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SCHOOL OF ENGINEERING AND DIGITAL SCIENCES

# Web Programming and Problem Solving

## JavaScript Functions

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# Introduction

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**Example 1.** The use of a formula several times.

In the Lab8, you were asked to compute the total score for the course, say like:

```
let total_score = avg_labs_score * 0.6 + quiz_score * 0.4
```

Note: this score is computed only for **one** student.

How to compute it for the other students?

# Introduction

**Example 2.** The use of ATM machine


There are clear instructions,

but do we know how it works internally?

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# Introduction

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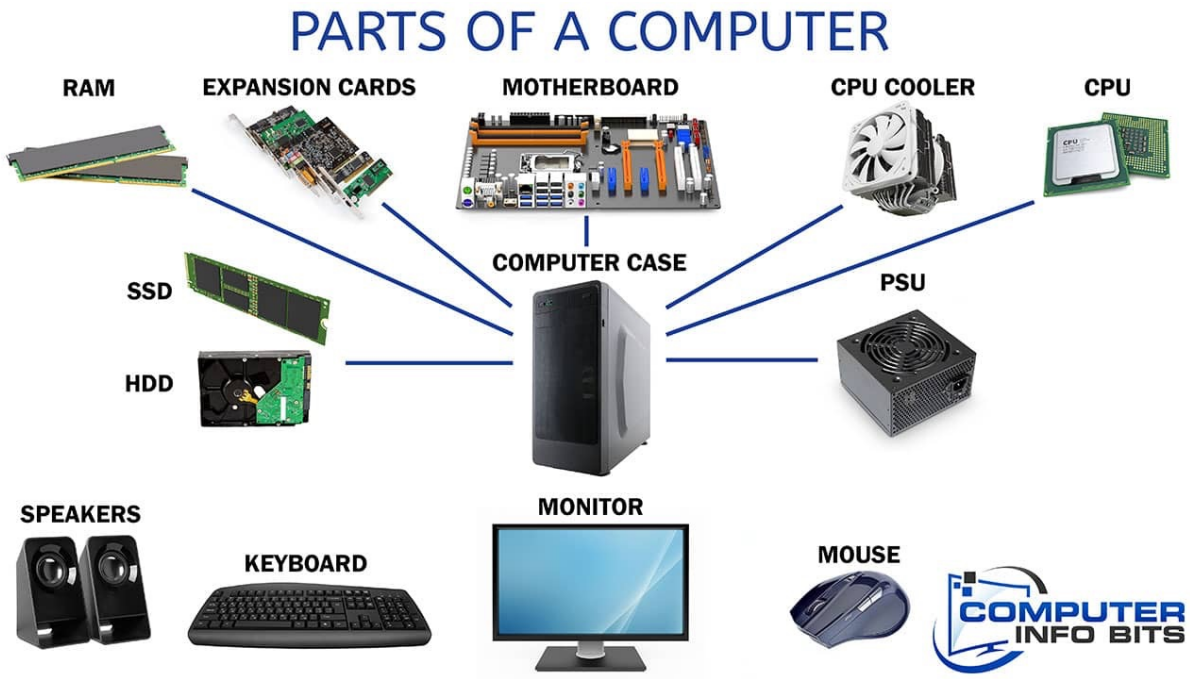
**Example 3.** Parts of a computer

A computer consists of parts that do specific functions



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# What is a function?

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A **function** is a block of a program code designed to perform a specific task.

The functions are used to provide:

- Reusability – to use the same code several times in the program
- Abstraction – to hide the internals of the code for end user
- Modularity – to organize and divide the program into sub tasks

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# Function usage

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The usage of a function is a two-step process:

- Function declaration (or definition)
- Function invocation (or execution, call)

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# Function declaration

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## Function declarations:

```
// Version 1 – formal declaration
function func_name ( parameter1, parameter2 ) {
        // function body
        return result
}

// Version 2 – function expression
let func_name = function ( parameter1, parameter2 ) {
        // function body
         return result
}
```

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# Function declaration

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## Function declarations (examples):

```
// Version 1 – formal declaration
function square ( number ) {
        result = number * number
        return result
}

// Version 2 – function expression
let square = function ( number ) {
        result = number * number
        return result
}
```

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# Function invocation

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## Function declaration

```
// Version 1 – formal declaration
function square ( number ) {
        result = number * number
        return result
}

// Version 2 – function expression
let mult = function ( number ) {
        result = number * number
        return result
}
```

## Function invocation

```
let a = 2
let b = square(a)    // b = 4

let x = mult(3)      // x = 9
console.log(x)       // log - function too
```

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# Function arguments

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The arguments of a function have the following properties:

- The arguments are passed by values and not visible to the outside of the function
- If objects or arrays are passed as arguments, the change of their properties or elements is visible to the outside of the function
- The functions can be passed as the arguments

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# Function scope

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**Scope** determines the accessibility (visibility) of variables (and functions).

JavaScript has 3 types of scope:

- Block scope – visible within a block "{}"
- Function scope – visible within a function
- Global scope – visible everywhere

In a function (block):

- variables defined **with** var, let and const have **local** scope and not visible to the outside of the function
- variables assigned **without** var, let and const automatically have a **global** scope
- all variables defined outside the function scope are accessible

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# Function scope

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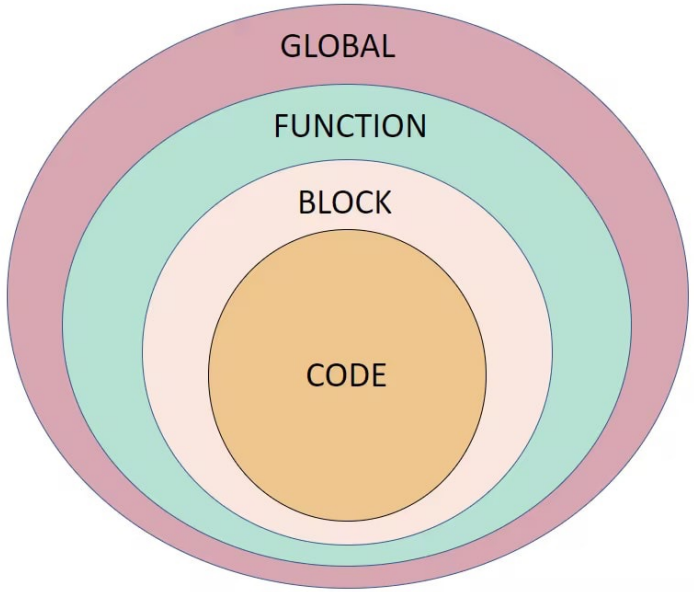
```
let x = 1;    // global x
function f () {
        let y = 2;      // local x
        function g ( ) {
                a = 2;        // global  a
                let z = 3;   // local z
                return a * (x + y + z);
        }
        return g( );
}
//   y is not visible here, a is visible here
console.log( f( ) );  // output is 12
```



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# Summary

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- **Key takeaways**:
  - A **function** is block of code to perform specific task and used for: reusability, abstraction and modularity
  - Remember 2-step function usage: declaration and invocation
  - The arguments are passed by value, though **object** and **array** arguments can be changed inside a function
  - JavaScript has 3 types of scope: block, function, global
  - Visibility of variables differs depending on scope

# Thanks for Attention!