Introduction to Programming

The first step to real programming

JavaScript

Agenda

- The course general and How to work during the course?
- What is a program?
- What is programming?
- How does a program run on the computer?
- JavaScript is a programming language!
- Where to develop JavaScript programs?
- Questions

Learn Objectives

- You know what a program is?
- You know what is programming?
- You know how a program runs on a computer?

Program and Programming

What is a program?

Computer programs are collections of instructions that tell a computer how to interact with the user, interact with the computer hardware and process data.

- Steps to finish a job
- By using programming concepts
- Operating on computer resources

Language	Example program

“C”	`#include <stdio.h>`
	`void main() {`
	`  printf("Hello World");`
	`}`

C++	`#include <iostream>`
	`int main() {`
	`  cout << "Hello World";`
	`  return 0;`
	`}`

Pascal	`program helloworld (output);`
	`begin`
	`  writeln('Hello World');`
	`end.`

Oracle PL/SQL	`CREATE OR REPLACE PROCEDURE helloworld AS`
	`BEGIN`
	`  DBMS_OUTPUT.PUT_LINE('Hello World');`
	`END;`

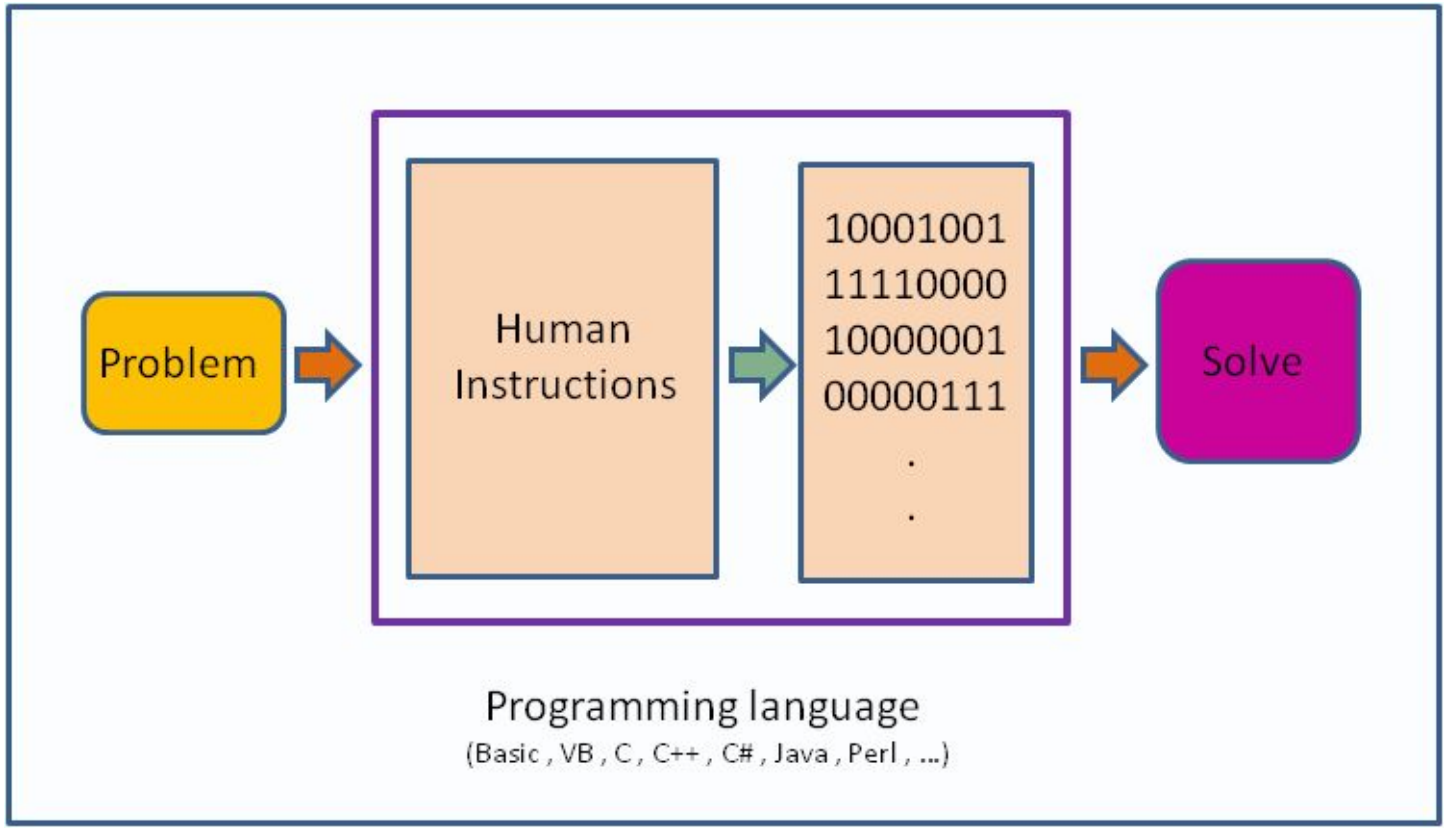
Java	`class helloworld {`
	`  public static void main (String args []) {`
	`  System.out.println ("Hello World");`
	`  }`
	`}`

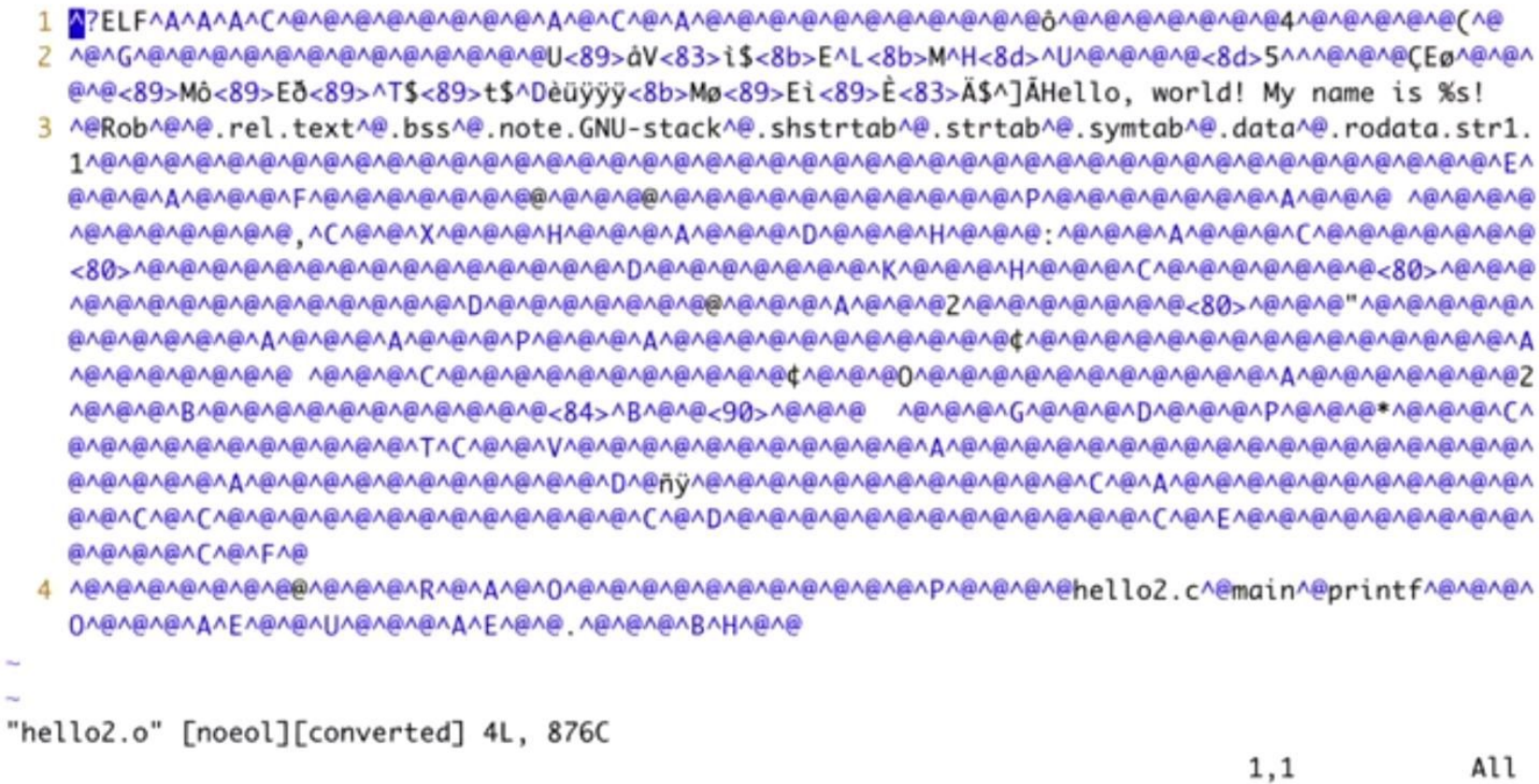
Perl	`#!/usr/local/bin/perl -w print "Hello World";`
Basic	`print "Hello World"`

Sample “hello world” programs from different languages

```
<!DOCTYPE html>
<html>
  <head>
    <link href="https://developer.cdn.mozilla.net/static/build/styles/s
          rel="stylesheet" type="text/css">

    <style type="text/css">
      h1 {
        color: blue;
      }
    </style>
  </head>
  <body>
    <h1>Your example?</h1>


    <script type="text/javascript">
      document.querySelector('h1').onclick = function() {
        document.querySelector('h1').textContent = 'Your example?';
      };
    </script>

  </body>
</html>
```

JS Code


Problem
Human Instructions
10001001
11110000
10000001
00000111
.
.
Solve
Programming language
(Basic , VB , C , C++ , C# , Java , Perl , ...)



Mashine Code

Source: https://cs50.stackexchange.com/questions/2763/code-in-compilers-video-shows-several-lines-as-an-example-of-machine-co

Programming

Define the journey of a bit

DEFINITION:

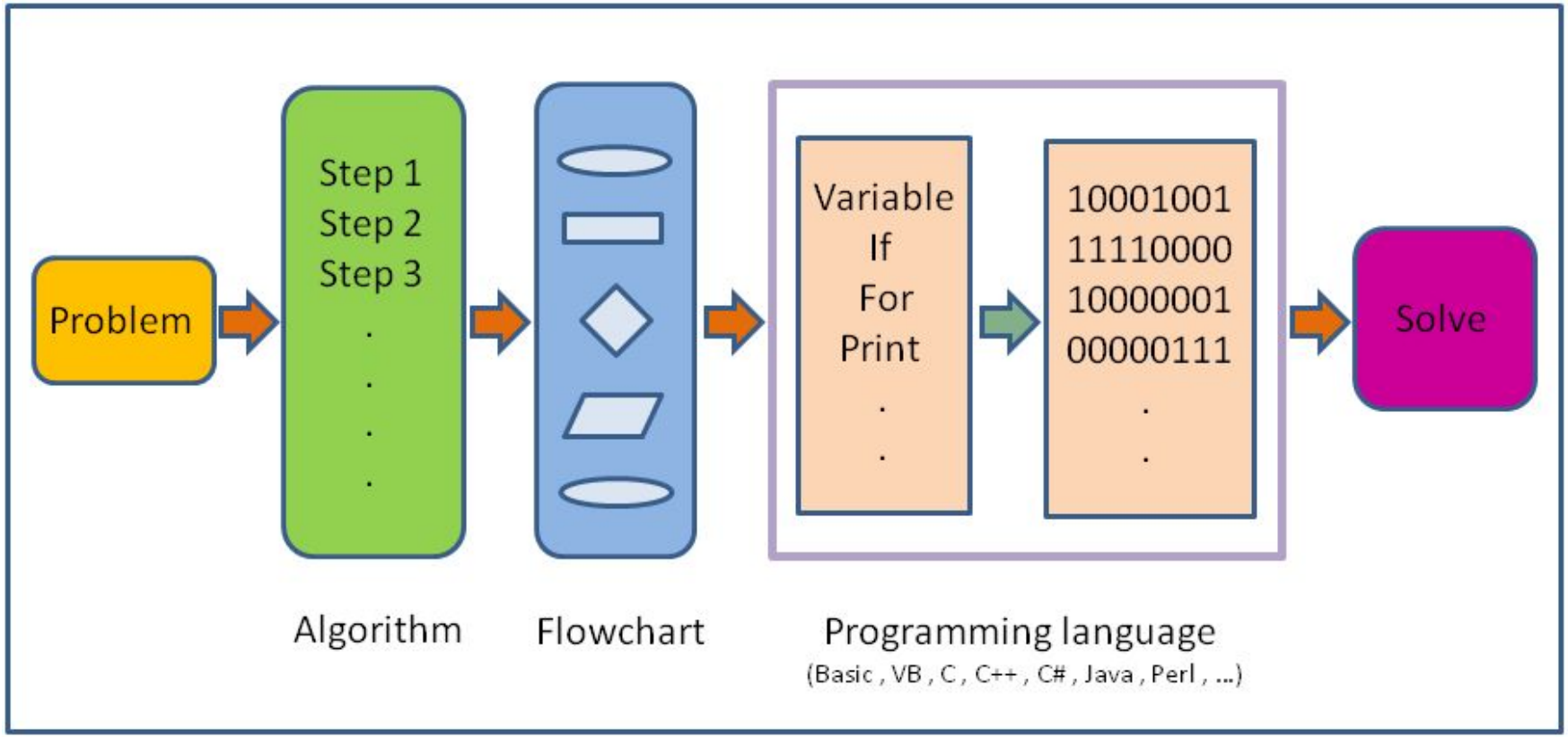
“a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.”

“The word algorithm derives from the name of the mathematician, Mohammed ibn-Musa al-Khwarizmi,”

We do it daily!

How do I solve a problem once and the solution can be reused.

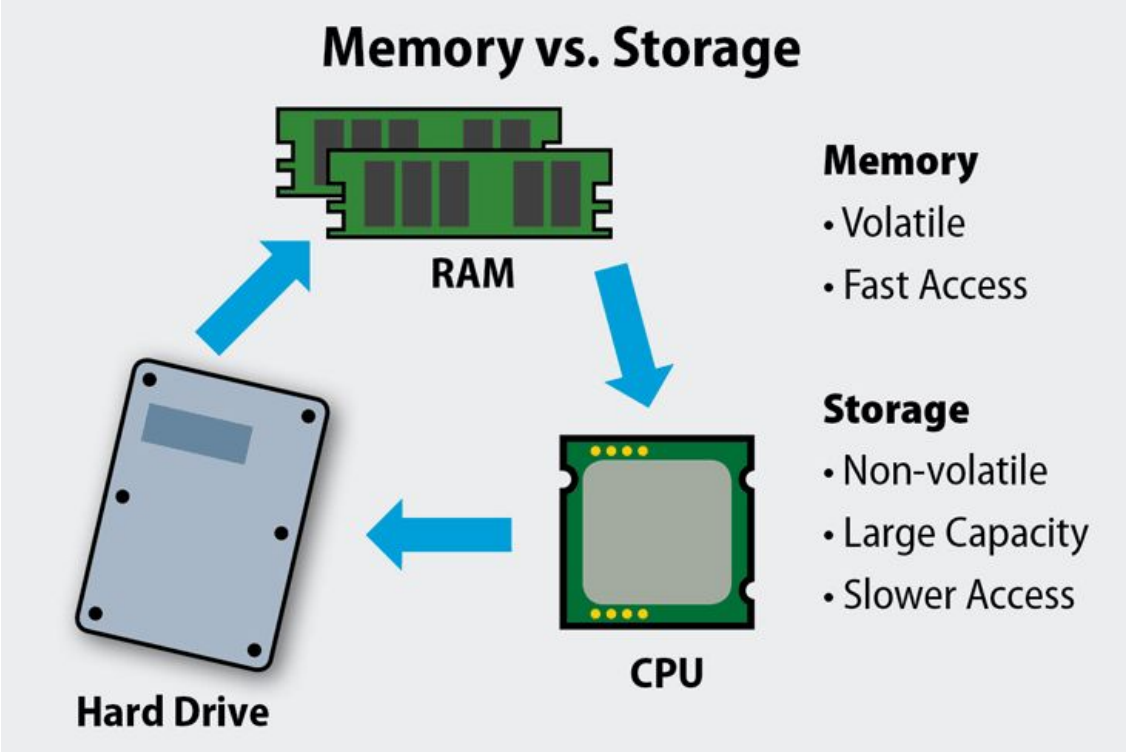
What is “heuristic” approach?


Problem
Step 1
Step 2
Step 3
.
.
.
.
Variable
If
For
Print
.
.
10001001
11110000
10000001
00000111
.
.
Solve
Algorithm
Flowchart
Programming language
(Basic , VB , C , C++ , C# , Java , Perl , ...)

How does run a program?

Components

- CPU
- Memory
- Bus
- I/O Peripherals
  - monitor
  - printer
  - mouse
  - keyboard
  - ...



Interaction with the system

How the data flows?

- Coded Programs are converted into a binary format which are represented just as 1001101010101...
- The instructions are processed in nano-seconds by the CPU.
- The processed data or instructions by cpu are then temporarily saved on the memory.
- The only way having the real data persistency (independent from the electricity) is the usage of the hard disk.

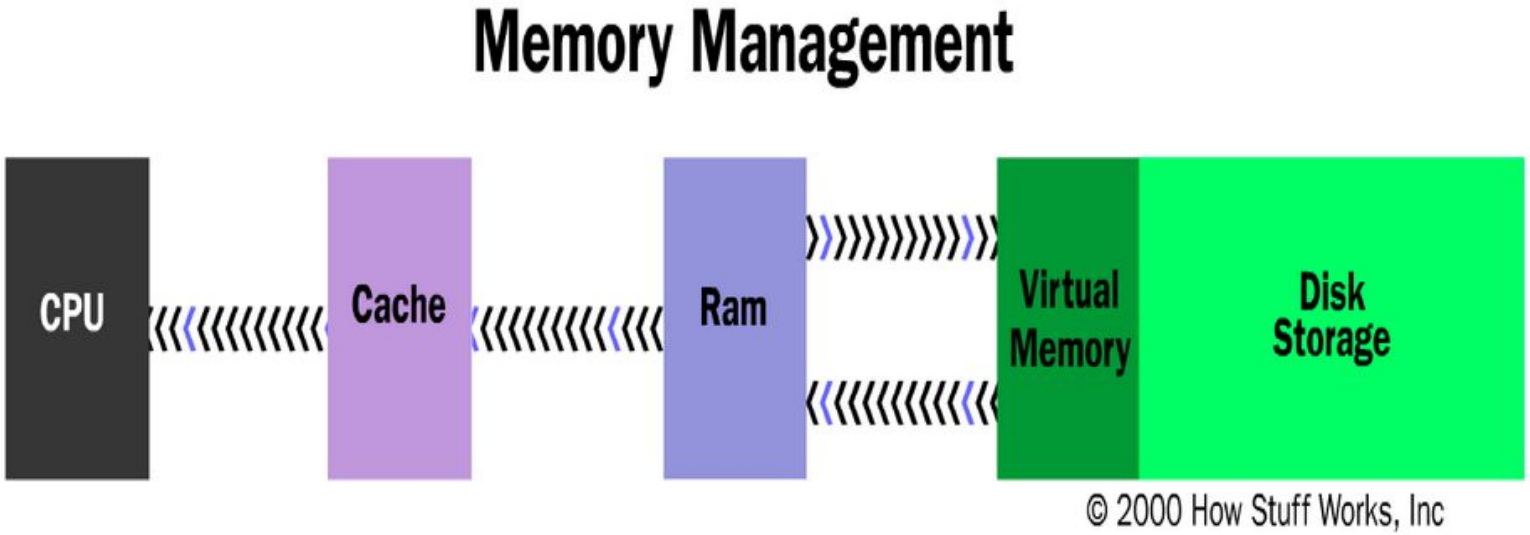
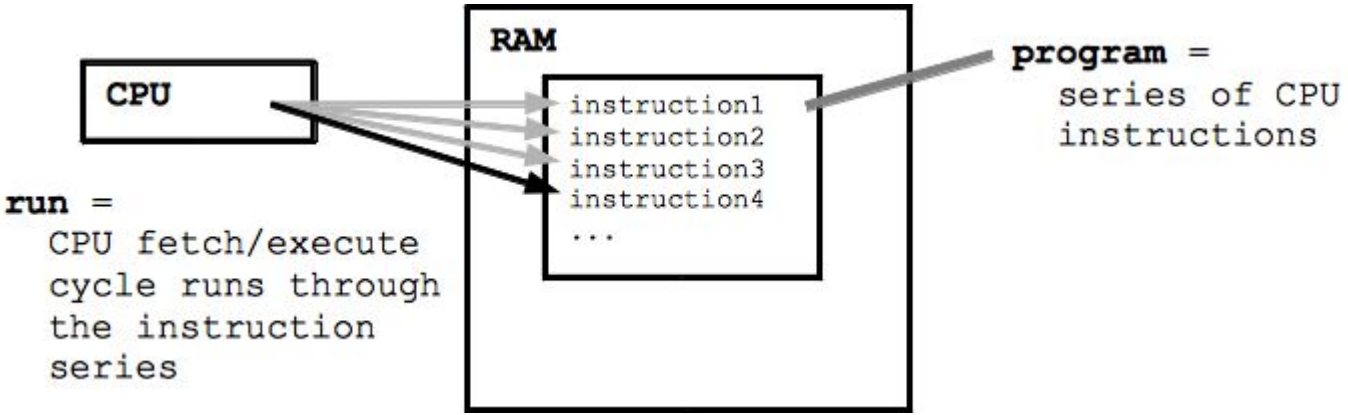
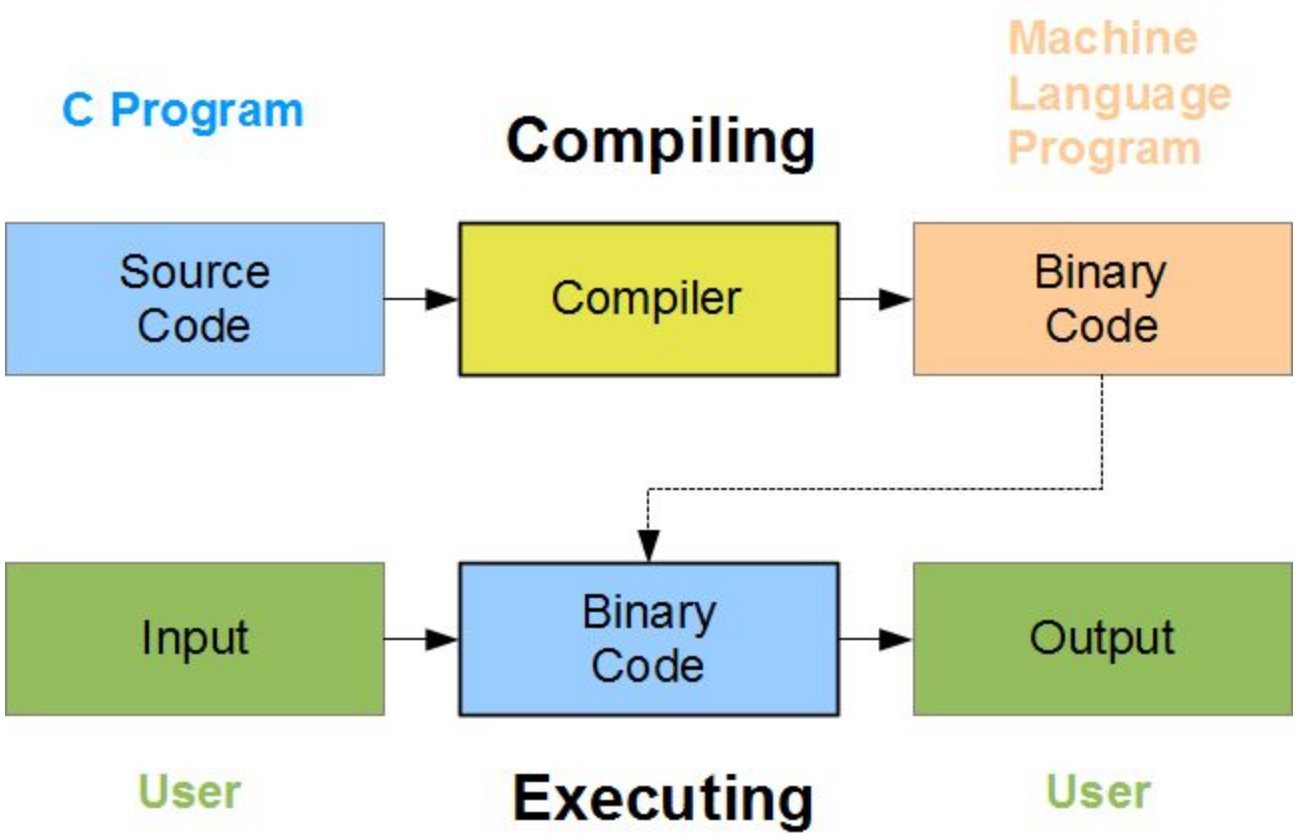


Diagram shows how the communication between ram and cpu is working
https://www.youtube.com/watch?v=p3q5zWCw8J4
https://www.youtube.com/watch?v=F0Ri2TpRBBg

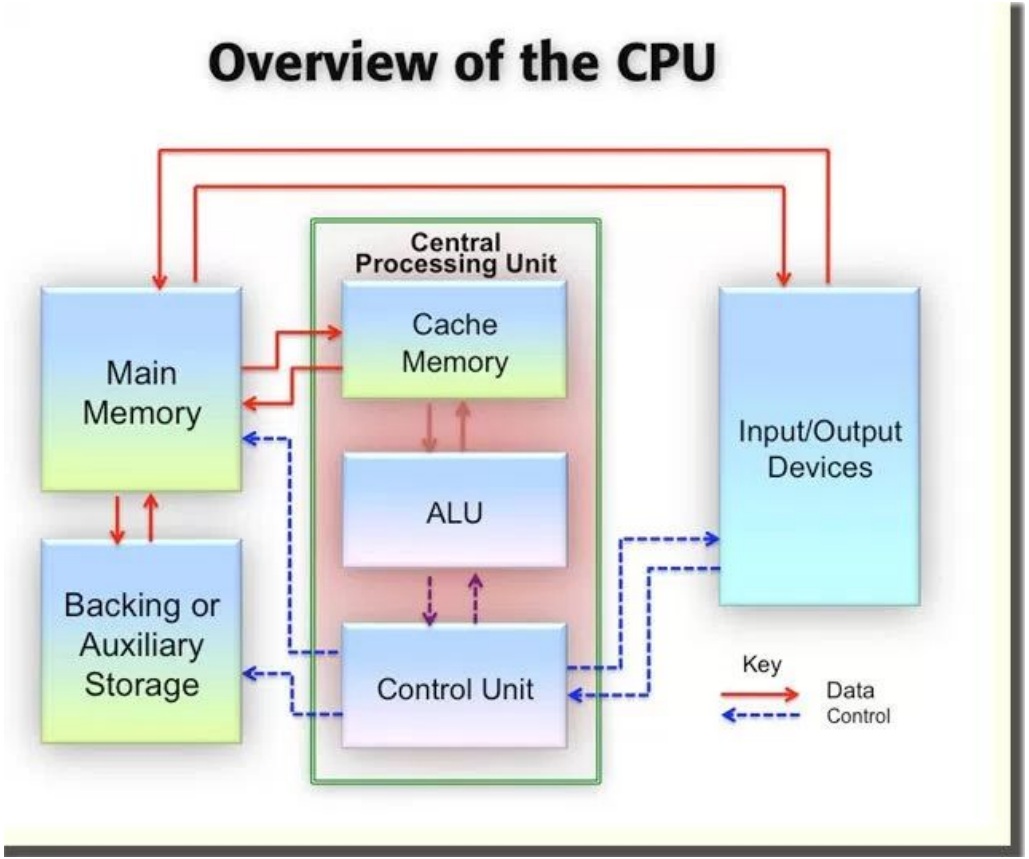


The program code (converted to machine code just like 01010010...) is loaded onto a special memory location and run sequentially by the cpu

Source: http://web.stanford.edu/

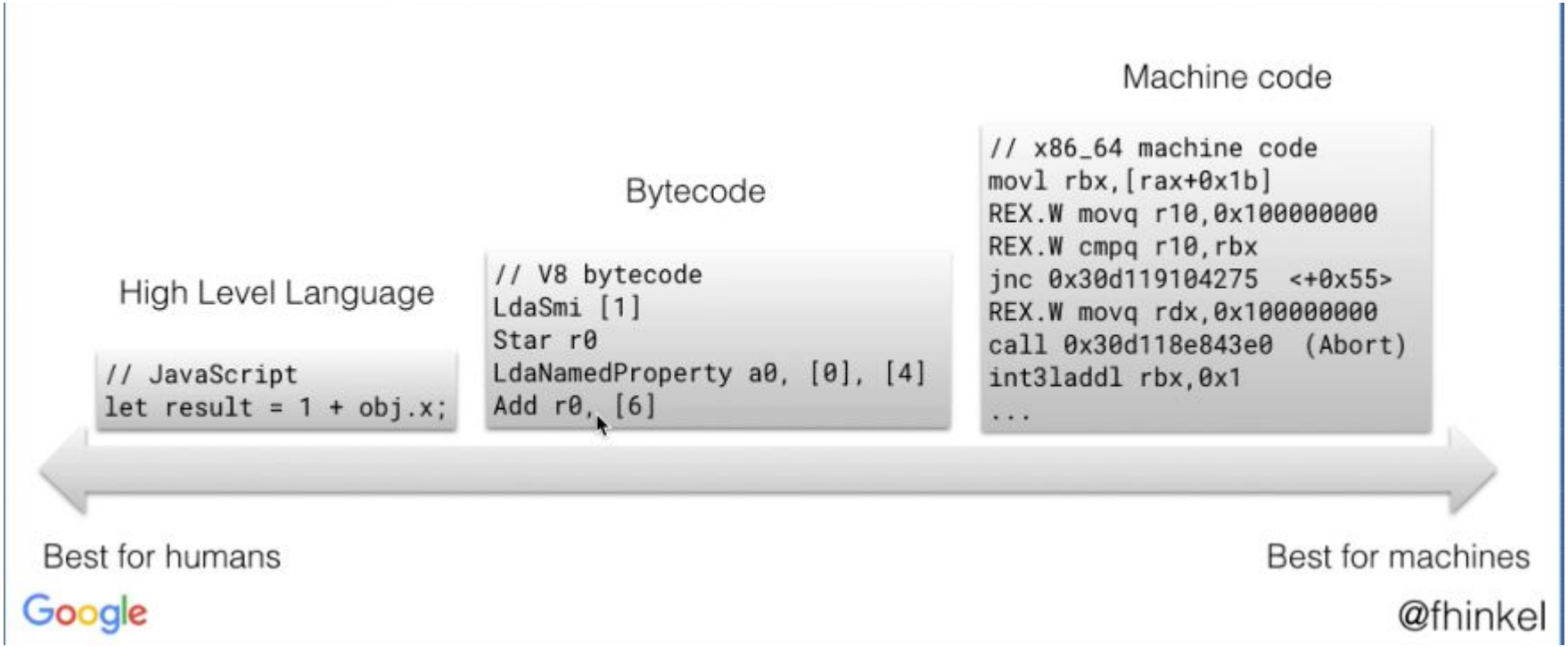


How a program code (written human readable text) is converted into executable code (binary format/ machine code).



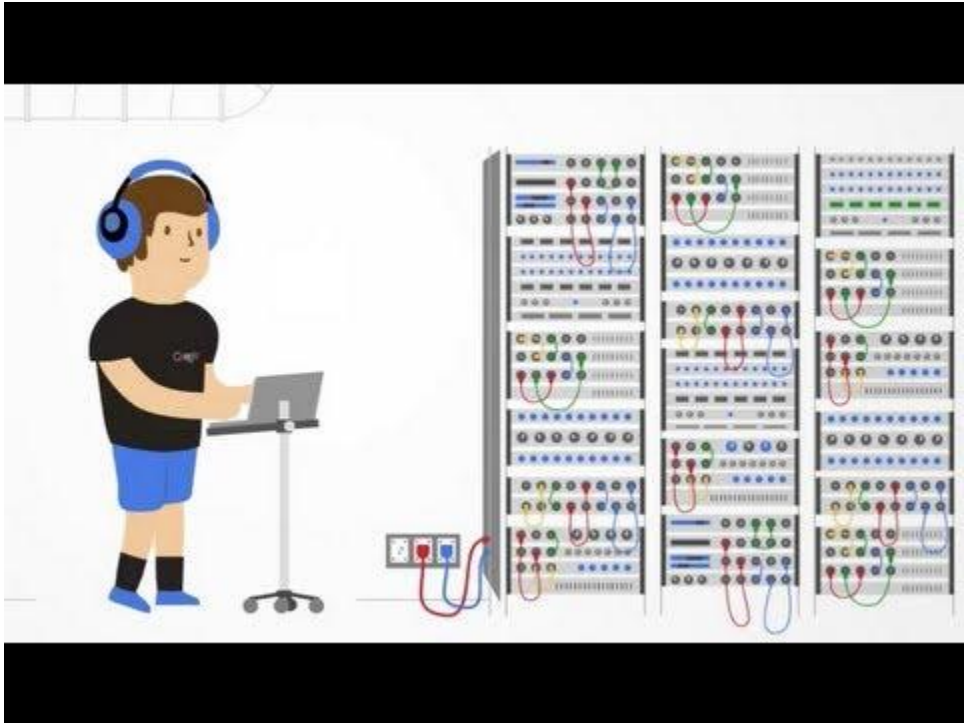
CPU Internals

Source: https://www.binarymove.com/how-cpu-works/



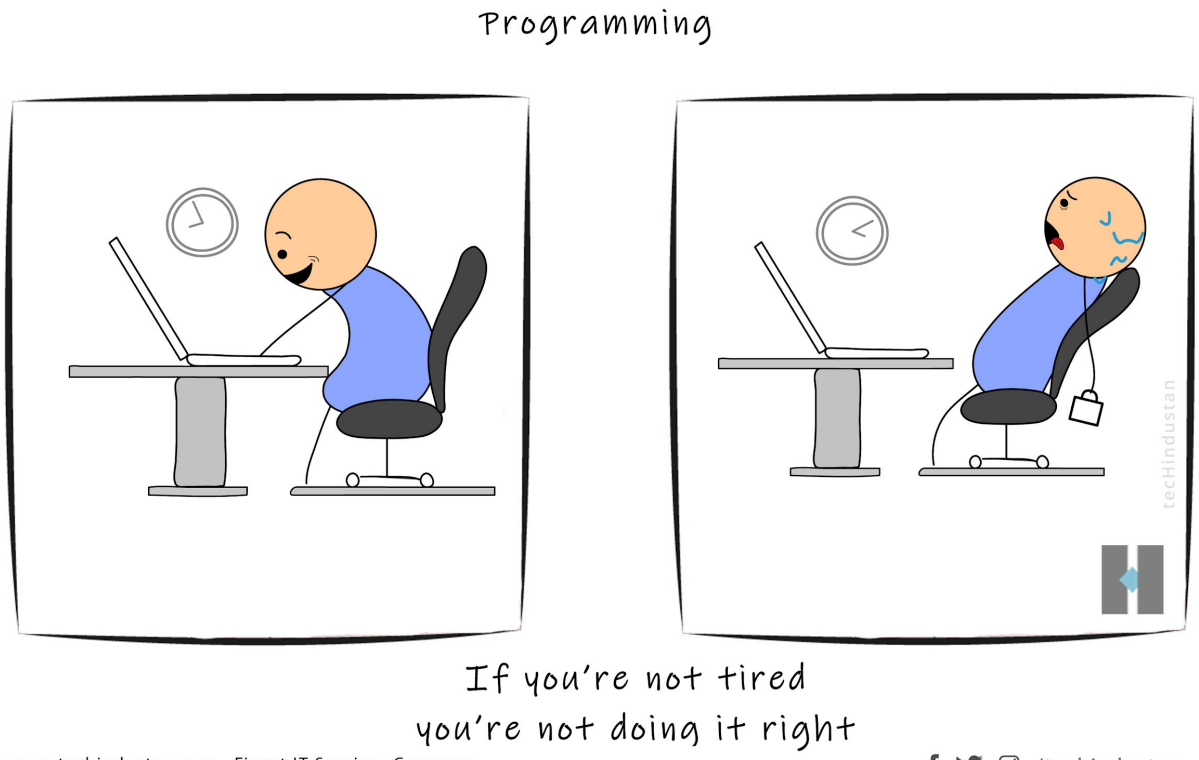
How is the code being translated?

Source: https://gerardnico.com/code/lang/machine



a journey of a send

Programmer

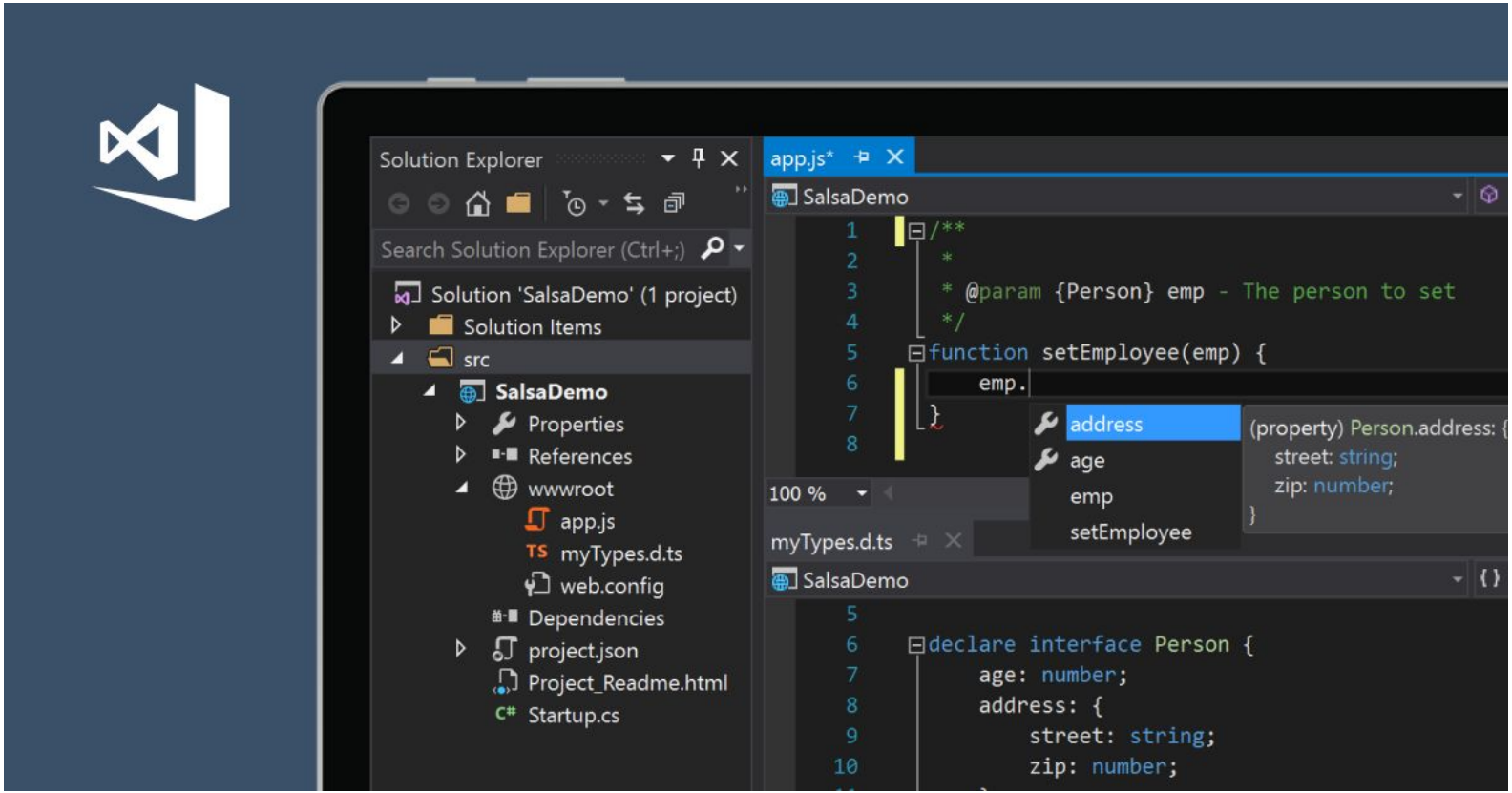


Lord of the bits.

Programmers use tools

For the programming

- Algorithms
- Data Structures
- Design Principles
- IDE
- Flowchart
- Pseudo Codes
- Debuggers
- ...


Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'SalsaDemo' (1 project)
Solution Items
src
SalsaDemo
Properties
References
wwwroot
app.js
myTypes.d.ts
web.config
Dependencies
project.json
Project_Readme.html
Startup.cs
app.js*
SalsaDemo
/**
*
* @param {Person} emp - The person to set
*/
function setEmployee(emp) {
emp.
}
address
age
emp
setEmployee
(property) Person.address:
street: string;
zip: number;
100 %
myTypes.d.ts
SalsaDemo
declare interface Person {
age: number;
address: {
street: string;
zip: number;

IDE

Algorithm

Define steps

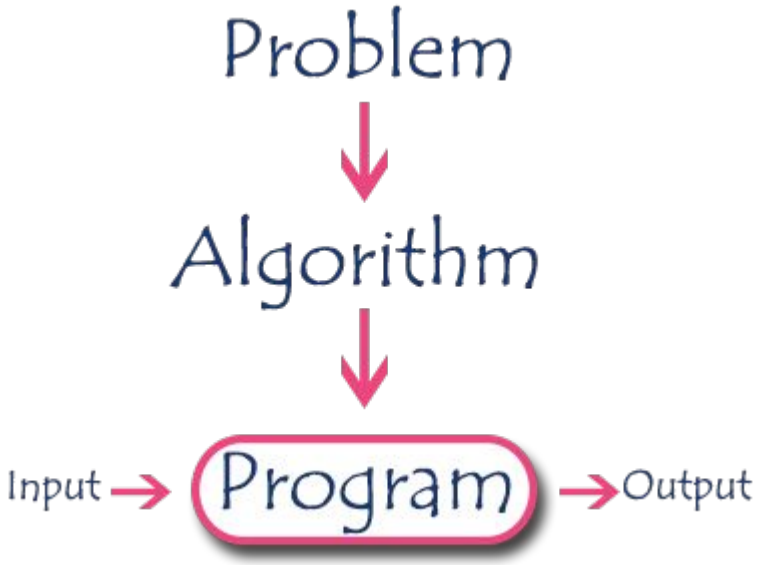
DEFINITION:

“a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.”

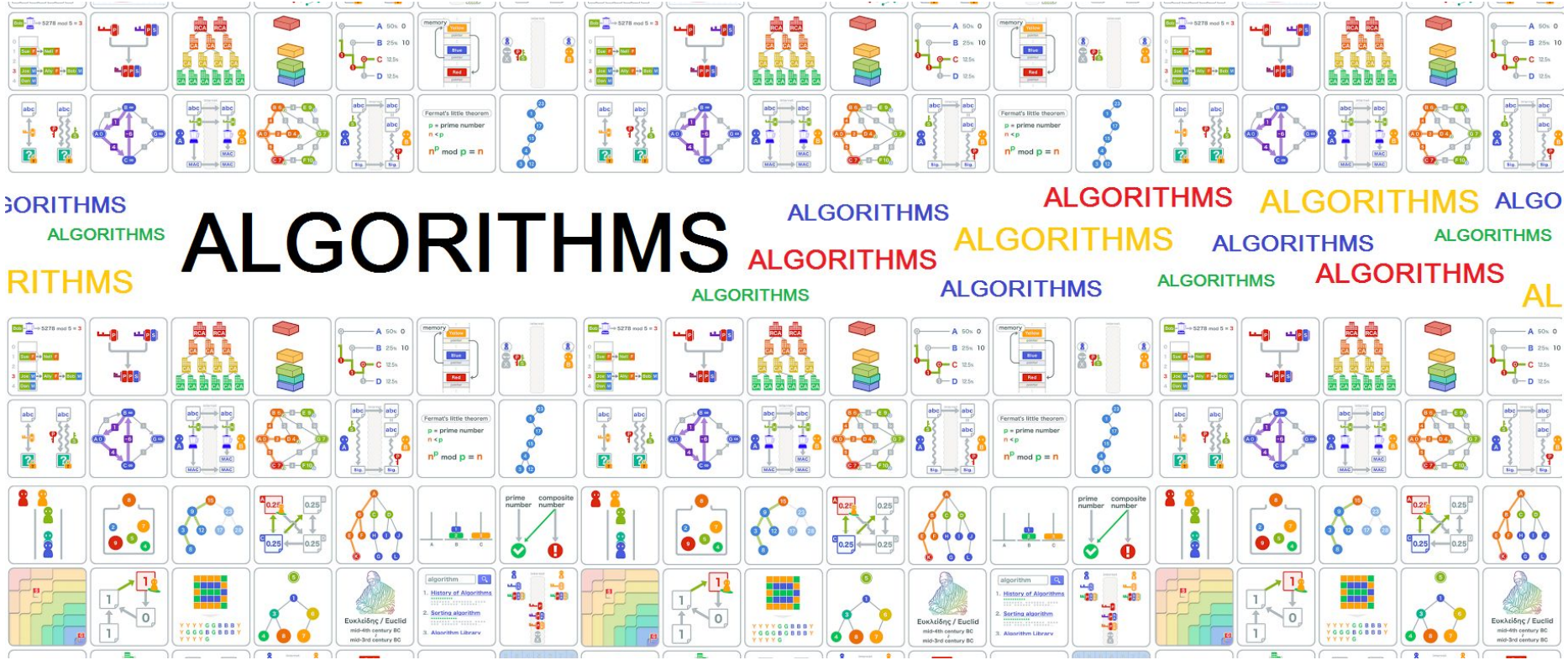
“The word algorithm derives from the name of the mathematician, Mohammed ibn-Musa al-Khwarizmi,”

Wir machen es täglich!

Wie löse ich ein Problem einmal und die Lösung kann wiederverwendet werden.



Source: BTech Smart Class


ALGORITHMS
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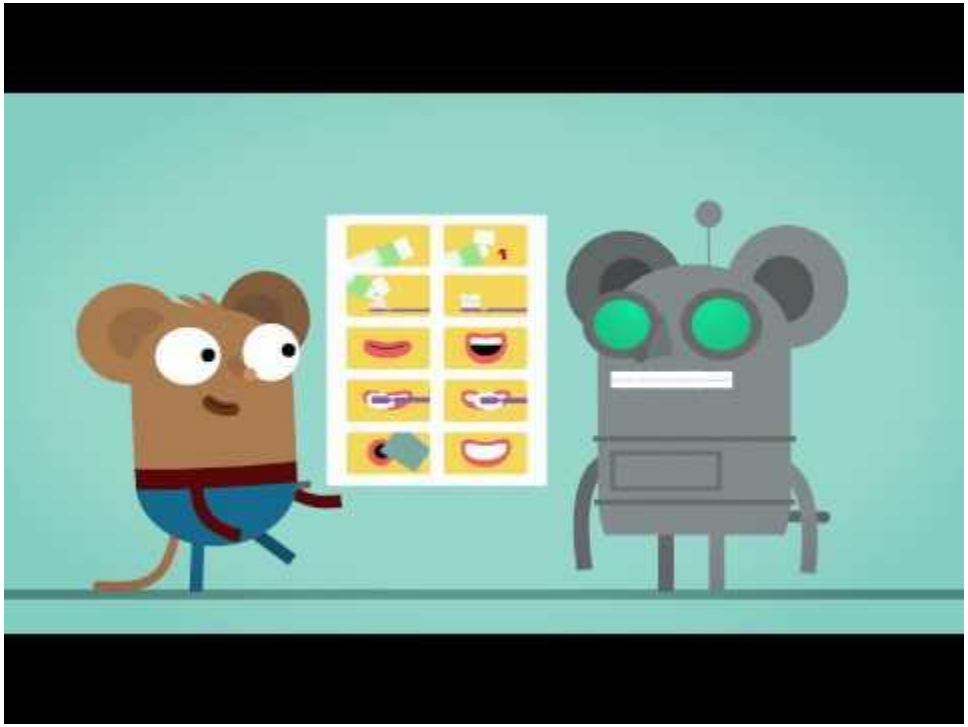

What is an algorithm?

What is an algorithm II?

Questions