Training Application Developer

Learning Interface

JavaScript

Domain C Level 2

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Overview

Level:Domain C Level 2
Duration:3 weeks
Method: Weekly schedule

Prior knowledge

C1 HTML and CSS

Materials

The following study materials are used:

- www.w3schools.com
- Your laptop

Instruction

It is recommended to follow this document from start to finish. Try out as many commands as possible. In between, show as much as possible to the teacher to see if you are on the right track.

Goals

After studying you will be able to put the basics of programming in javascript into practice.

Assessment

This module is concluded with a final assignment.

Study block 1

Study

Study on w3schools.com (javascript tutorial):

- Home
- Introduction
- Where to
- Output
- Syntax
- Statements
- Comments
- Variables
- Operators
- Arithmetic
- Assignment
- Data types
- Functions
- Conditions
- Switch

Commands

Assignment 1

Create two variables: first name and last name.
Show the contents of these variables on the screen.
Do this in 3 different ways: window.alert, document.write and innerHTML

Assignment 2

Create a script that has 3 variables:
Var a = 3;
Var b = 4;
Var c = 5;

On the screen, specify the following values:

- Addition of a,b and c
- Addition of a and c minus b
- Remainder of c by a
- Subtract A from c and then multiply by b
- Addition of b and c and then divide by a

Assignment 3

Create the function "calculate" which has 2 numbers as parameters (digit1, digit2).
Give as return value the numbers multiplied by each other. Show this on the screen

Assignment 4

Create a new function "arithmetic" that has 3 parameters (digit1,digit2,action).
The function determined by the parameter "action" which calculation must be performed.
Action can have one of the following values:

- Subtract
- Add
- Multiply
- Share

Make a version using if/else and a version with a switch.
The return value is the result of the requested sum. Show this on the screen.

Study block 2

Study

Study of w3schools.com:

- Objects
- Scope
- Strings
- String methods
- Numbers
- Number methods
- Array
- Array methods
- Array sort
- Booleans
- Loop for
- Loop while

Commands

Assignment 1

Create an object "house". Use the following values here: content, area, place, type of house. Now enter these values on the screen by using the object.

Assignment 2

Create the variable "sentence". Assign the value "application developer".

a) Determine the length of this string and show it on the screen.
b) Determine where the developer is located. Show this on the screen.
c) Determine if the word "wrapper" appears in the variable. Show this on the screen
d) Use the "slice" or "substr" method to show the word "wik" on the screen.
e) Replace the word "developer" with programmer. Show this on the screen.
f) Specify the contents of the variable on the screen in all caps only.

Assignment 3

Create the variable "word" and give it the value "education". Use the function "charat" and a for loop to show the whole word among each other. So a letter on each line.

Assignment 4

Create the variable "digit" and give it the value "6.325".

a) Specify the value on the screen rounded to 2 decimal places.
b) Use the "valueof" function to show the value of the variable on the screen.

Assignment 5

Create an array of "names" with the following values: "Zoe, Bram, Clarissa, Isa, Gerrie".

a) Use a for loop to put the values on the screen.
b) Use a while loop to put the values on the screen
c) Use with a function of javascript the possibility to put an array on the screen at once.
d) Determine how long the array is and show it on the screen
e) Add your name to the array and then show the array on the screen
f) Show all names from the array on the screen with a # as a delimiter
g) Sort the array in alphabetical order and display it on the screen.

Study blocks 3 and 4

Study

Study of w3schools.com:

- Events
- JS HTML DOM: intro, methods, document, elements, html, css, events and eventlistener
- Study the following link: http://www.w3schools.com/tags/ref_eventattributes.asp

Below is a code with which you can try something out. You can see here that you can also use an event on a div:

```
<! DOCTYPE html>
<html>
<head>
  <script>
    function color text(color){
      document.getElementById("change text").setAttribute("style","color:"+color+";");
    }
  </script>
</head>
<body>

<div id="changetext">
  This text changed.
</div>

<div id="blok1" style="width:100px; height:100px;background-color:red;" onclick="color
text('red');" >
</div>
<br>
<div id="blok2" style="width:100px; height:100px;background-color:green;" onclick="color
text('green');" >
</div>

</body>
</html>
```

You can link multiple events to the same function. Because this refers to a different element each time (namely to the person who triggered the event), we don't even have to rewrite the function.

```
function vertaal(){
  Customize the content of the HMTL element that triggered this event
this. innerHTML = "Hello World!" ;
}
function createEvents()
{
  All HTML elements have an event with the same function
  Yet that function will only 'translate' the element that is clicked on
document. getElementById("translate_me1"). onclick = translate;
 document. getElementById("translate_me2"). onclick = translate;
 document. getElementById("translate_me3"). onclick = translate;
 document. getElementById("translate_me4"). onclick = translate;
 document. getElementById("translate_me5"). onclick = translate;
}
window. onload = createEvents;
```

windows.event

Sometimes you also want information about the event. For example, at an onkeypress event you often want to know which key has been pressed. The variable window.event was devised for this purpose. In some browsers (e.g. Firefox) window.event does not exist, but the variable is given as an argument to the event. We can also come up with a solution for this:

```
function functionDieEventUsed(event)
{
  If window.event does not exist, its value is null, either: 0, or: false
  if(window.event)
       So if it does exist, the above if statement is true
       event = window.event;       Code in which you use event
}


function createEvents()
{
  document.getElementById("button").onclick=functionDieEventUsed;
}
window.onload = createEvents;
```

All kinds of information about the event can be requested via the variable event. Below you can see in a table which information can be requested.

Attribute	Definition
altKey	Is true if the alt key was pressed when the event was triggered
ctrlKey	Is true if the control key was pressed when the event was triggered
shiftKey	Is true if the shift key was pressed when the event was triggered
keyCode	Value of the key pressed
clientX	Specifies the x coordinate of where the mouse was when the event was triggered, where 0 is the left edge of the element being clicked
clientY	Specifies the y coordinate of where the mouse was when the event was triggered, where 0 is the top edge of the element being clicked
screenX	Displays the x coordinate of where the mouse was when the event was triggered, where 0 is the left edge of the screen
screenY	Specifies the y coordinate of where the mouse was when the event was triggered, where 0 is the top edge of the screen
Button	Indicates which mouse button was pressed when the event was triggered

Commands

Assignment 1

Create a button that calls up the "Show Name" function. The feature will show your name on the screen.

Assignment 2

Make a button, if that button is clicked, a message will appear with the text Hello world!

Assignment 3

Create a div element that says: Hello world! As soon as you move your mouse over this div, the text must be pushed at an angle. As soon as you move your mouse away from this div, the text should return to normal. If you click on the div, the text must be translated into Dutch ("Hello world!" so). If it is clicked again, the text changes back to English. So with every click, the language changes. No matter how many times the text is translated, it should always be italicized when the mouse passes over it, and back to normal when the mouse moves off the div. Tip: give the div with CSS (just via the style attribute) a background so that you can see when you hover your mouse over it and when you don't. The document.getElementById() function may only be used to assign the events, nothing else.

Assignment 4

Create 5 divs with the same text of which you can change the formatting by clicking as follows:
if you just click on a div, it will be bolded.
By clicking on a bold div, while holding down shift, it should become normal again.
The text in the div doesn't matter (tip: give the divs a background color, so you can see when you click on it or not).

Note: only the layout of the div that is clicked on may change, so they change separately. The *document.getElementById()* function should only be used when assigning the events

Assignment 5

Create a page that constantly displays your mouse's coordinates. Use of *document.write()* is prohibited.

Assignment 6

Make some kind of timer. The user is asked about how many seconds the timer should go off (assume that a valid number is entered). After so many seconds, a message should appear with the text: "Timer ended!". Use the setTimeout() function http://www.w3schools.com/jsref/met_win_settimeout.asp.

Assignment 7

Create a page with your name and next to it a button (or link) "Display details". When clicked, the text of this link changes to "Hide details" and your date of birth and place of residence must appear under your name. If you click on "Hide details", your date of birth and place of residence must disappear again (your name will always remain) and the text on the button/link must change back to "Show details".

Assignment 8

Create a web page containing a div that says 'Click here'
Make sure that every time you click on that divin, a prompt appears asking for a name.
That name should then appear in that div.
If the div is clicked again (with a name now), the same prompt should appear again and the newly entered name should appear after the previous name, separated by a comma.

Creating HTML DOM Elements

You have learned how to add an image in HTML. Namely like this:

```
<img src='./images/plaatje.jpg'>
```

Instead of doing this in HTML, we can also do this with Javascript. For example, it could look like this:

```
//We selecteren eerst de plek waar het plaatje in moet komen te staan.
let container = document.getElementById('container');
//We maken een variabele met daarin de HTML voor het plaatje
let image = "<img src='./images/plaatje.jpg'>";
//We plaatsen (append) het plaatje in de container
container.appendChild(image);
```

In this upper case, we write the HTML text in javascript. And we place that HTML text in a certain place (container). We do this with appendChild(). This feature ensures that the image is placed inside the container.

Now let's go a step further and create an HTML element with a javascript function. This function is called **document.createElement.** I'll show you an example of how to create an image with this feature.

```
//We selecteren de container waarin het plaatje moet komen te staan.
let container = document.querySelector('.container');
//We creeren een image element met document.createElement
let image = document.createElement("img");
//We voegen een id en een src toe aan dit HTML element
image.id = 'image1';
image.src = './images/image1.jpg';
//We voegen image toe aan container
container.appendChild(image);
```

You can see in this example that after I have created an image element that I can add more data to this element. After all, an image element needs a source (src). In addition to the source, I also add an id so that I can select this element again later based on the id.

Practice assignment 1

Create a new HTML page and add an image to this page using Javascript using document.createElement()

Practice assignment 2

Take your code from practice assignment 1 and now create a for-loop that puts 9 pictures on the image.

Drag and Drop

You can create functionality with javascript where you can move HTML elements with the mouse "Drag and Drop" Drag and drop.

To be able to drag an HTML element you need to add a value to it.

In the picture below you can see at the bottom that "ondrop" and "ondragover" have been added to a .

Below that you see a picture <img> and it has "draggable" and "ondragstart"

```
<script>
  function allowDrop(ev) {
    ev.preventDefault();
  }

  function drag(ev) {
    ev.dataTransfer.setData("text", ev.target.id);
  }

  function drop(ev) {
    ev.preventDefault();
    var data = ev.dataTransfer.getData("text");
    ev.target.appendChild(document.getElementById(data));
  }
</script>

<body>

<div id="div1" ondrop="drop(event)" ondragover="allowDrop(event)"></div>

<img id="drag1" src="img_logo.gif" draggable="true" ondragstart="drag(event)" width="336" height="69">

</body>
```

Via the link below you can find more information about how this functionality works, and there are examples that you can try out.

You need this functionality for the final assignment.

https://www.w3schools.com/html/html5_draganddrop.asp

Final assignments

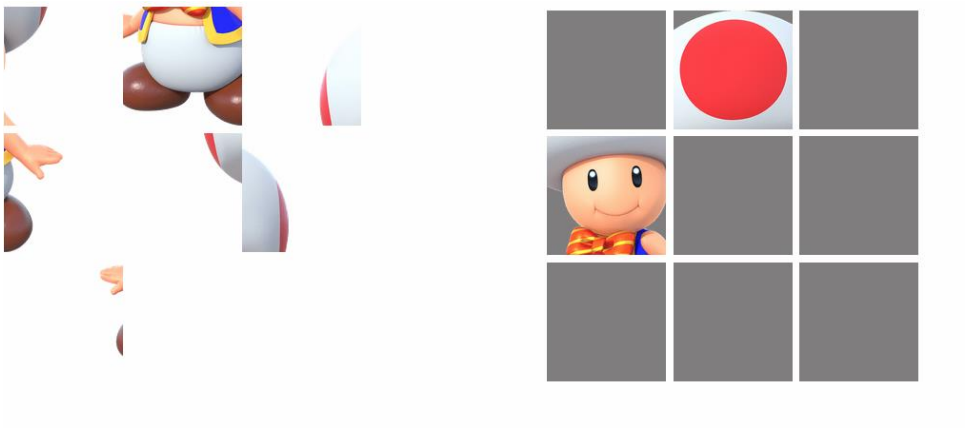
Study

All previous learning material is needed to make the assignments.

Commands

Assignment 1

Create a leg puzzle game.



- The jigsaw puzzle must consist of at least 9 pieces.
- Use 'drag and drop' functionality to move the images to the board.
- Use the document.createElement functionality to create the images
- Use a for-loop to make the pictures and a for-loop to make the board.
- Program a win-condition. For example, by displaying a message when all images are in the right place: 'you win!'.
- Your javascript and CSS must be in separate files (not in the HTML file!)

Assignment 2

Create a table of 5 by 5, in which a black block starts in the middle. This block must be able to be controlled with the arrow keys. When the block comes to the edge, it stops there (so it does not go to the other side, nor does it go off the edge).

Sources

- ✓ http://javascript.divendo-webs.com/
- ✓ http://www.w3schools.com