Introduction to Javascript

Programming Language for ~~UI Interaction~~

JavaScript

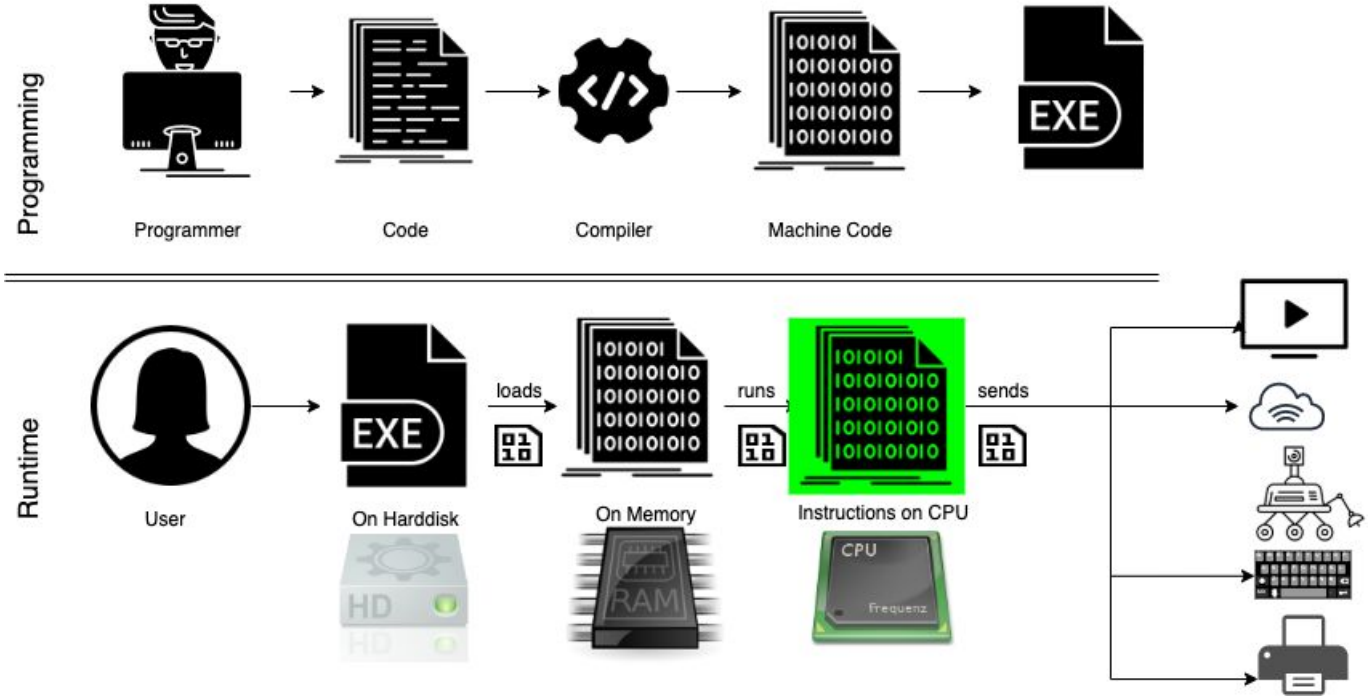
Agenda

- More on Algorithm & Flowcharts
- JavaScript and its history
- How to run JavaScript programs?
- Data types and variables
- Questions

Learn Objectives

- You understand how to create algorithms
- How to execute JS programs
- You know what Data types is.
- What are the JavaScript Variables?

Wrap up



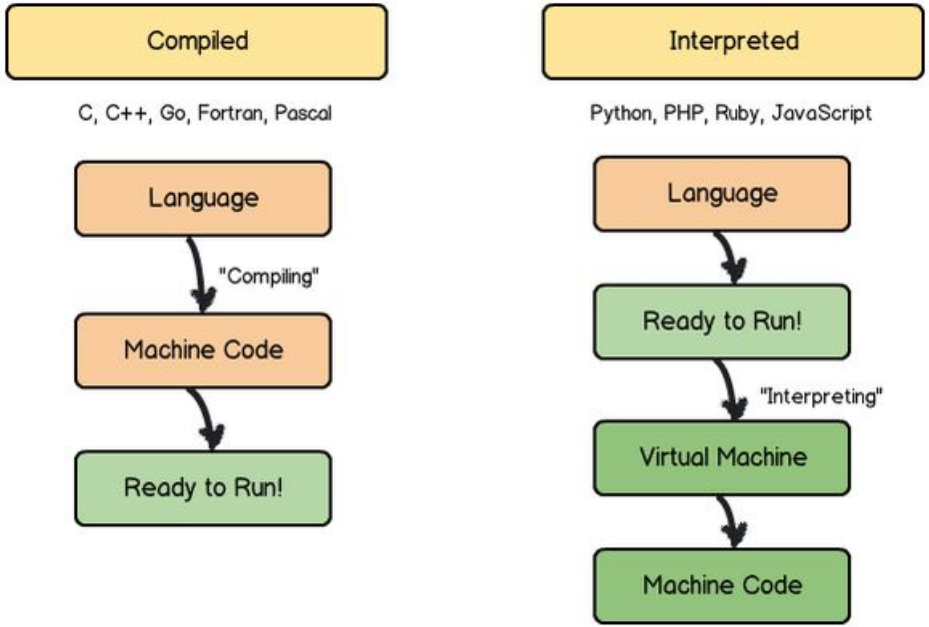
Program & Programming and Computer & Network

JavaScript

Javascript

More than 25 years with us!

- Lingua Franca vom Web
- Developed by Netscape (Brendan Eich) for interactivity in 1995
- It was inspired by Java, Scheme and Self
- The name
  - First named as Mocha,
  - Then officially named Livescript
  - Afterwards it is called Javascript (Oracle has ownership rights on the name)
  - Currently ES6 (ecma script)
- Interpreted language



compiled vs **interpreted (js)**

JavaScript

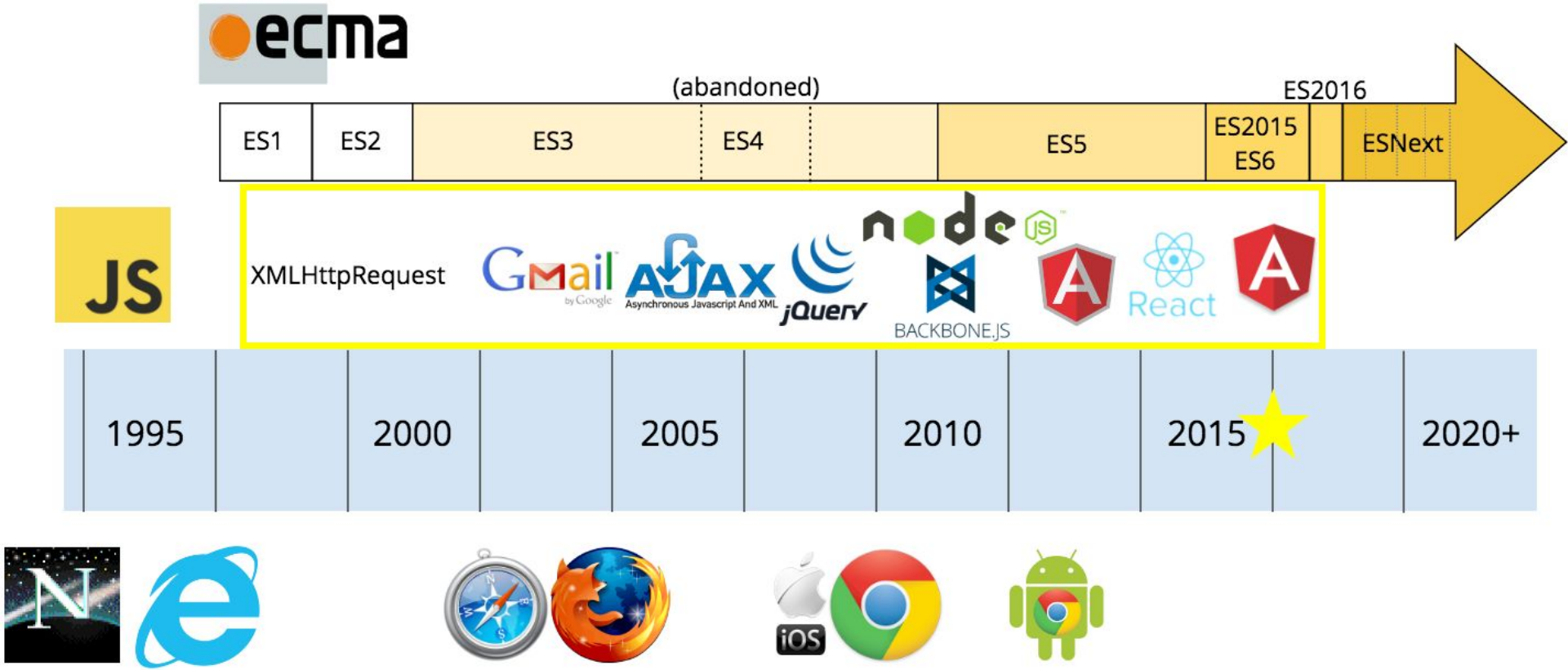
As Language

- Programs are an ordered list of logical steps which are dealing with a task.
  - Task -> Subtask -> Language structure
- JS is a programming language
  - Native Language Analogy
- JS runs on platforms (engines):
  - Browser (V8, Spidermonkey, Chakra)
  - NodeJS
  - ~~JVM~~
- JS supports the following programming paradigms
  - Imperative
  - Functional
  - Object Oriented
  - Event driven
- JS is a weakly typed language
  - types?
- Language standards will be maintained by ECMA International, Geneva
- TC39 is the technical commitee https://github.com/tc39

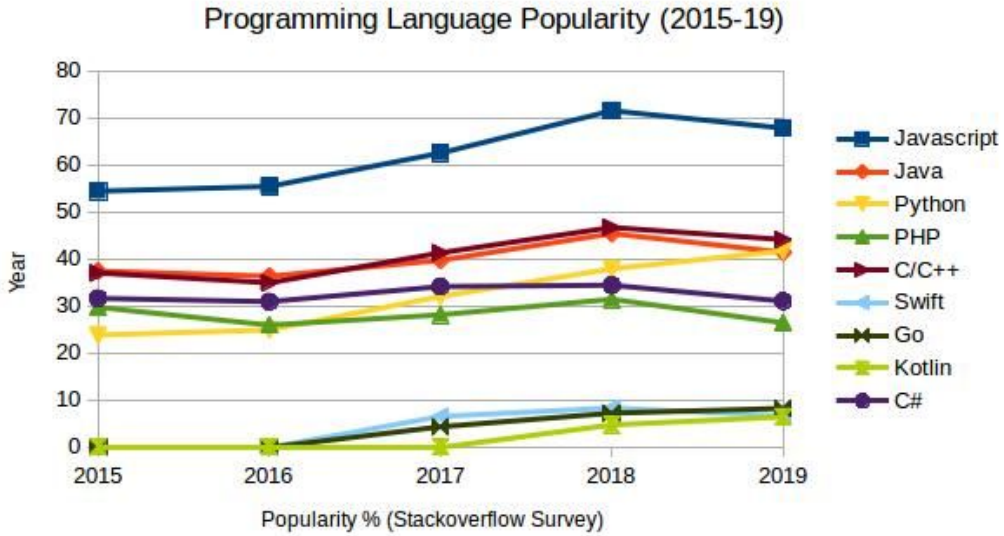
Keyword :: one of

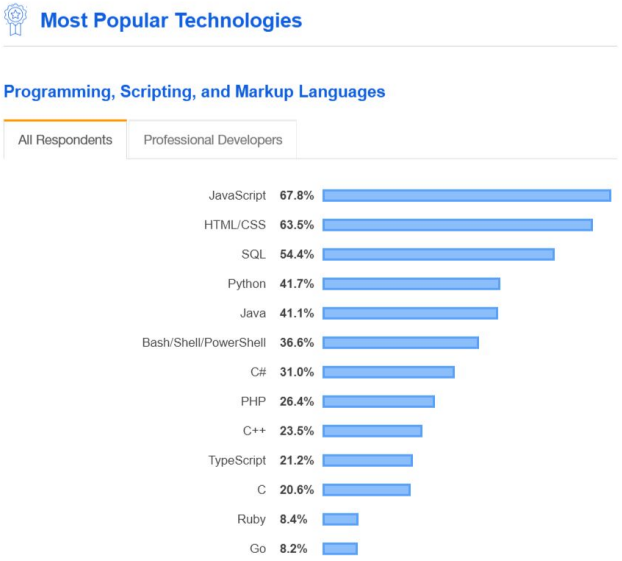
```
break      do         in           typeof
case       else       instanceof   var
catch      export     new          void
class      extends    return       while
const      finally    super        with
continue   for        switch       yield
debugger   function   this
default    if         throw
delete     import     try
```

Reserved keywords - Lego Pieces



Evolution of JS





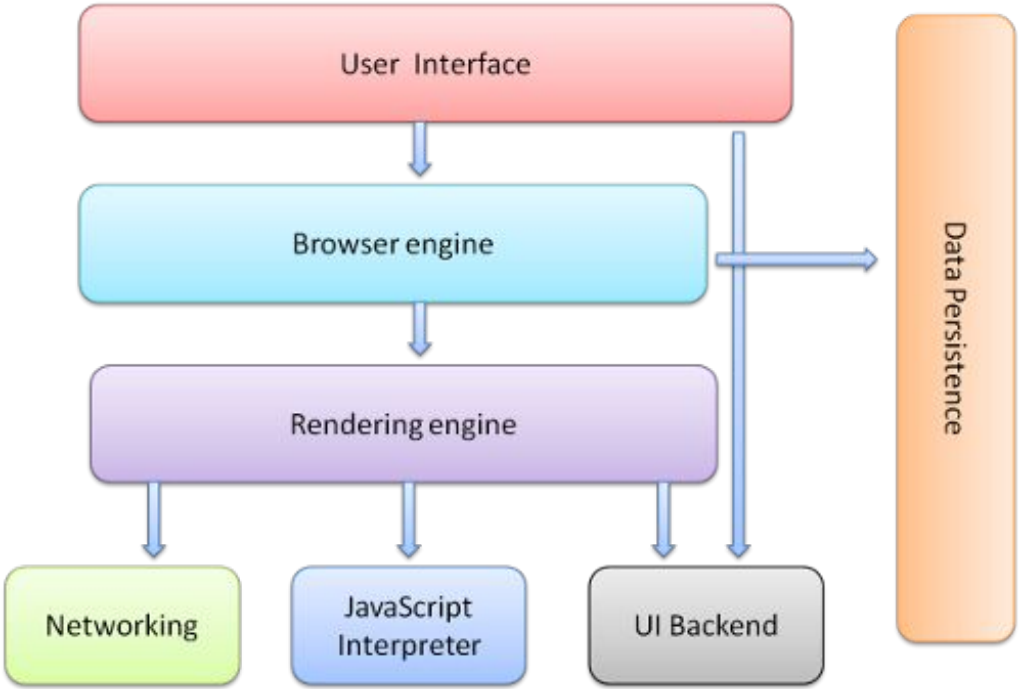
2021, Stackoverflow Survey

Popularity of Languages

How to include Javascript in Browser?

For html

- Inline
  - <input onclick=”alert(0)” />
  -
- Internal
  - Between <script> tags
- External
  - Preferred way
  - With <script src=”external.js”></script>
  - deferred, async keywords



Where does Javascript included in rendering process?

Other Development Environments

Running JS

- Node
- Visual Code
- Chrome Dev-Tools

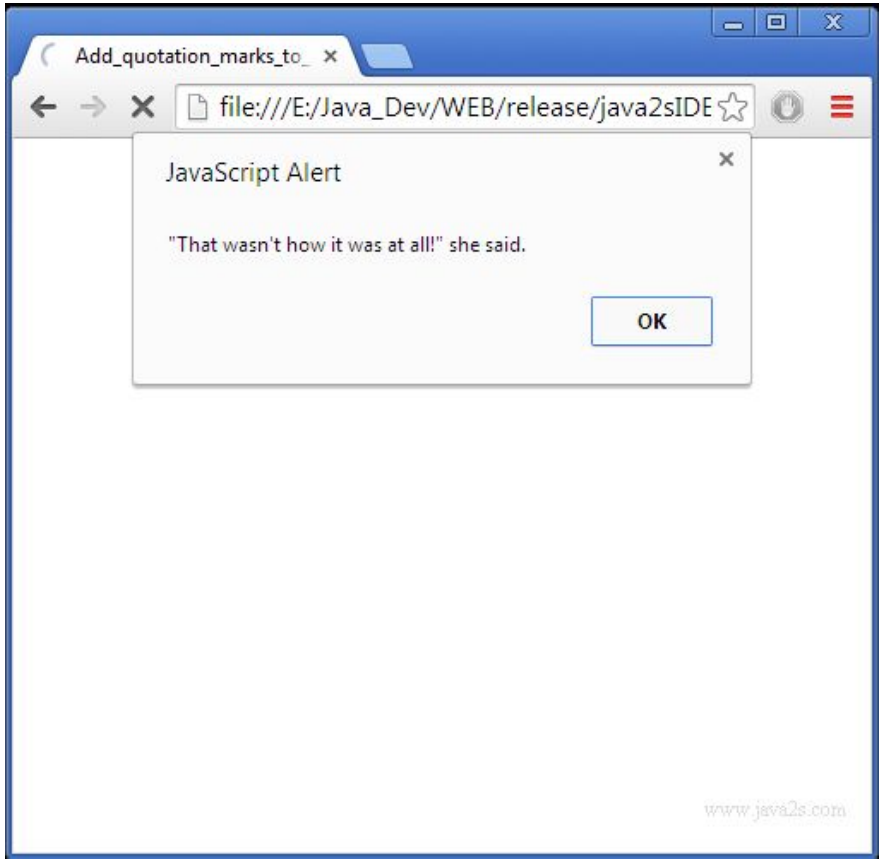
javascript Engine

Execution Environments

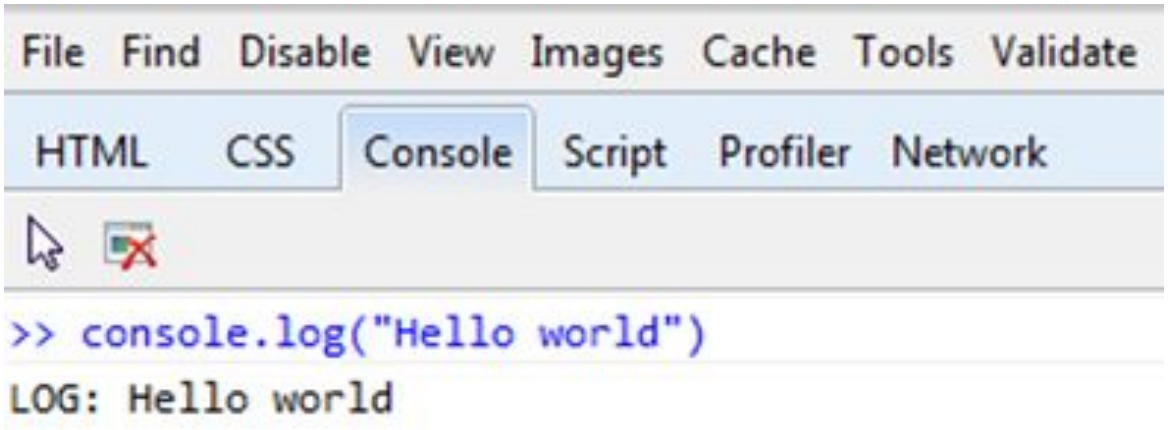
```
alert("hi coders")
prompt("enter a number", "")
document.write("<b>hi!</b>")
console.log("I am in console")
console.error("I am an error!")
```

your best friends during your programming sessions.

- Simple to understand the state of the program
- Shows immediate results of programming statements
- You know how the program is working stepwise
- Easily find the (logic) errors


Add_quotation_marks_to_
file:///E:/Java_Dev/WEB/release/java2sIDE
JavaScript Alert
"That wasn't how it was at all!" she said.
OK
www.java2s.com

alert(“”)


File Find Disable View Images Cache Tools Validate
HTML CSS Console Script Profiler Network
>> console.log("Hello world")
LOG: Hello world

console.log(“”)

Language Structures

- Variable
  - Datatype
  - Operators
  - Comparison, Evaluation
- Conditionals
  - Logical Operators
  - Switch Statement
- Loops
- Functions (subprogram)

- Strings
- Arrays
- Objects
- Built-in Objects
- Classes, Inheritance
- Modules
- Async Programming
- ...

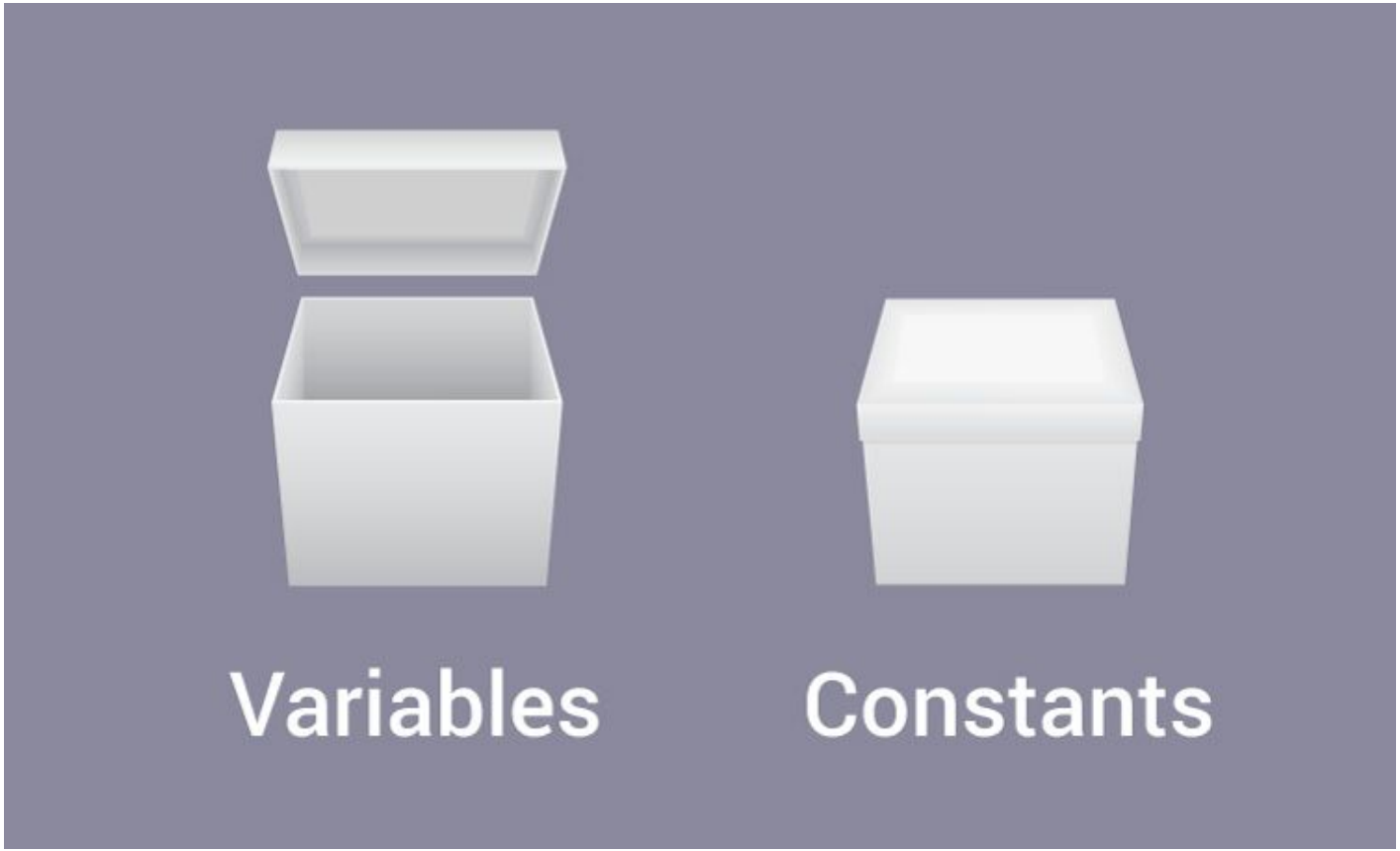
Language Constructs

Variables

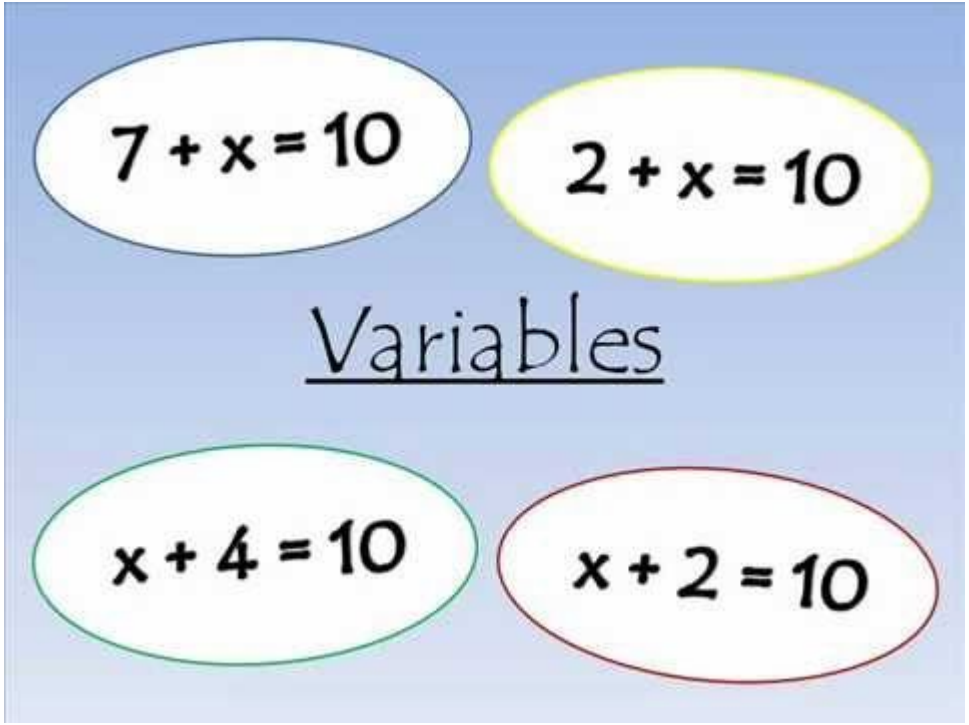
Memory addresses which are kept for the programcode temporarily.

- var & let & const
- reserved keywords
- naming conventions
- declaration
- assignment

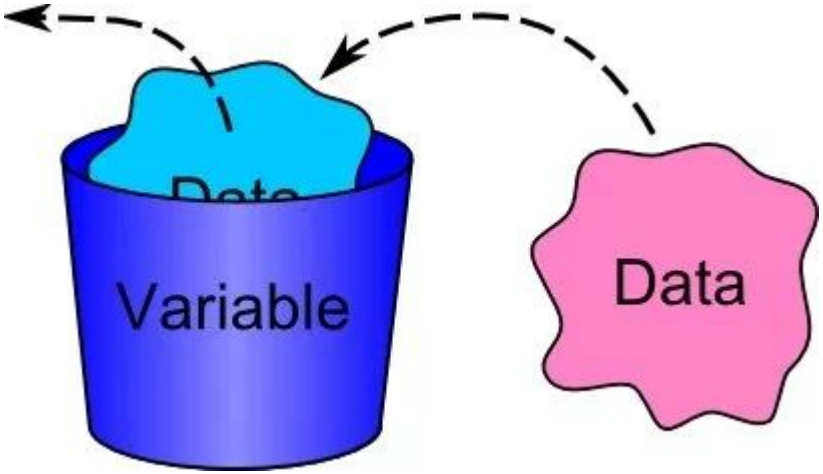
```
let  kalanPara = 10000;
let cebimdekiPara = kalanPara;
kalanPara = 3000; // cebimdekiPara'da ayni degere sahip olur

const PI = 3.14;
```

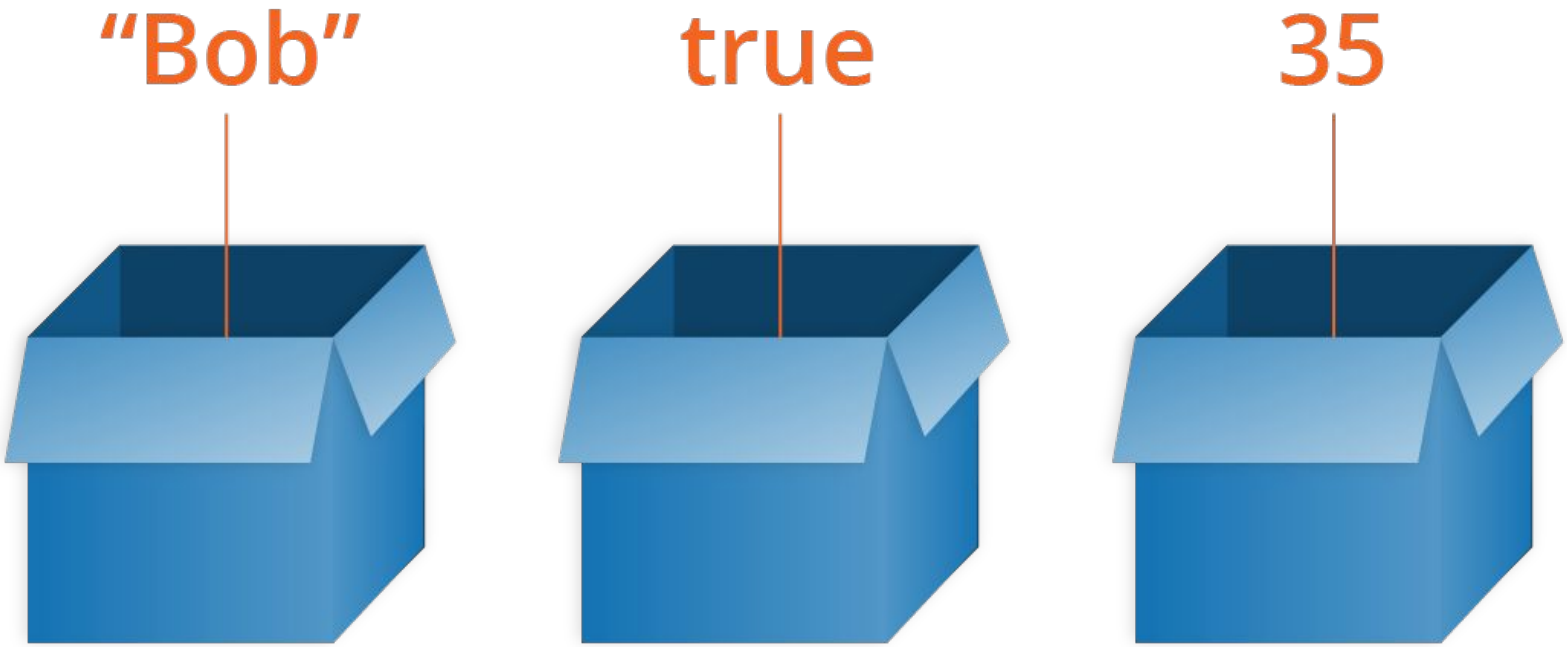


variable vs constant



Finde die x?


Variable
Data



Variables can store different types

Language Constructors

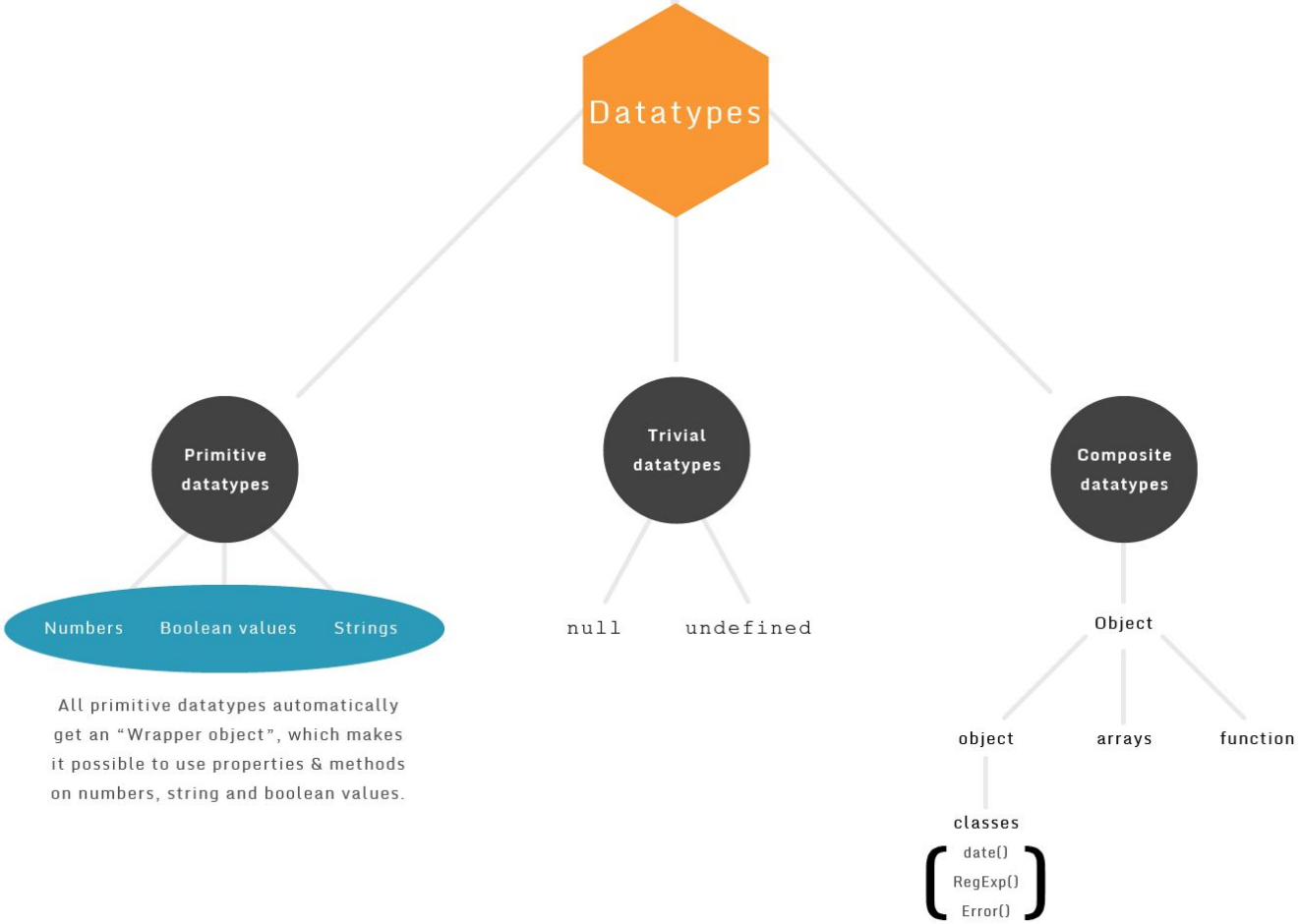
Data Types

The CPU and memory understand the data types better. Since the data types are predictable by System, the programs become faster.

- Number
- Bigint
- String
- Boolean
- null
- undefined
- object
- Symbols

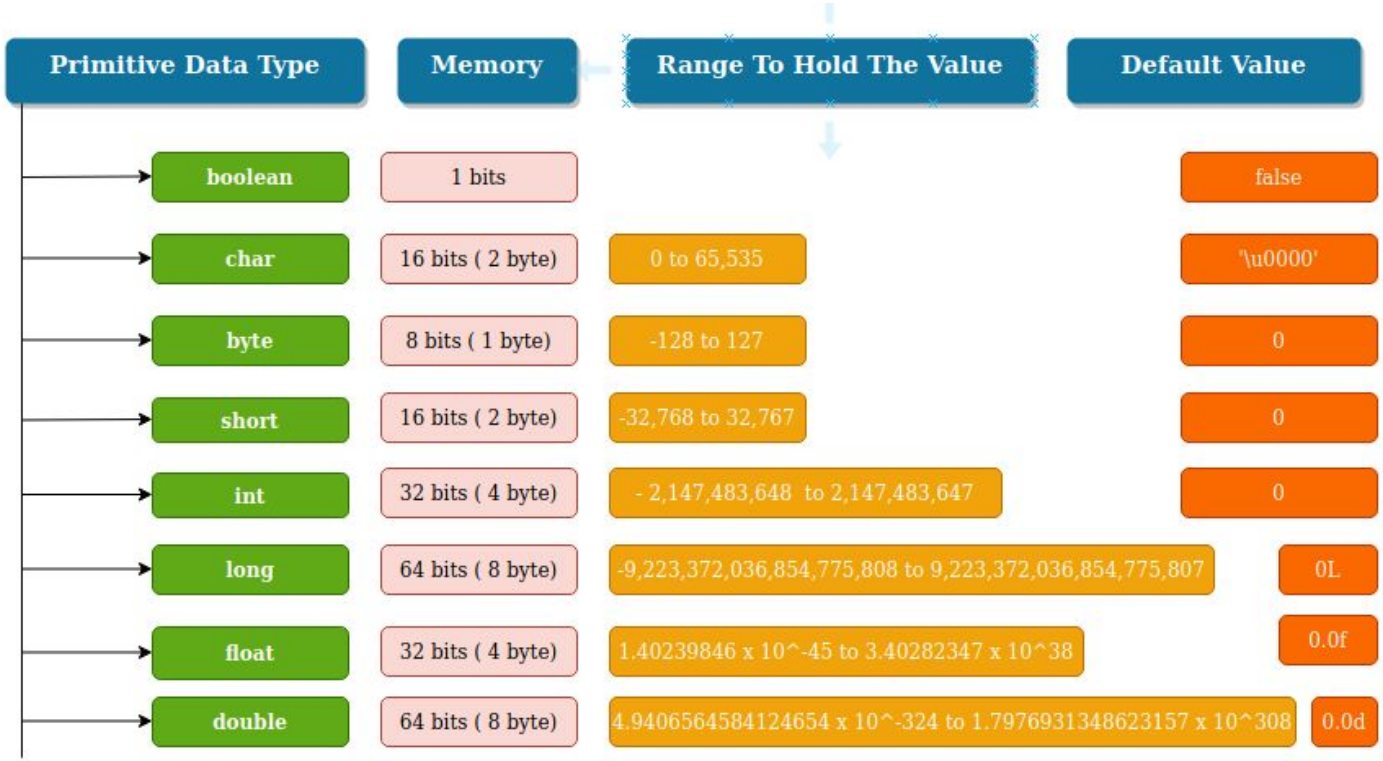
typeof & instanceof


float
int
char
long
double



All primitive datatypes automatically get an “Wrapper object”, which makes it possible to use properties & methods on numbers, string and boolean values.

Data Types



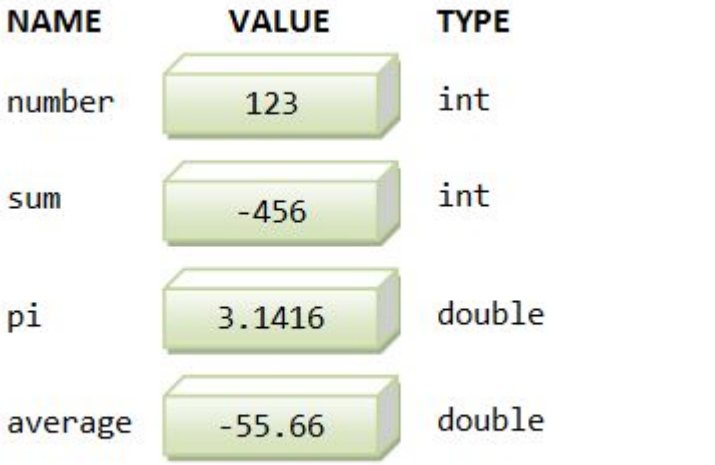
Data types and limits, generally

Numbers in Javascript

- Number.MAX_VALUE
  - 1.7976931348623157e+308
- Number.MIN_VALUE
  - 5e-324
- Number.MAX_SAFE_INTEGER
  - 9007199254740991
- Number.MIN_SAFE_INTEGER
  - -9007199254740991
- Number.NEGATIVE_INFINITY
  - -Infinity
- Number.POSITIVE_INFINITY
  - Infinity

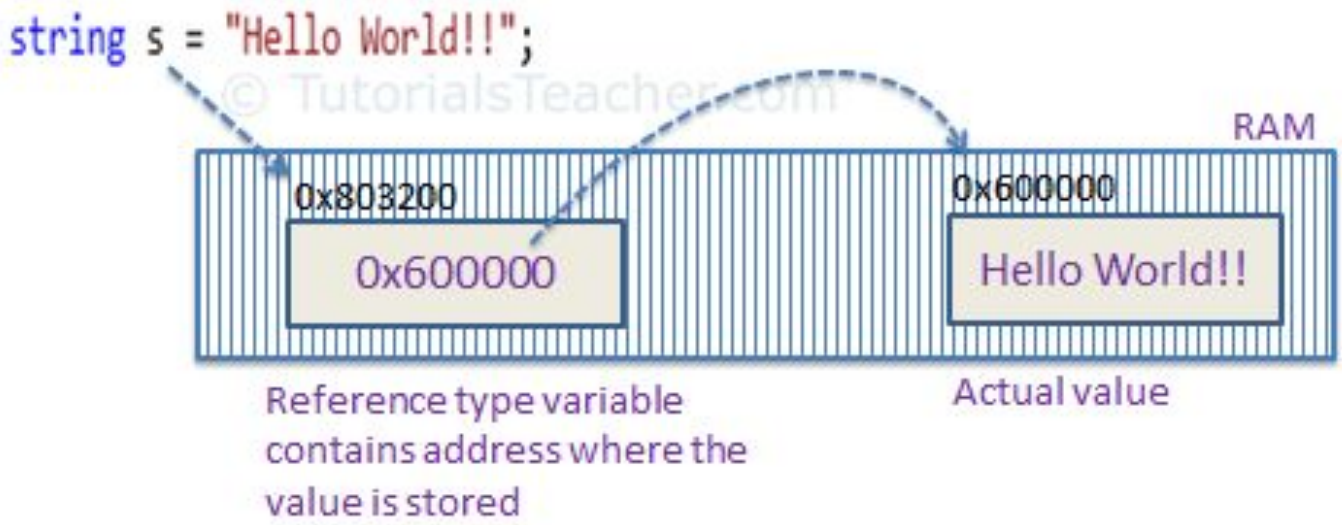
Texts in Javascript

The String type is the set of all ordered sequences of zero or more 16-bit unsigned integer values ("elements") up to a maximum length of 2^{53}-1 elements.



A variable has a *name*, stores a *value* of the declared *type*

Beispiele (C programming language)

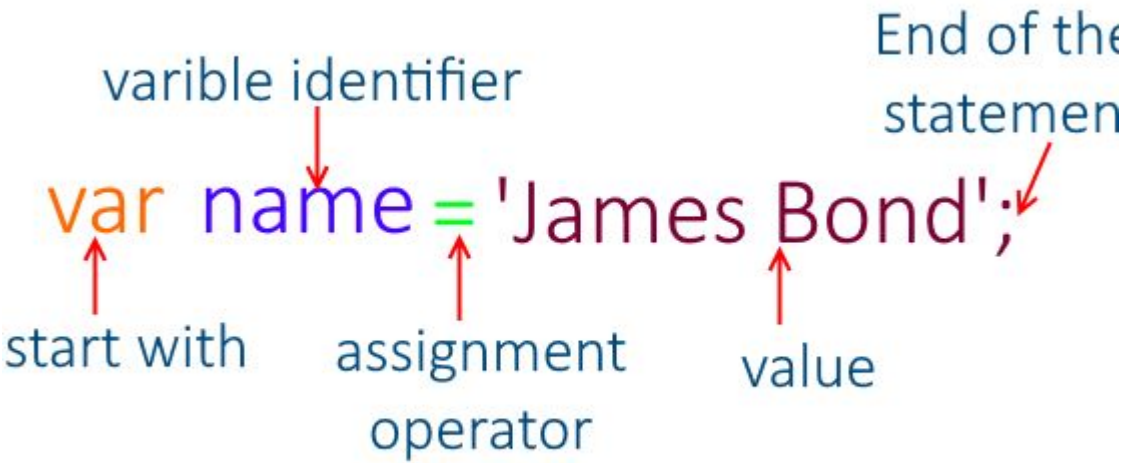


variable name --> variable reference (adress) --> variable data

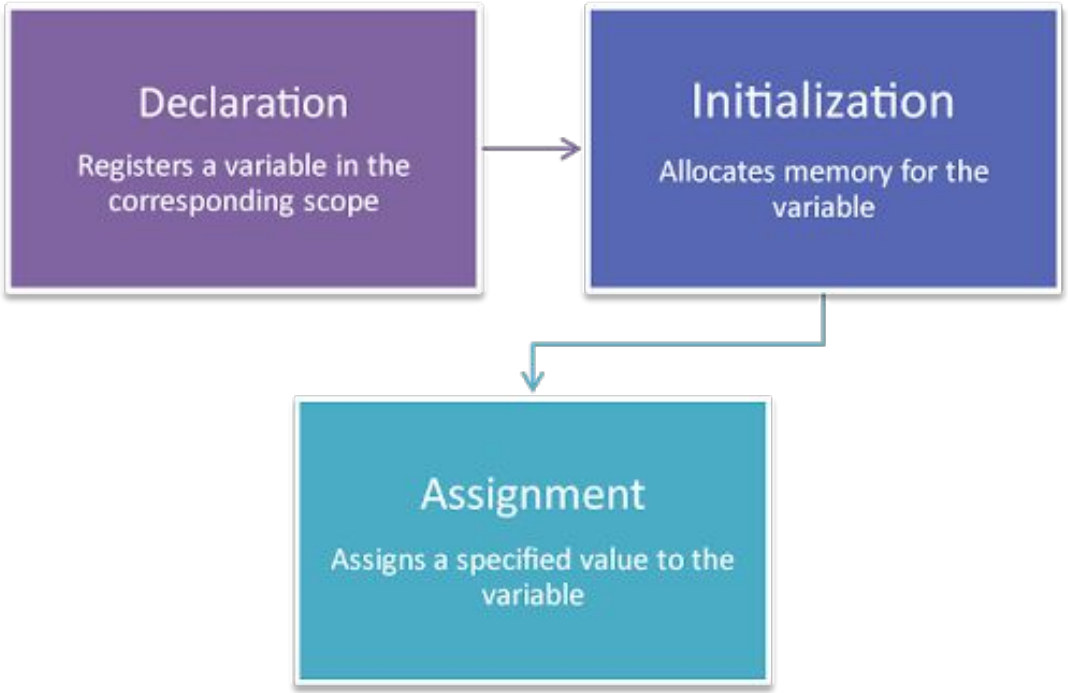
let's try it!

```
5  <script>
6  var x = 5;
7  var y = "I love my dogs";
8  var dog = {breed:"Labrador",weight:"100lbs" };
9  var a;
10 var b = null;
11 var c = "";
12
13 alert(typeof x);   //Output: NUMBER
14 alert(typeof y);   //Output: STRING
15 alert(typeof dog); // Output: OBJECT
16 alert(typeof a);    // Output: UNDEFINED
17 alert(typeof b);   // Output: OBJECT
18 alert(typeof c); //Output: STRING
19 </script>
```

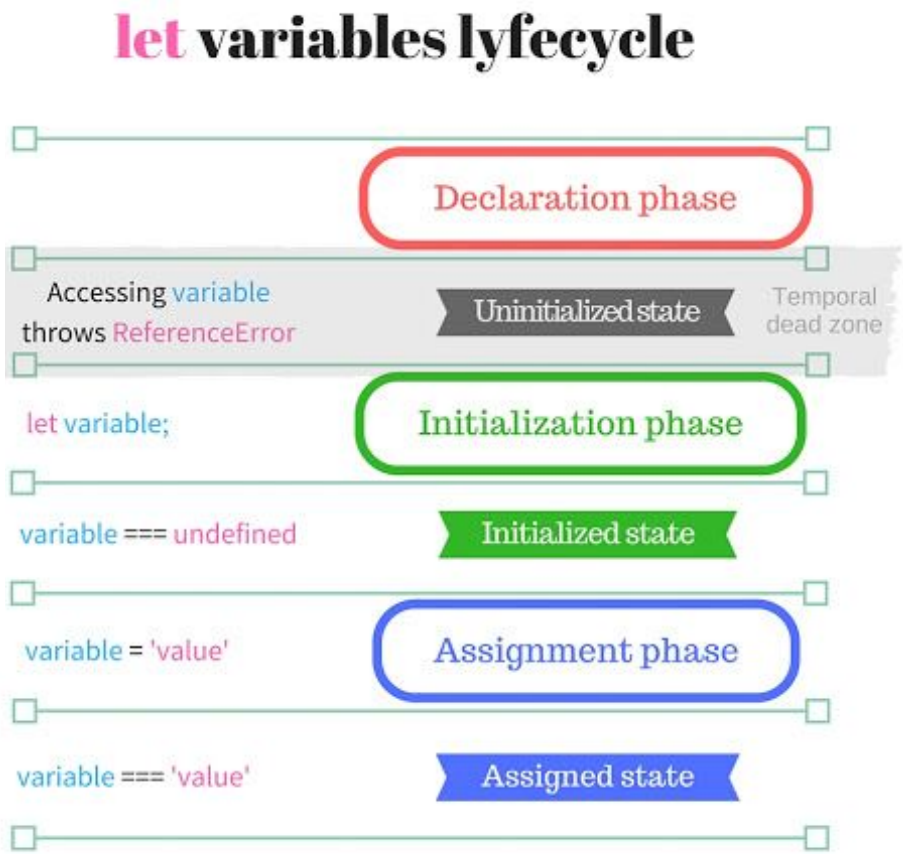
lifecycle of a variable



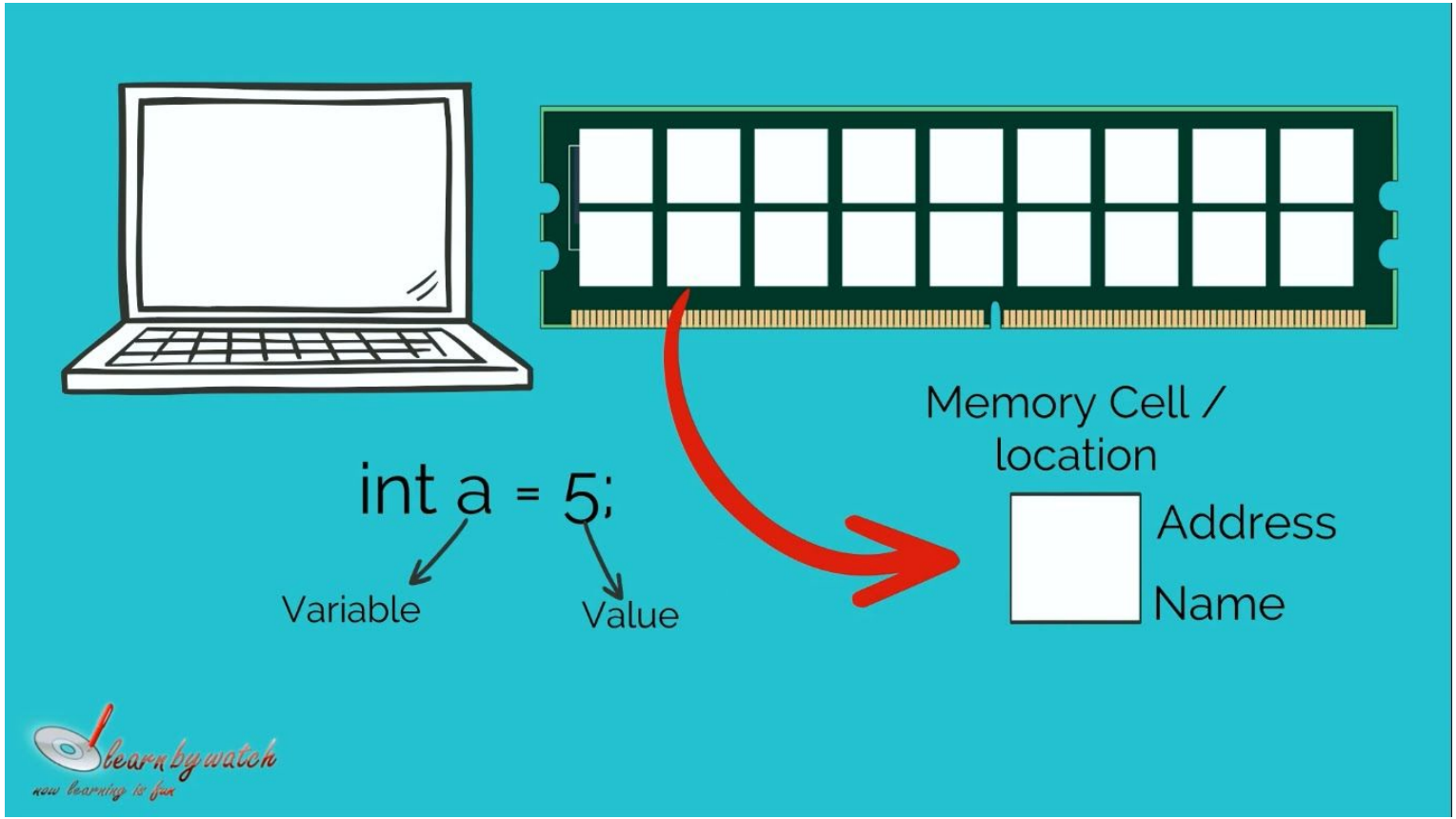
Anatomy of an assignment



Lifecycle of a variable



Lifecycle of a variable


int a = 5;
Variable
Value
Memory Cell / location
Address
Name
learn by watch
now learning is fun

Assignment

let's try it!

```
let user = 'John';
let age = 25;
let message = 'Hello';
const name = 'IT Club';

console.log(name)
```

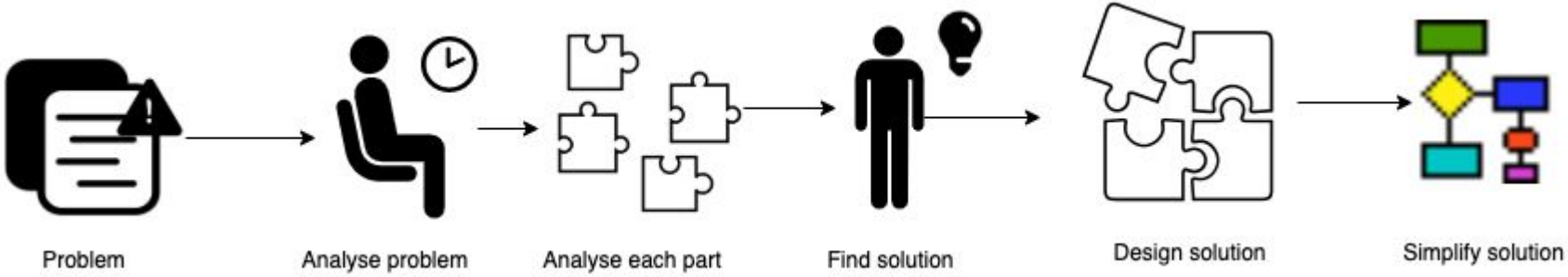
Flowcharts

Design algorithms visually

DEFINITION:

“a diagram of the sequence of movements or actions of people or things involved in a complex system or activity.”

- How do I make algorithms understandable for everyone?
- Simple way
- Recognizable



Problem & Algorithm

Terminator: An oval flow chart shape indicating the start or end of the process.

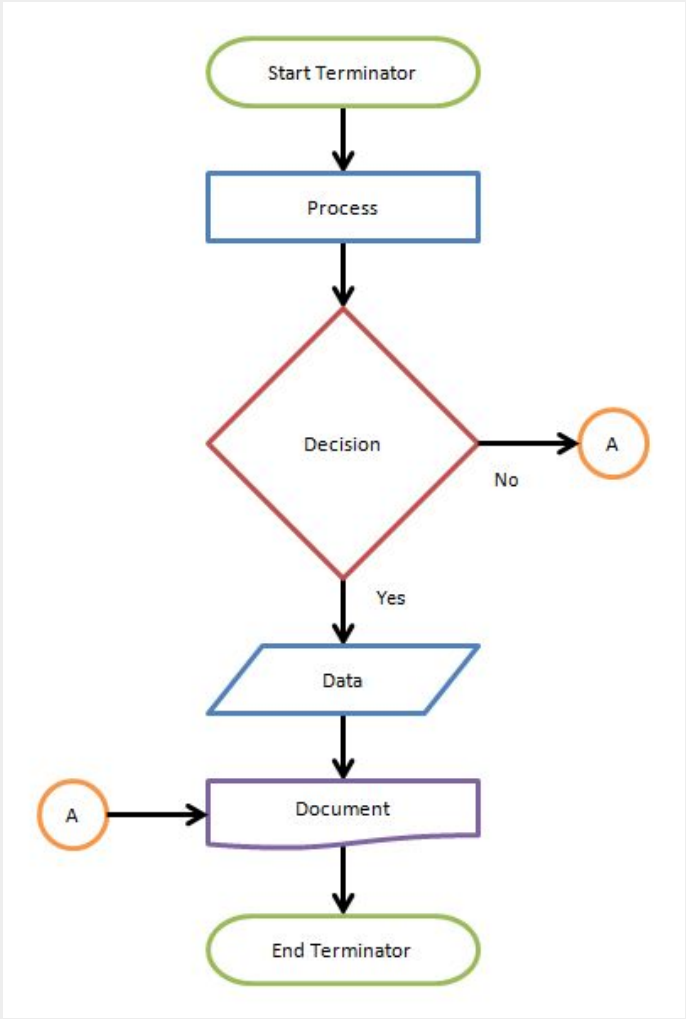
Process: A rectangular flow chart shape indicating a normal process flow step.

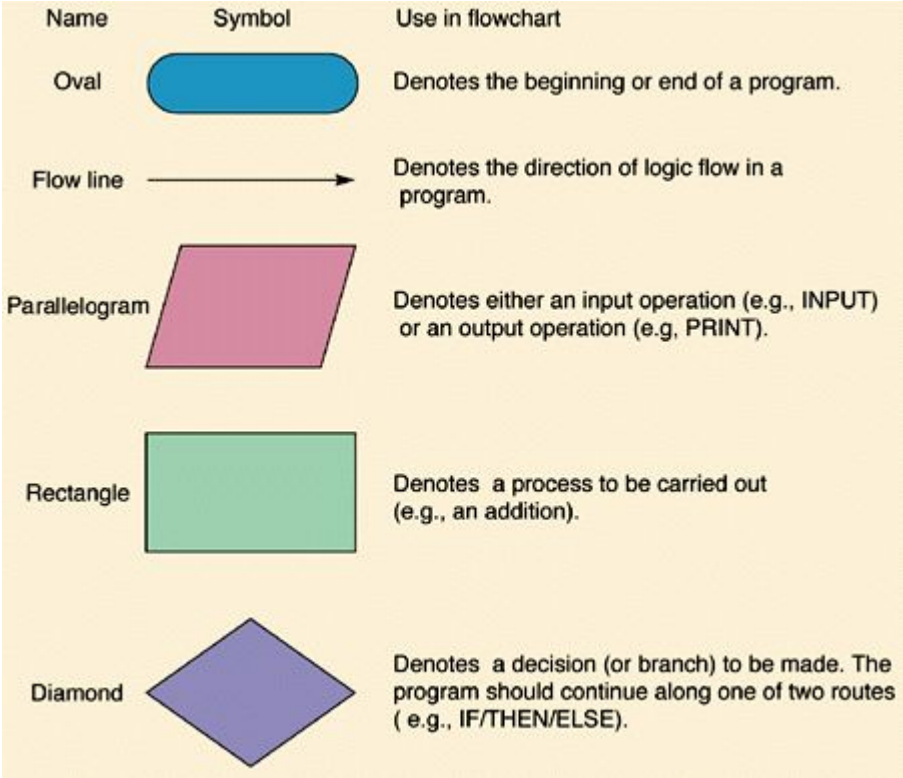
Decision: A diamond flow chart shape indication a branch in the process flow.

Connector: A small, labeled, circular flow chart shape used to indicate a jump in the process flow. (Shown as the circle with the letter “A”, below.)

Data: A parallelogram that indicates data input or output (I/O) for a process.

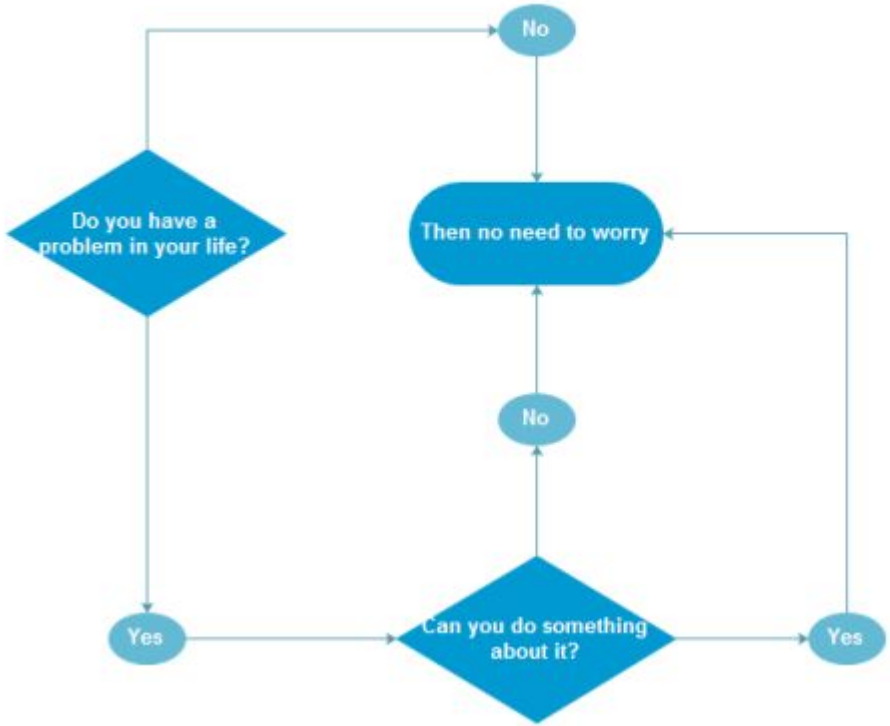
Document: Used to indicate a document or report (see image in sample flow chart below).





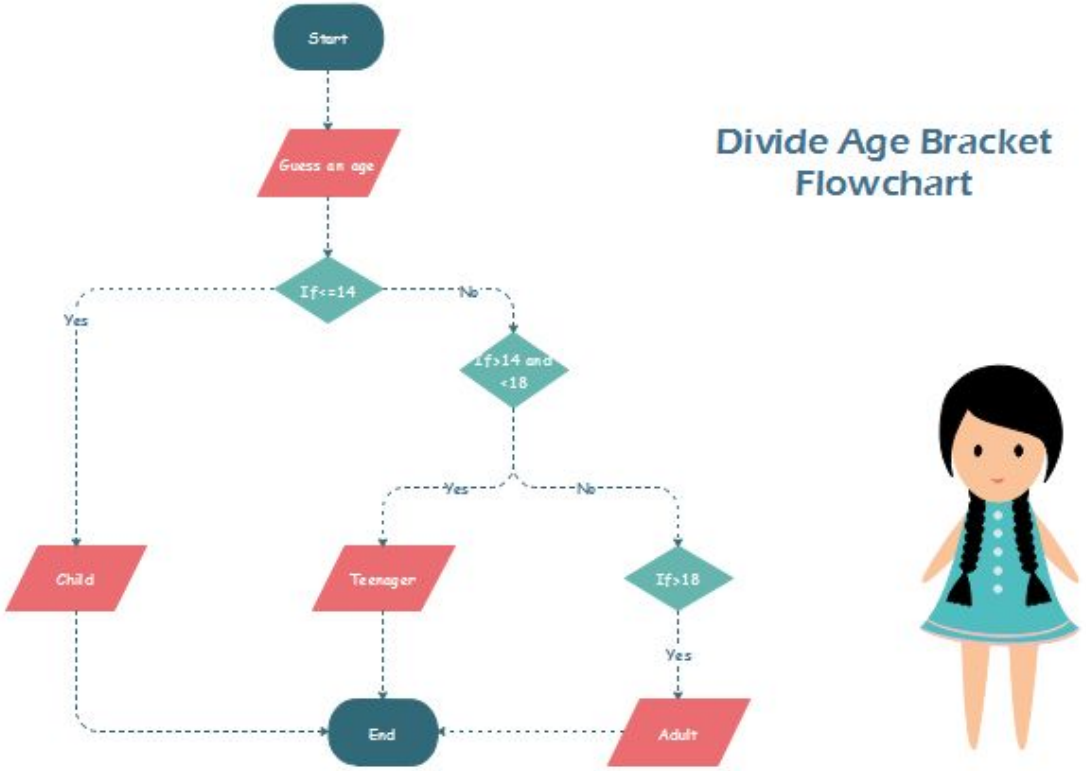
Was braucht man für ein Flowchart zu kreieren?

Source: Wiley



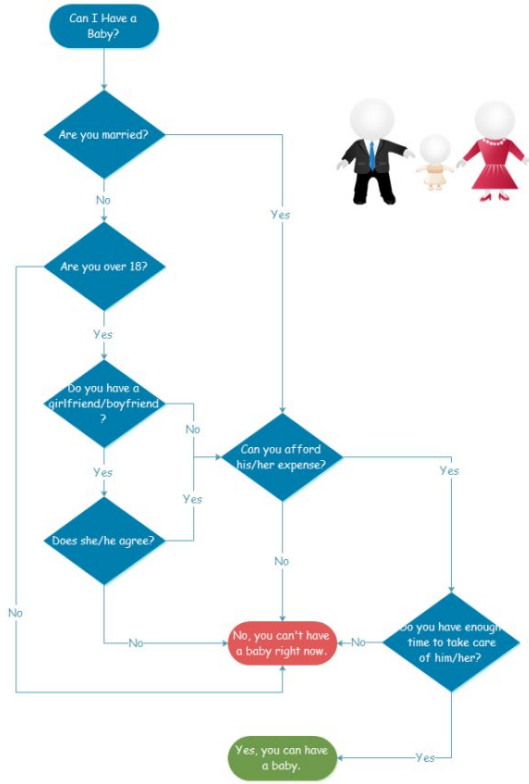
Ein einfaches Flowchart

Source: Edraw



Ein anderes Beispiel

Source: http://edrawsoft.com/



Ein anderes Beispiel

Source: https://www.edrawsoft.com/have-baby-flowchart-example.php

let's try it!

Create some algorithms by using flowcharts

Questions