Getting Started with HTML, CSS, and JavaScript

Overview

In this lab, you'll review a complete Web application to get up to speed quickly with common HTML, CSS, and JavaScript features. We'll explain the details as we go along, so you can understand how it all fits together.

The purpose of this lab is to hit the ground running on this course, and to give you an opportunity to familiarize yourself with the development environment for the course (Visual Studio Code).

There are also some Appendices you might want to leaf through as you go through this lab, to brush up on some essential techniques:

- Appendix A: CSS Essentials
- Appendix B: JavaScript Essentials
- Appendix C: JavaScript Standard Objects

Roadmap

There are 4 exercises in this lab, of which the last exercise is "if time permits". Here is a brief summary of the tasks you will perform in each exercise; more detailed instructions follow later:

1. Understanding the project structure
2. Working with strings and dates
3. Working with arrays
4. Working with regular expressions (if time permits)

Server

HTML files can be opened from the file system, but for security reasons browsers will limit the possibilities. It is better to open a server in the project folders. Here are two ways to do that.

Visual Studio Code

1. Open Visual Studio Code
2. Choose menu "File | Open…" and open the root folder of the course material. After opening you should see a folder called ".vscode" at the top of the tree in the Explorer on the left.
3. Choose menu "Tasks | Run Task…" and choose task "npm: install".
4. Select/Open a file in the folder that you want to be the root of your server. This will generally be the homepage of your app.
5. Choose menu "Tasks | Run Build Task…" or choose the shortcut.

6. To close the server again, choose menu “Tasks | Terminate Task…”.

Command line

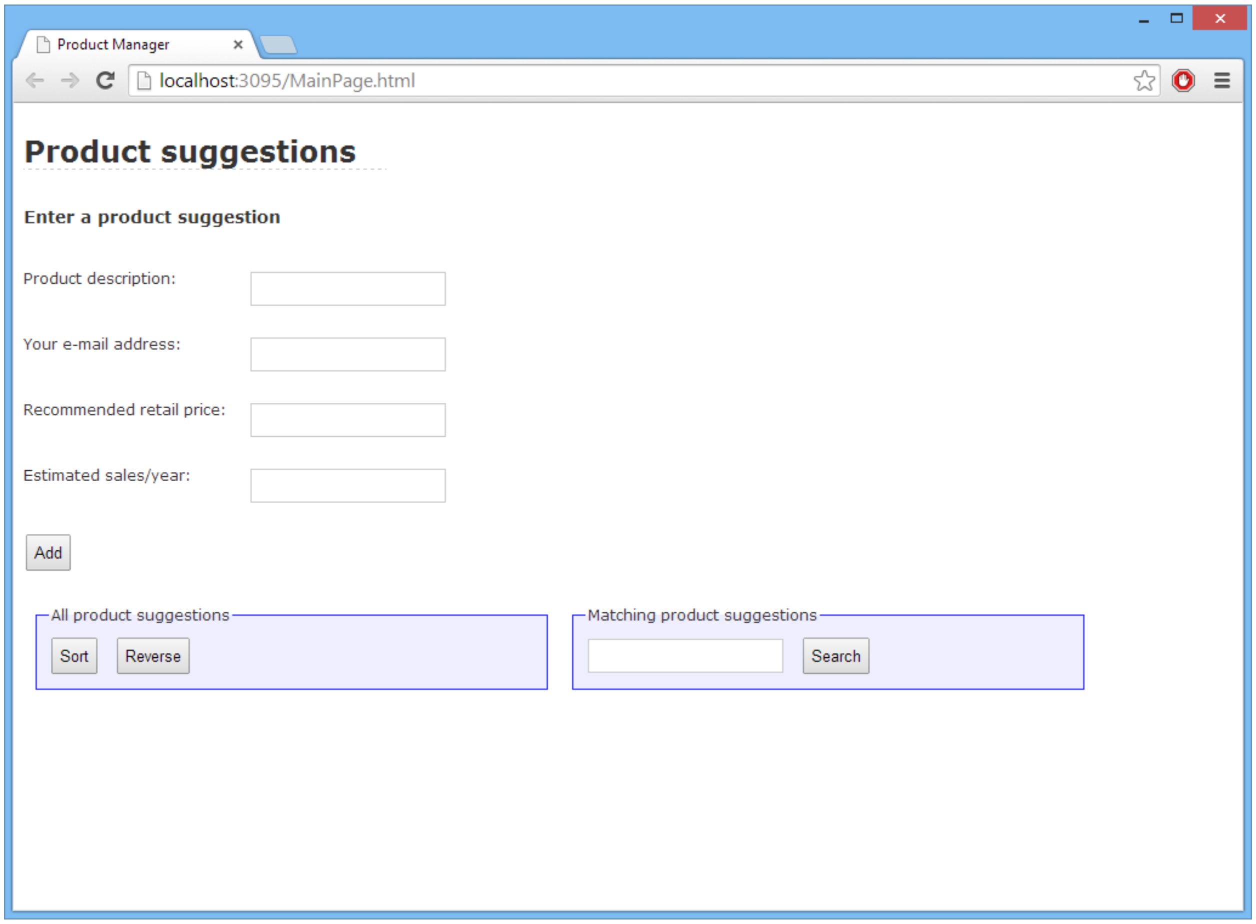
1. Globally install “live-server” with command “npm install -g live-server” (see: https://www.npmjs.com/package/live-server)
2. Open the command line (Windows) or terminal (macOS) in the folder that you want to be the root of your server. This will generally be the homepage of your app.
3. Run “live-server” to open the server. Choose Ctrl+c to close the server again.

Familiarization

Start Visual Studio Code and open the *Start* folder for this lab. Here are the details of the project:

- *Folder:*
  `\start`

The project contains a single HTML page named `MainPage.html`, which is the start-up page in this Web application. Run the Web application (see "Server" above). The web page appears as follows:



Product suggestions

Enter a product suggestion

Product description:

Your e-mail address:

Recommended retail price:

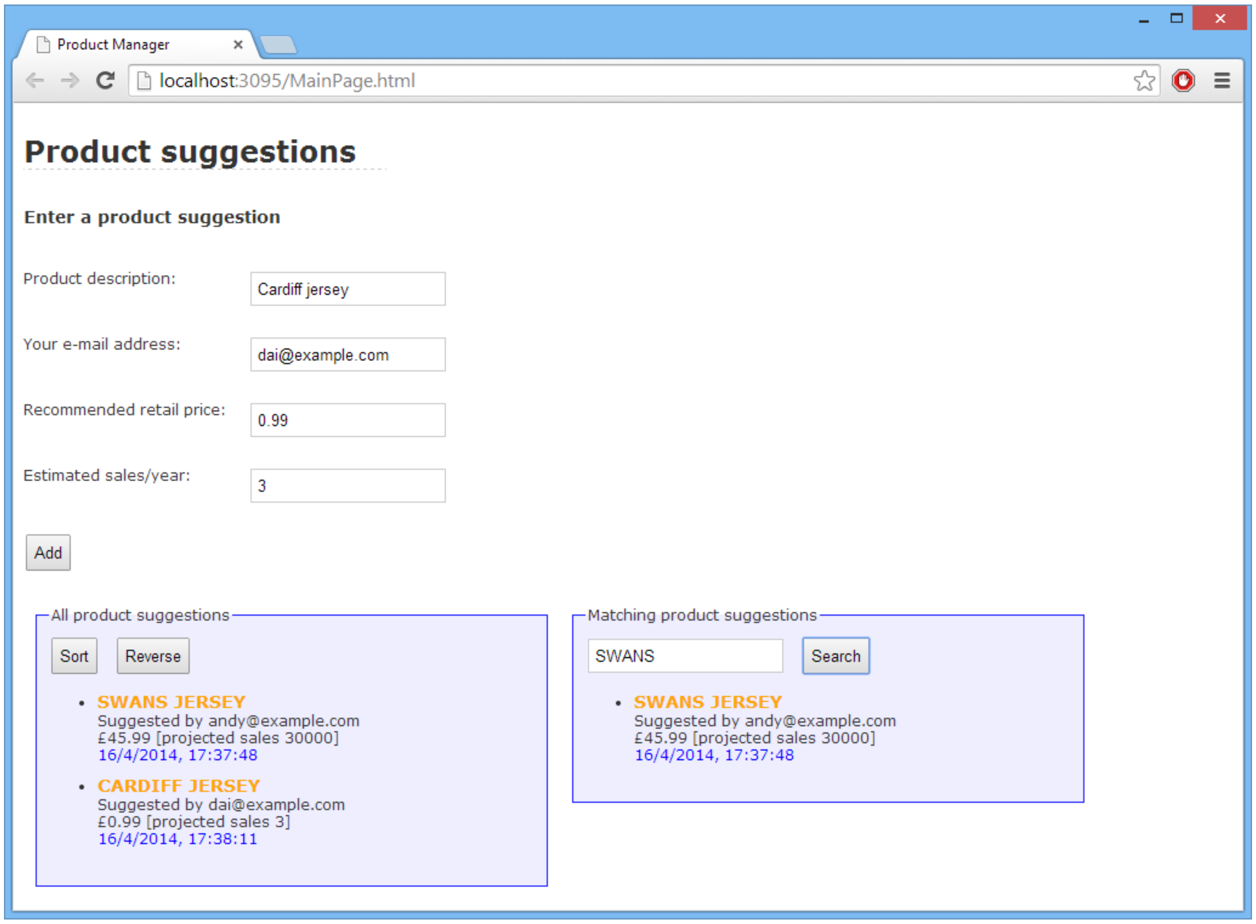
Estimated sales/year:

The web page allows the user to suggest new products that a company might add to its product range. The user can enter a description of the product, their email address, a recommended retail price for the new product, and an estimate of the number of units that might be sold in a year.

When the user clicks *Add*, the Web page adds the product suggestion details (as a formatted string) to an array behind the scenes. The contents of the array are displayed in the *All product suggestions* panel in the lower-left of the Web page. The user can also sort and reverse the array, via the *Sort* and *Reverse* buttons.

On the lower-right of the Web page, the *Matching product suggestions* panel allows the user to search for products that match a regular expression pattern entered by the user. The matching records are displayed as a list in that panel.

The following screenshot shows how the Web page might appear after adding several product suggestions and doing a search:



Product suggestions

Enter a product suggestion

Product description:	Cardiff jersey
Your e-mail address:	dai@example.com
Recommended retail price:	0.99
Estimated sales/year:	3

All product suggestions

- SWANS JERSEY
  Suggested by andy@example.com
  £45.99 [projected sales 30000]
  16/4/2014, 17:37:48
- CARDIFF JERSEY
  Suggested by dai@example.com
  £0.99 [projected sales 3]
  16/4/2014, 17:38:11

Matching product suggestions

SWANS

- SWANS JERSEY
  Suggested by andy@example.com
  £45.99 [projected sales 30000]
  16/4/2014, 17:37:48

Play around with the Web page until you're happy with how it all works, then close the browser and return to Visual Studio. The following exercises explain how that all worked ☺.

Exercise 1: Understanding the project structure

In Solution Explorer, open `MainPage.html` and observe the following points:

- The `<head>` links in a predefined style sheet named `Stylesheet.css`. Take a look at this style sheet if you like. For more info about CSS styles, see Appendix A.
- The `<head>` includes a script file named `ProductSuggestionsFunctions.js`. Take a look at this script file. The script file contains various functions that we'll explain during this lab. For more info about essential JavaScript syntax, see Appendix B.
- Back in `MainPage.html`, the `<body>` defines all the HTML markup. Note the following points:
  - When the user clicks the *Add* button, it causes the `doAdd()` function to be called. This function returns `false`, to prevent the form from submitting itself to the Web server.
  - The first `<fieldset>` element displays all the product suggestions (the product suggestions will actually be displayed in the `<span>` whose `id` is `allProductsList`). The `<fieldset>` also contains *Sort* and *Reverse* buttons, which invoke the `doSort()` and `doReverse()` functions respectively.
  - The second `<fieldset>` element allows the user to search for product suggestions that match a regular expression. The results will be displayed in the `<div>` whose `id` is `matchingProductsList`.

Exercise 2: Working with strings and dates

Open the `ProductSuggestionsFunctions.js` script file. Note that it kicks off by defining a global variable named `allProducts` – this is an empty array.

Now locate the `doAdd()` function. The purpose of this function is to get the values entered by the user in all the text boxes, build a formatted string, and then add it to an array.

The function begins by getting the values entered in all the text boxes:

- To get the value of a text box, we use code such as the following:
  ```
  var elemValue = document.getElementById("elemId").value;
  ```
  For example, to get the value of the *description* text box (whose ID is `description`):
  ```
  var description = document.getElementById("description").value;
  ```

- The *email* field is retrieved as a simple string.
- The *price* field is converted into a floating-point number with 2 decimal places, by using JavaScript's `parseFloat()` function.
- The *sales* field is converted into an integer, via JavaScript's `parseInt()` function.

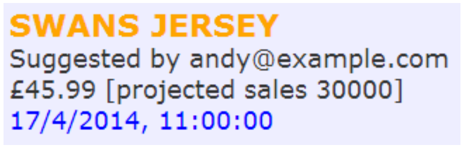
Next, the code creates a string variable to format these values. Here's an explanation of the string handling code (for more info about the standard `String` object in JavaScript, see Appendix C):

- We use the `toUpperCase()` function on the standard `String` object to convert the product description to uppercase.
- We use the `big()`, `bold()`, and `fontcolor()` functions on the `String` object to add HTML formatting to the string (i.e. to set the font size, font weight, and font colour).

Next we append the current timestamp to the string, by using functions on the standard `Date` object (see Appendix C for more details about `Date`):

- We get the current date and time, simply by creating a new `Date` object.
- We use various `Date` functions to get the date (i.e. day), month, full year, hours, minutes, and seconds.
- We use the `pad()` helper function (at the bottom of the script file) to ensure that 2-digit time fields (hours, minutes, seconds) are displayed with a leading zero if necessary.

This is how the details appear when displayed:



```
SWANS JERSEY
Suggested by andy@example.com
£45.99 [projected sales 30000]
17/4/2014, 11:00:00
```

Exercise 3: Working with arrays

In this exercise you'll examine the array-handling code, which adds each product suggestion to an array and displays the array items as a bulleted list on the Web page. For more info about arrays, see Appendix C.

Aside: In this lab, the array will contain simple HTML strings. In the next lab, you'll refactor the Web application so that it uses fully object-oriented `Product` *objects instead, which is a much more elegant approach.*

To get started, note again that we declared a global variable named `allProducts` to hold an empty array. Then, near the end of `doAdd()`, we push the current product suggestion into the array and then call `displayProducts()` to display all the products suggestions. Note that the `displayProducts()` function takes two parameters:

- The array to display. We want to display all the product suggestions, so we pass in `allProducts` here.
- The id of the target element where we want to display the array data. We pass in "`allProductsList`" here (this is the `id` of the `<span>` where the full product list will appear).

Now locate `displayProducts()`. The function displays all the items in the specified array as a bulleted list, in the specified target element. Note the following points:

- We build up a formatted string of HTML as follows:

```
<ul>
  <li> … </li>
  <li> … </li>
  <li> … </li>
</ul>
```

- We loop through the array, and wrap each array item in a `<li>` … `</li>`.
- To assign the HTML to the target element, we use the following code:

```
var targetElement = document.getElementById(targetElementName);
targetElement.innerHTML = str;
```

Now locate the `doSort()` function. This function sorts the array and redisplays the sorted array data.

Finally locate the `doReverse()` function. This function reverses the array and redisplays the reversed array data.

Exercise 4 (If time permits): Working with regular expressions

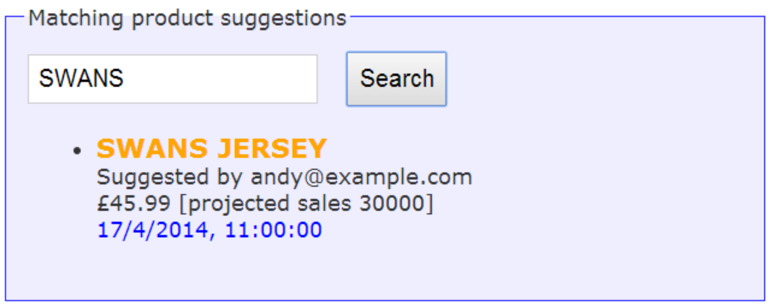
Regular expressions are great for pattern matching. We use regular expressions in `doSearch()` to search for all product suggestions that match a regular expression entered by the user. Note the following points in the `doSearch()` function (see Appendix C for more info about regular expressions):

- The user will enter the regular expression in the `searchString` text box. We get the value of this text box and create a new `RegExp` object based on this string, as follows:

```
var searchString = document.getElementById("searchString").value;
var re = new RegExp(searchString);
```

- Next, we create a new array ready to hold all the matching product suggestions.
- We loop through the array of all product suggestions (`allProducts`) and test whether each item matches the regular expression. If it does, we add it to our “matches” array.
- After the loop, we display the “matches” array in the “`matchingProductsList`” target element (we use the `displayProducts()` function to do this).

Run the Web application to remind yourself how this works. Add some product suggestions, and then try out the search functionality. You should see a result such as the following:



- SWANS JERSEY
  Suggested by andy@example.com
  £45.99 [projected sales 30000]
  17/4/2014, 11:00:00