CSCU9B2 Practical 4: Basics of JavaScript

Aims:

- **To understand basic JavaScript programming.**

- **To use JavaScript variables, conditional statements, loops and functions.**

Please register your practical attendance: Go to the GROUPS\CSCU9B2 folder in your Computer folder and double-click on the Register icon. Ask a demonstrator if you need help or something goes wrong.

This sheet contains one checkpoint (see end of sheet).

Before moving on to the fun side of JavaScript that makes a web page interact with the user by changing HTML content and CSS presentation, we first need to be comfortable with the very basics of this programming language.

JavaScript variables

Probably the most important concept of a programing language is *variable declaration*. In all programming languages, including JavaScript, variables are used for storing some sort of data (i.e., values). JavaScript variables can store: *numbers*, *strings*, *booleans* and *objects*. Moreover, JavaScript also has *array* variables for storing more than one value.

Basic variables

Let's start writing your first JavaScript code.

- Create a new, empty HTML file (you will need the basic page tags, <html>, <head>, <body>, but no content at this stage – though you can add any headings or text if you like.
- Inside your new HTML file, put the JavaScript code to follow within a <script> element placed in the **body** section (i.e. between <script> and </script> tags placed after <body>).
- In your script, declare a variable of each basic data type (string, number, boolean) and print it's value to the screen (ie your browser window) using the code:

  document.write("<p>The value of variable X is " + X + "</p>");

- Load your HTML file into a web browser to see the result.

Objects

An **object** is a variable type that can be described by more than one variable (**properties**). Moreover, objects may have actions (**method**) that can be performed on any instance of the given object.

In real life, a car is an object. It has **properties** like weight and color, and **methods** like start and stop.

In JavaScript, almost everything can be treated as an object. Even a string variable can be considered as an object. Indeed, string is a built-in JavaScript object which has a property called length, that

indicates the number of characters in the given string variable. A string object further includes a number of methods that are used for text manipulations, e.g.,toUpperCase, substring, replace, etc.

Visit http://www.w3schools.com/js/js_string_methods.asp for examples with JavaScript string methods.

The properties and methods of an object are accessed with the '.' (dot) operator e.g., name.property; name.method

- Create a string variable and assign it a value. Then print in the browser window the number of characters contained in the string. Also show the use of several methods for string manipulation.

String is an example of a built-in JavaScript object with predefined properties and methods. However, you can create your own objects.

- Create an object called "book", and assign to it the following properties: author, title, number of pages, year of publishing. Visit: http://www.w3schools.com/js/js_objects.asp for more details on how to create objects. Then, output in the browser window (using document.write) the property values assigned to the book object.

Conditional statements

Conditional statements are used to perform different actions based on different conditions. The **if-else** statement is one of the conditional statements used in JavaScript.

- Use the if-else statement to verify whether a year is a leap year. A year will be a leap year if it is divisible by 4 (ie if year%4=0) but not by 100. If a year is divisible by 4 and by 100, it is not a leap year unless it is also divisible by 400.

The **else if** statement is used to specify a new condition if the first condition is false.

- Create a simple calculator: Declare two number variables x1, x2, and assign them values. Declare a string variable oper that can have values "+", "-", "/", "*". Perform the selected operation on variables x1 and x2. Output the result in the browser window.

The **switch** statement is another conditional statement that selects one of many blocks of code to be executed.

- Repeat the above calculator exercise using the **switch** statement.

Loops: for and while

Loops can execute a block of code a number of times.

- Using the **for** loop, write a program that displays all the even numbers below 50 in the browser window. A number num is even if the remainder after its division by 2 is equal to zero, i.e., if num%2=0.
- Now, use the **while** loop to perform the same task.

JavaScript functions

A function is a block of code that is executed only if invoked (called). Functions in JavaScript are usually placed within a <script> tag in the <**head**> section on an html file.

- Write a function is_leap(year), which takes a number (i.e., a year) as a parameter and outputs in the browser window whether the year is a leap year. (You should be able to reuse some of the code from the earlier if…else exercise). You may also output the result with an alert message:

  e.g., alert(year + "is not a leap year")

- Write a simple function to display an alert message and try invoking this function with an event such as a click on button. The syntax for creating a button and invoking a function is:

  <button onclick="function_name(params)"> Click </button>

CHECKPOINT [JAVASCRIPT]

Please show the lab demonstrator all your JavaScript code for these exercises, and demonstrate that they work. You may be asked for a short explanation of the code. You need to complete the variable and object declarations, plus one example of using "if…else", a "for" loop and a function definition to get the checkpoint.