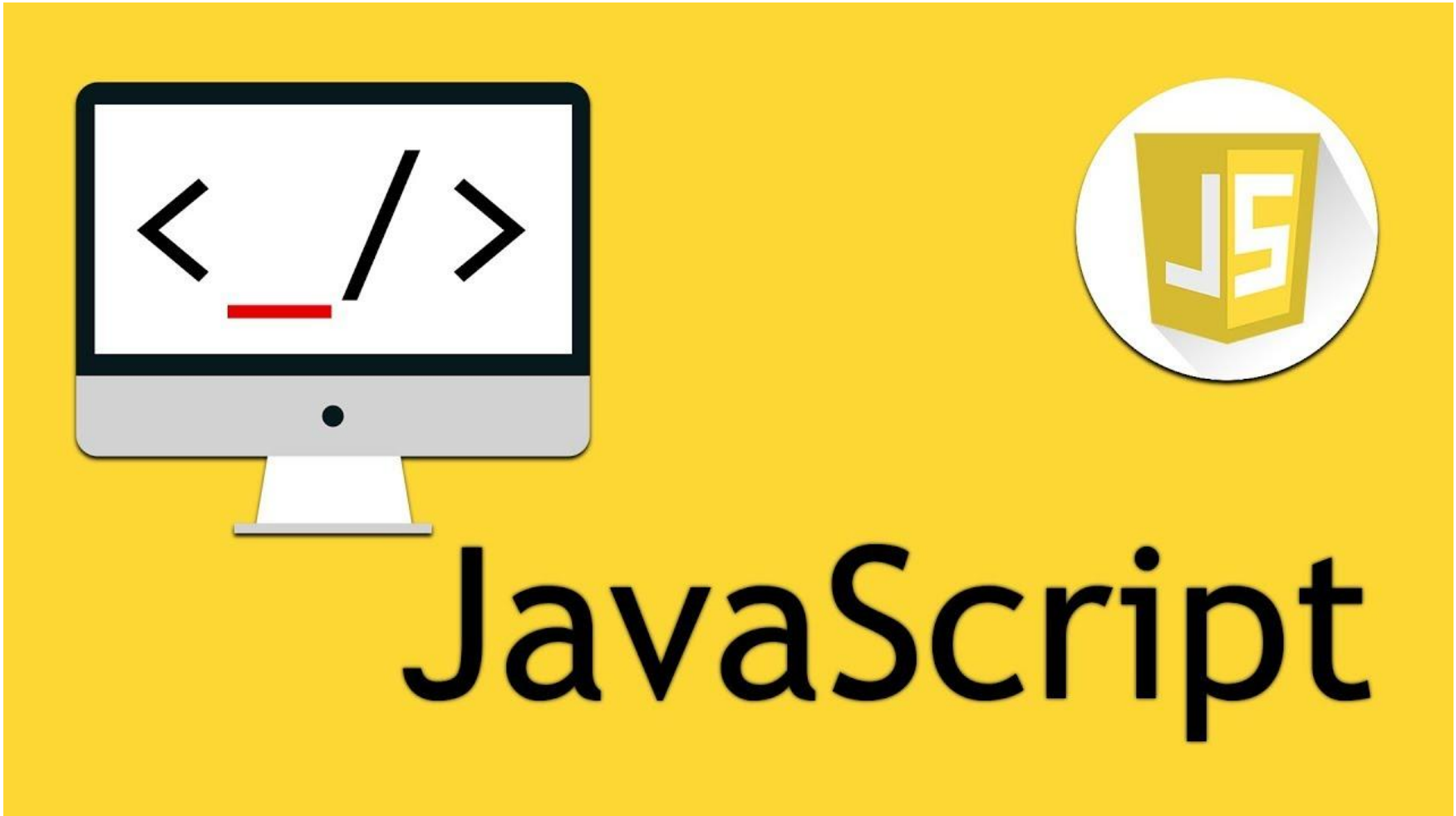
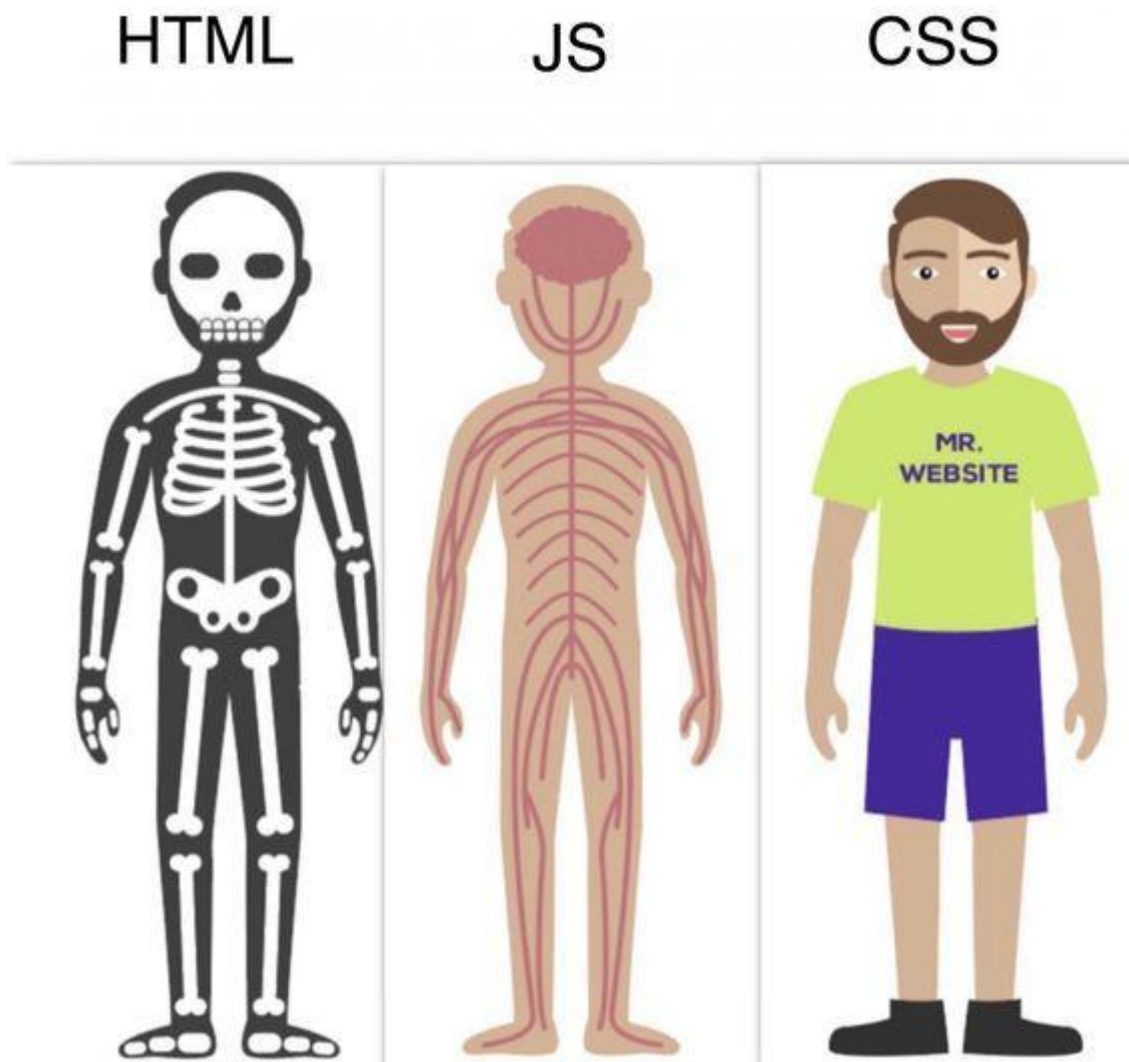

JavaScript

Last lecture reminder

We learned about:

- What is computer programming and for what we need it
- High level programming language and machine language
- What is algorithm and what define a good algorithms
- Introduced the programming flowchart and flowchart symbols
- What is a variable
- Different types of primitive variables


HTML
JS
CSS
MR.
WEBSITE

What is Javascript?

Javascript is one of the most popular programing languages in the world

It is widely used all over the world for both frontend and backend development

It was first released at 1996 by Netscape company and it purpose was to make our internet web pages more dynamic (until then all the internet was just static pages)

By using Javascript we can build:

- Full web applications from end to end
- Real Time applications (like chats, navigation app and more)
- Games
- Development tools and command line scripts

Who is using Javascript?

Source: Google images

Javascript Execution

When we write Javascript code and provide it to our HTML files it's the browser responsibility to run this code

In order for the browser to run the Javascript code it need to be familiar with it

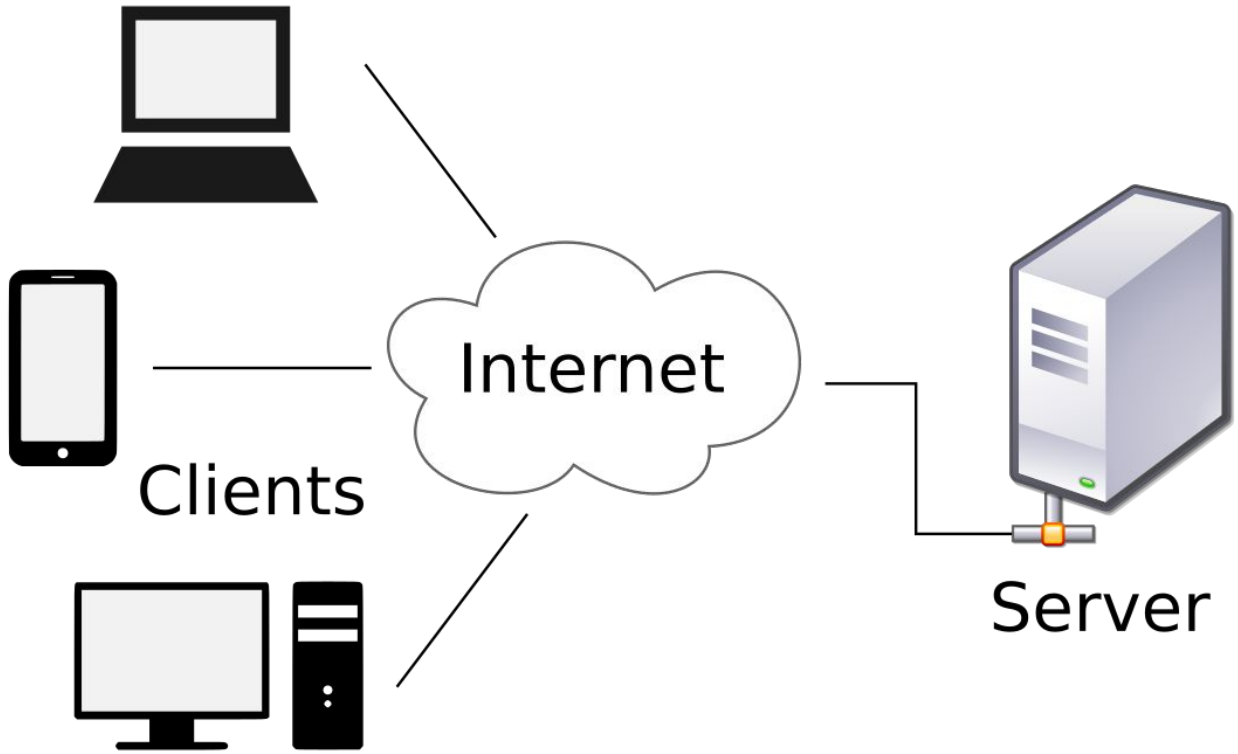
This is why Every browser has its own Javascript Engine

For example:

- Chrome - V8 Javascript Engine
- FireFox - SpiderMonkey
- Explorer - Chakra

Note: Originally javascript was built only for the browser but as the language developed it introduced Node.js Which is also a server side programing language

Client side vs Server side



Client Side

A Client can be every machine that its purpose is to make requests through the web and display the response

For example - :

A client can also be a program like web browsers or desktop applications that have a connection to the web (like word, excel, computer game, exc...)

Basically we can say that a client is a machine or a program the its purpose is to make requests through the web and display the response

Server Side

- Server is a machine that run computer programs that it purpose is to handle the clients requests and provide the relevant response to each request

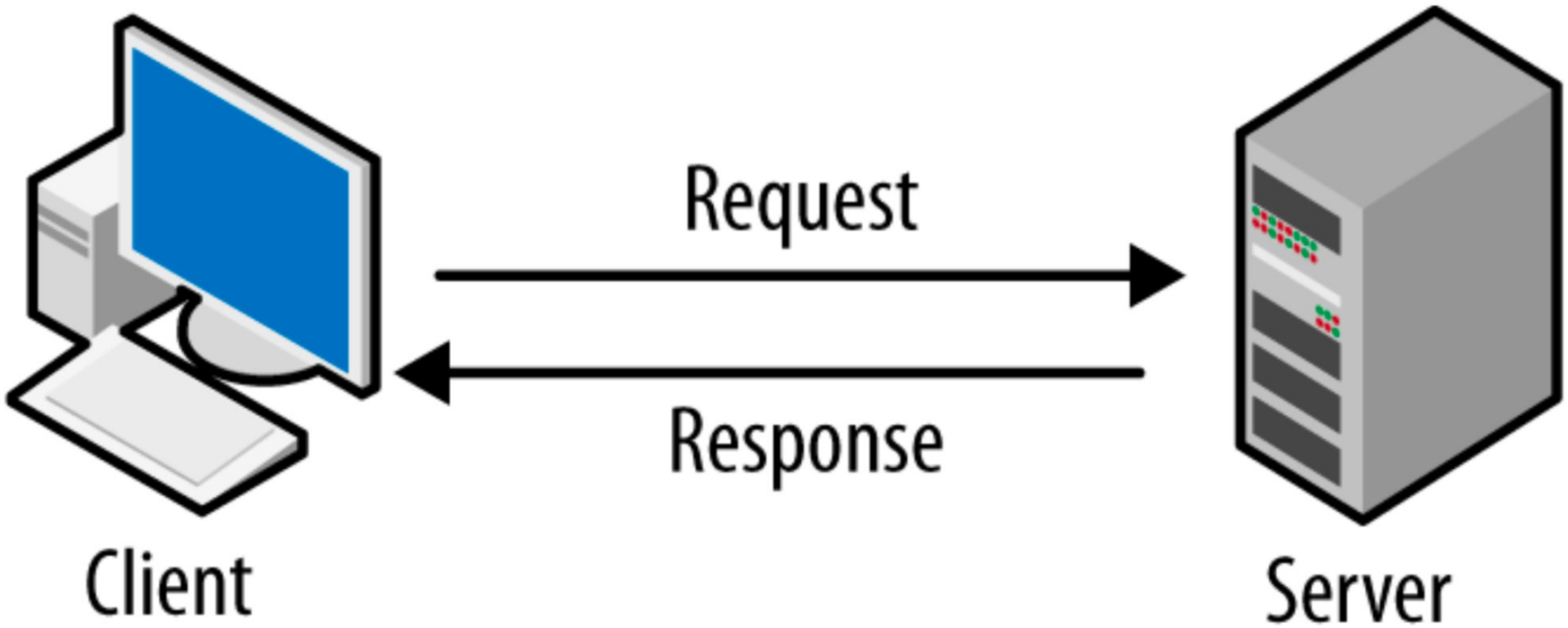
- Servers contain all the logic that the program need in order to handle the client request and produce the response. In the industry this is called the **“Business Logic”**

- Servers are also responsible for managing and saving the program data
  In the industry this process is been called **“Persistency”**

- Because the servers are the machines that should handle all the requests from the clients (the “load”) they should be very strong and be high-performance computers

- The more our site needs to support more people meaning our server will need to support more client requests, the more our server computer need to be strong and our programs need to be more efficient

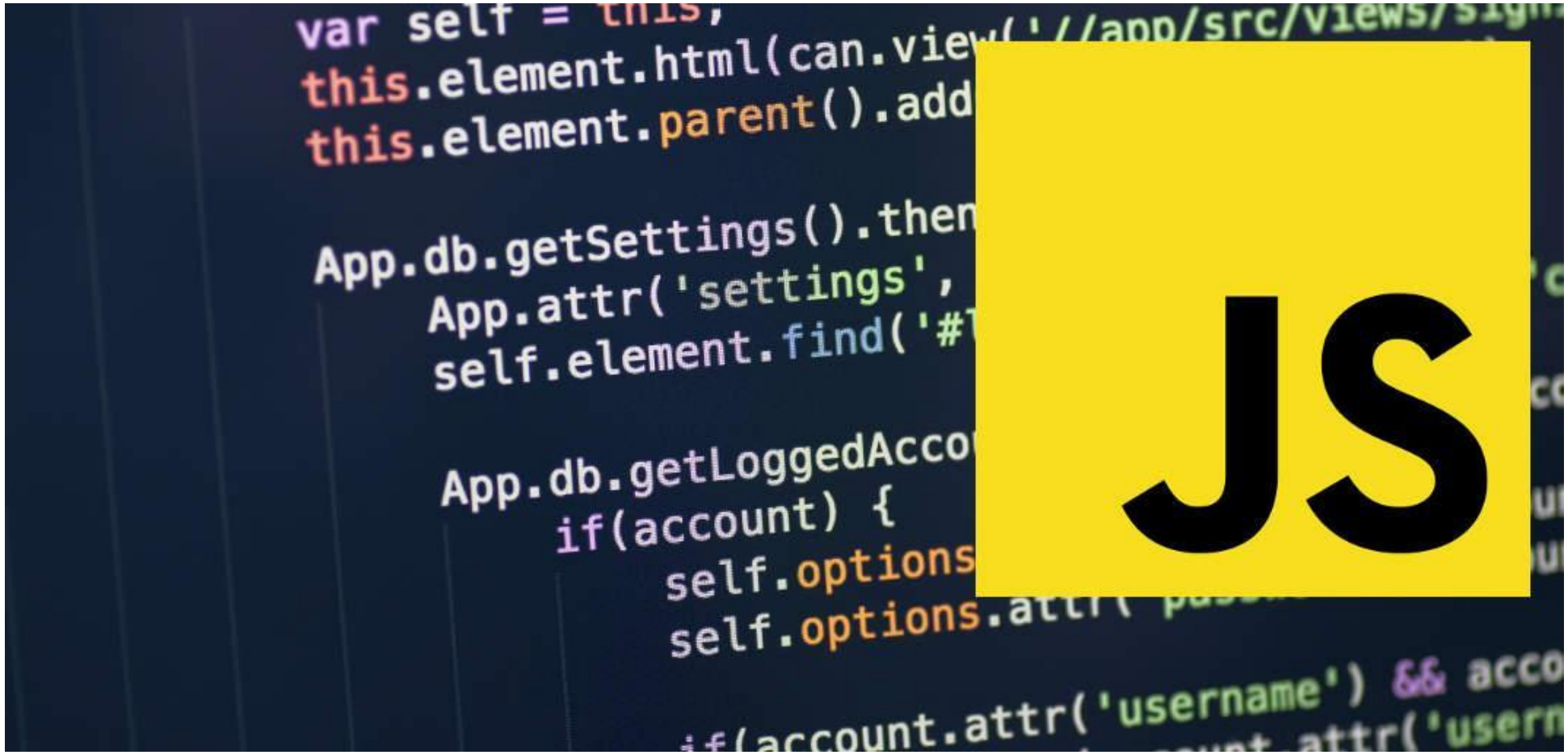
Client - Server model



Javascript Features

- Just-in-time compiled programming language - The compilation process been done at run time
- Dynamic typing - JavaScript supports dynamic typing which means the types of the variables we creating are defined only at runtime based on the stored value
- Platform independent - Javascript is not relaying on any platform to execute the code, which mean that once we right our script it can be run anywhere and anytime
- Interpreted language - Mean that Javascript code is been processed line by line
- Async processing - Mean that Javascript support asynchronous requests, by using that we can send requests and not waiting for a response

Let’s Learn How To Write Javascript



Variables in Javascripts

As we learned in the last lecture, variables are very important notion in writing computer programmes

Variables are functioning as containers that allow us to store data inside of them and use this Data everywhere we want inside our program

Every variable has its own type and as we saw, it is important to choose the right variable type for the right purpose

Because javascript support dynamic typing, when we creating a new variable we don’t need to determine the type of it - instead the type of the variable will be define in run time

How To Create Variables In Javascript?

let keyword -

- By using the **let** word we can declare on creating a new variable
- Variables that were created using let cannot be redeclared
- We can assigned a new value to let variables
- In Javascript we can create new let variable by following this template:

let {Name of the variable} = {value of the variable}

for example: let name = “ben”;

Note: because we used the let keyword we can’t create another variable with the name “name” and use it - If we will do that we will get a **syntax error**

How To Create Variables In Javascript?

var keyword **-**

- By using the **var** word we can declare on creating a new variable
- Unlike let, variables that were created using var can be redeclared
- We can assigned a new value to var variables
- In Javascript we can create new var variable by following this template:

var {Name of the variable} = {value of the variable}

for example: var number = 6;

How To Create Variables In Javascript?

const keyword **-**

- By using the **const** word we can declare on creating a new constant variable
- Variables that were created using const can’t be redeclared
- Unlike var and let, we can’t assigned a new value to const variables
- In Javascript we can create new const variable by following this template:

const {Name of the variable} = {value of the variable}

for example: const maxStudentsInClass = 45;

Operators in Javascripts

Operators are syntax symbols that allow us to perform specific actions on primitive data types and variables

In Javascript we can find a lot of operators that each of them is relevant to different family

The most used operator families are:

- **Arithmetic operators -** addition, subtraction, multiplication, division exc...
- **Relational operators -** used in logical statements to determine if a logic statement will return a “true” or “false”
- **Logical operators -** used in logical statements to determine equality or difference between variables or values
- **Assignment operators -** used to assign values to Javascript variables

Arithmetic Operators

Operators	Meaning	Example	Result
+	Addition	4+2	6
-	Subtraction	4-2	2
*	Multiplication	4*2	8
/	Division	4/2	2
%	Modulus operator to get remainder in integer division	5%2	1
+ +	Increment	A = 10; A+ +	11
− −	Decrement	A = 10; A− −	9

Relational Operators

Operators	Meaning	Example	Result
<	Less than	5<2	False
>	Greater than	5>2	True
<=	Less than or equal to	5<=2	False
>=	Greater than or equal to	5>=2	True
==	Equal to	5==2	False
! =	Not equal to	5! =2	True
===	Equal value and same type	5 === 5	True
		5 === “5”	False
! ==	Not Equal value or Not same type	5 ! == 5	False
		5 ! == “5”	True

Logical Operators

Operator	Meaning	Example	Result
&&	Logical and	(5<2)&&(5>3)	False
||	Logical or	(5<2)||(5>3)	True
!	Logical not	!(5<2)	True

&&

Operand 1	Operand 2	Result
True	True	True
True	False	False
False	True	False
False	False	False

||

Operand 1	Operand 2	Result
True	True	True
True	False	True
False	True	True
False	False	False

!

Operand	Result
False	True
True	False

Assignment Operators

Operator	Example	Equivalent Expression (m=15)	Result
=	y = a+b	y = 10 + 20	30
+=	m +=10	m = m+10	25
-=	m -=10	m = m-10	5
*=	m *=10	m = m*10	150
/=	m /=10	m = m/10	1.5
%=	m %=10	m = m%10	5
**=	m**=2	m = m**2 or $m = m^2$	225
//=	m//=10	m = m//10	1

Class Exercise - Variables and Operators

Class Exercise - Variables and Operators

Instructions:

Answer the following questions:

Give value to the variable a, b, c, d in order that the if() **will be TRUE**?
Give value to the variable a, b, c, d in order that the if() **will be FALSE**?

```
if(  a  + b     && c + d )

if( a >= b  || c > d)

if( a >= b  || c < d)

if (  a === b && c <= d)

if ( true && a + b + c + d)

if ( a != b)

if ( a != b && a<= c || a<= b || true)

if ( a != b && a<= c || a<= b || false)

if ( a%b == 0 && c%d == 1 )
```

Class Exercise - Variables and Operators

Instructions:

Answer the following questions:

true or false ?

4<9
(2*3+4)*(7+7)
18 + 18
10==10
10 == 10 && 20 == 30
10 == 10 || 20 == 30
20 == 30 || 10 == 10
!3
3
(33 > 20) && (2 < 12) && 10
true && true
true && false
true || false
false || true
(!10) && (10)
(!10) && (!10)
5 != 5 && 5 != 5
2 === 2 || 3 == 3
2 === 2 && 3 == 3
40 <= 30 && 1 >= 4
13 >= 3 || 47 >= 5

Class Exercise - Variables and Operators

Instructions:

Open the google chrome tools and go to the “console” tab

Write a Javascript program that execute the following:

- Create two variables and save and assigned two numbers to them
- Print the result of every arithmetic operator we learned
- Use console.log() function for print the result

Go to https://onecompiler.com/javascript
You will be provided with basic function() and condition statement syntax

- Add the missing logic so the function could work as expected from it
- Write another function that do the opposite logic from the first function

Class Exercise Solution - Variables and Operators