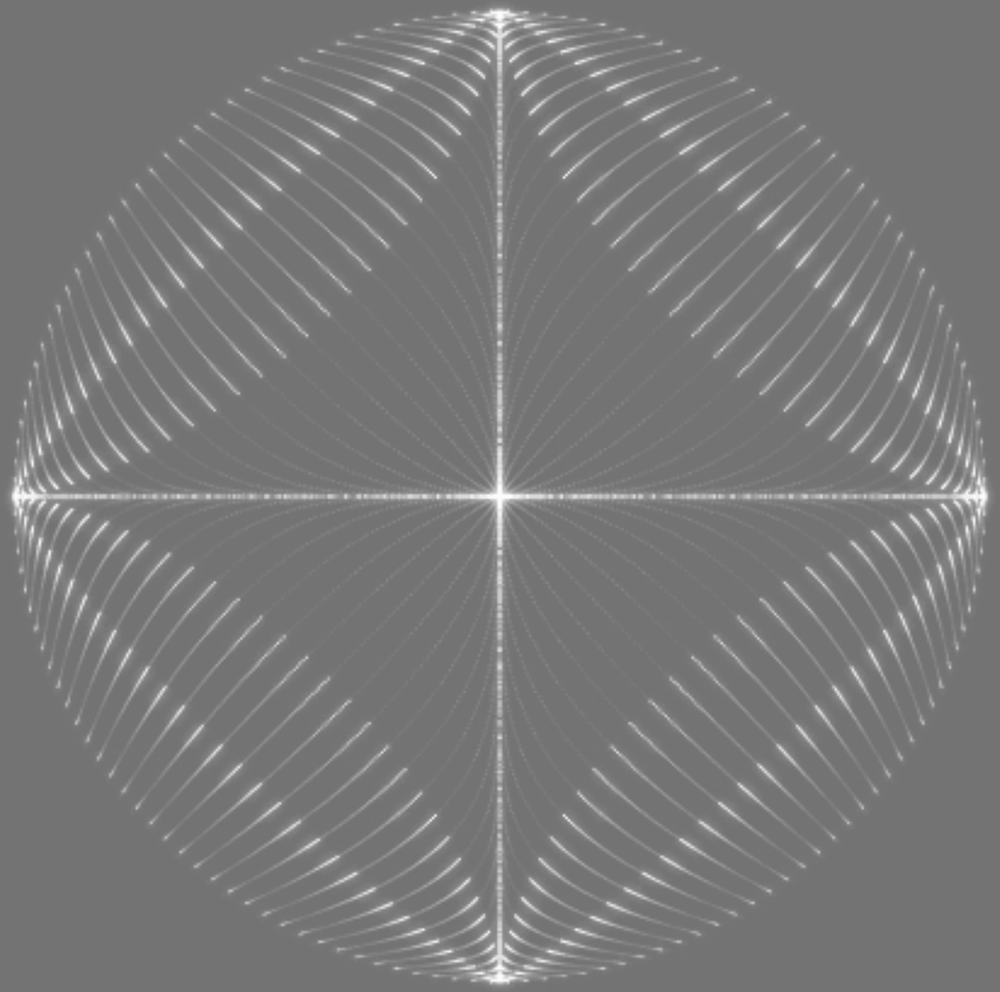
Introduction

Programming Languages

To develop software we use various tools:

- Editors
- Integrated Development Environment (IDE)
- Compilers / interpreters
- Libraries
- Hardware

Code must be understandable and readable for humans



Programming is an

ART

Introduction

Programming Languages Popularity

Sep 2022	Sep 2021	Change	Programming Language	Ratings	Change
1	2	↑	Python	15.74%	+4.07%
2	1	↓	C	13.96%	+2.13%
3	3		Java	11.72%	+0.60%
4	4		C++	9.76%	+2.63%
5	5		C#	4.88%	-0.89%
6	6		Visual Basic	4.39%	-0.22%
7	7		JavaScript	2.82%	+0.27%
8	8		Assembly language	2.49%	+0.07%
9	10	↑	SQL	2.01%	+0.21%
10	9	↓	PHP	1.68%	-0.17%
11	24	⇈	Objective-C	1.49%	+0.86%
12	14	↑	Go	1.16%	+0.03%

https://www.tiobe.com/tiobe-index/


Monty Python's
FLYING
CIRCUS

"A program is a sequence of instructions written in a programming language that specifies how to solve a problem"

Program

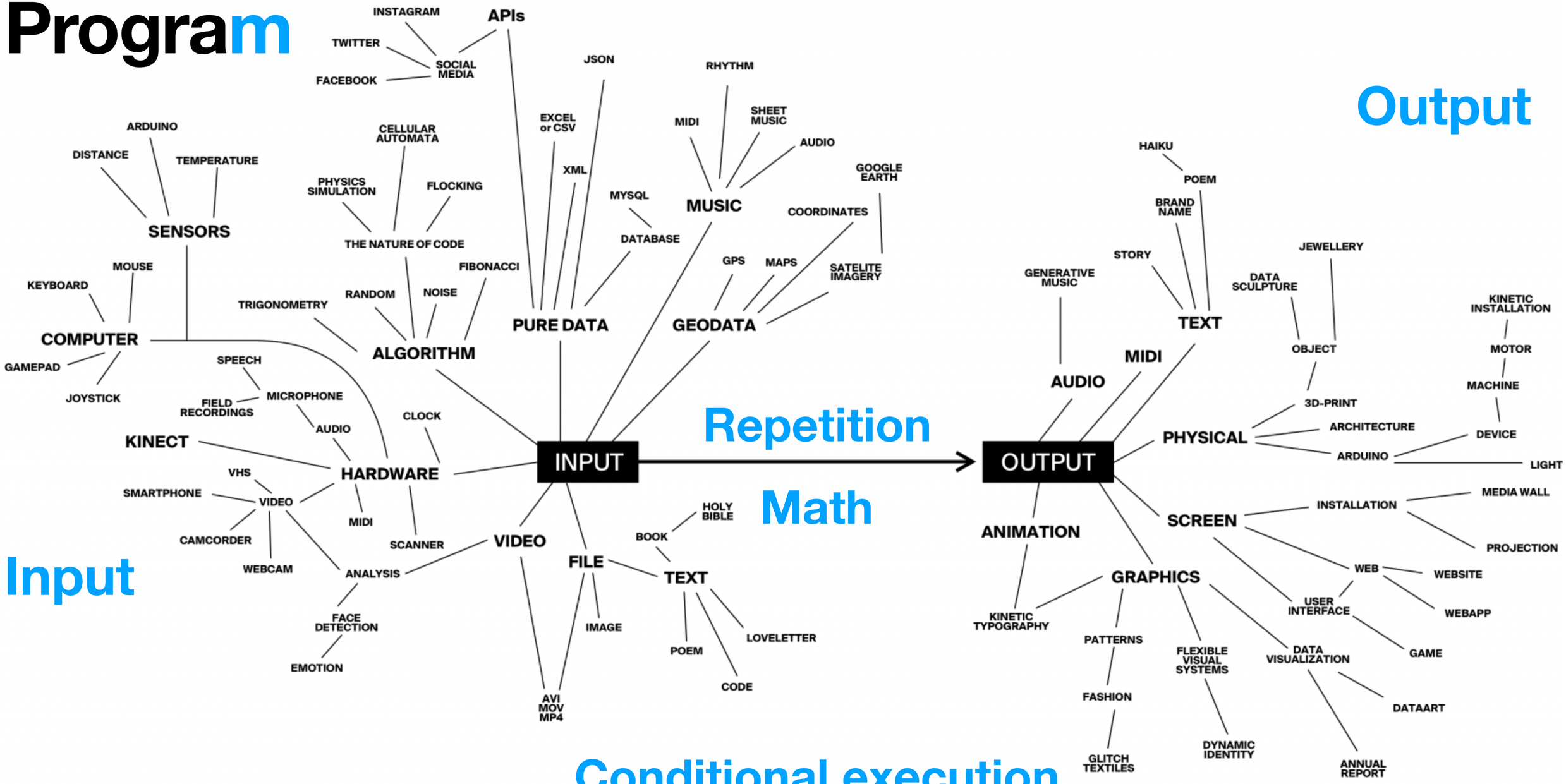
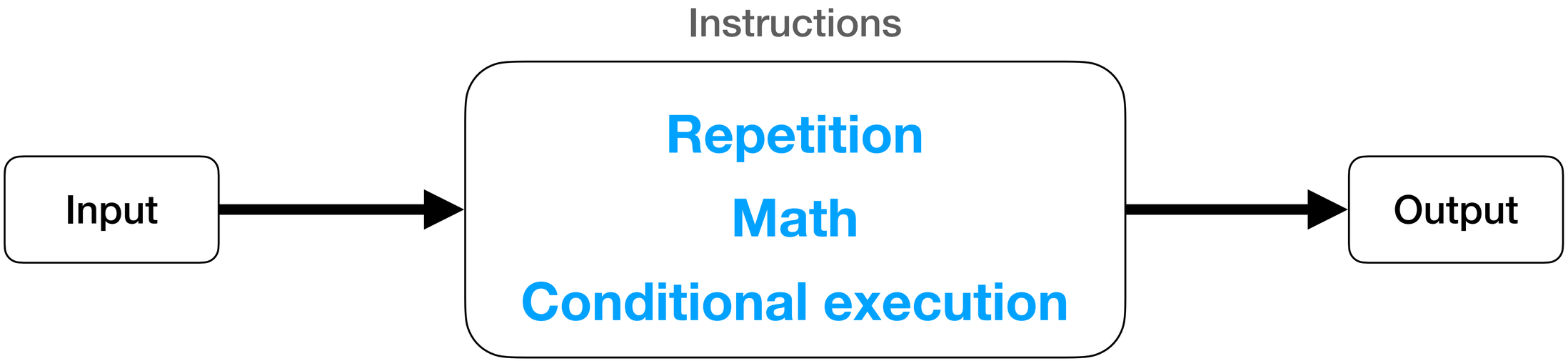


Image taken from: https://timrodenbroeker.de/what-is-creative-coding/

Program


Instructions
Input
Repetition
Math
Conditional execution
Output

Compilers & Interpreters

Computers only understand **machine language**. This language is written exclusively in **zeros and ones**, so it looks somehow like this:

0011101000111010

1011010100001010

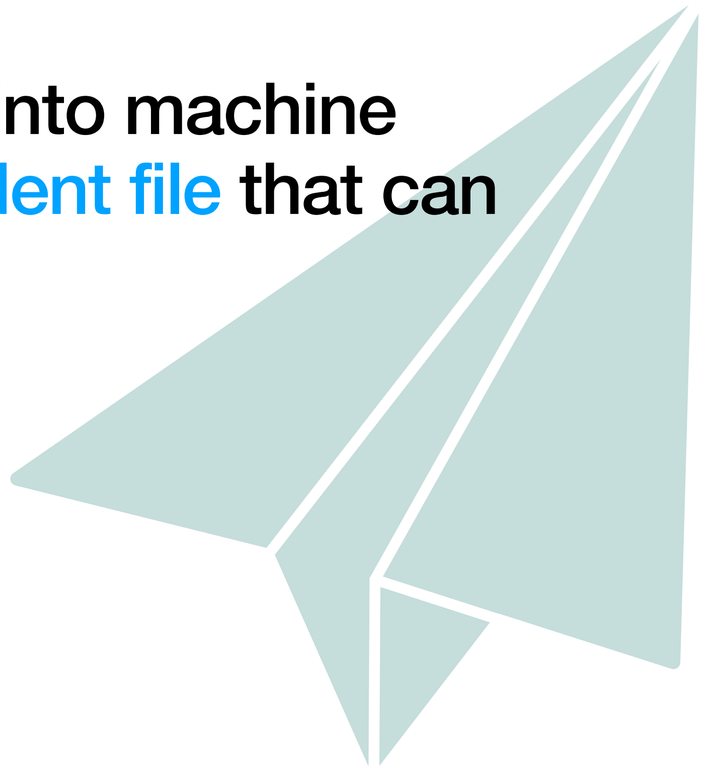
Compilers & Interpreters

It is cumbersome for programmers to write programs in such language. Therefore, we need translators that map high-level languages (e.g., Python) to machine language.

Compilers & Interpreters

Interpreter: reads the source code of a program, parses it, translates it, and executes it on the fly (e.g., Python).

Compiler: it takes the program and translates it into machine language. This translation is saved in an independent file that can be later used for execution.



Mentimeter

https://www.menti.com/8co1js3uxs

Homework

- Installation Guide
- Coding standard
- Video Tutorials
- Assignment 0 (Canvas ➡ assignments) -> Deadline: due 09 Sep at 23:59 p.m.
- Exercise 1 (Canvas ➡ assignments) due 14 Sep at 23:59 p.m.
- Prepare lecture 2 (Canvas ➡ Modules ➡ Week 2)