One-Dimensional Arrays

- Let's review and see some additional information about arrays.
- **Array** – ordered collection of values.
- **Indexing** – first element associated with index 0.
- An element of an array can be of any type and an array can hold different types of elements.
- **Initialization of arrays**
  - Via array literal – comma separated list of elements within square brackets.
    - var a = [2, 3, 5];
    - var b = []; // empty array
  - Specified in the Array constructor
    - var c = new Array();
    - var d = new Array(2, 3, 5); // initializes array with 2, 3, 5
    - var e = new Array(4); // defines array of size 4
- You can print array contents with alert.

One-Dimensional Arrays

- You can change the number of elements of an array at any time.
  - Example

    ```
    var data=[];  // initially zero elements
    data[0]=10;
    data[1]=20;  // two elements by now
    ```
- **length property**
  - Read/write value.
  - Can be used to expand/truncate array.
  - Example (truncating)

    ```
    var data=[];
     data[0]=10;
     data[1]=20;
     data.length = 1;
    ```
- **Example:** GetFilteredData.html

Converting Between Arrays and Strings

- **From array to String via join:**

```
var a = [5, 9, 10];
var aStr = a1.join();                 // aStr   → 5, 9, 10
var aStr2 = a1.join("<br />");    // aStr2 → 5<br />9<br />10<br />
```

- **From String to array via split:**

```
var b = "30, 40, 50";
var bArray = b.split(",");
for (var idx=0; idx < bArray.length; idx++) // loop that prints 30, 40, 50
      alert(bArray[idx]);
```

Combining and Dividing Arrays

- **concat** – join arrays together returning an array with the result. It does not modify the original arrays. You can pass additional array as comma-delimited parameters.
- **Example:**

```
var data1 = ["Mary", "June"];
var data2 = ["Lynn", "Kim", "Tim"];
var concatenated = data1.concat(data2);  // concatenated we will have
                                         // [“Mary”, “June”, “Lynn”, “Kim”, “Tim”]
```

- **splice** – removes a segment of elements from the array. First parameter represents starting index; second number of elements to retrieve from that index on.
- **Example:**

```
var ages = [-1, 4, 5, 6, 8, 10, 12, 14];
var segment = ages.splice(2, 3);
// ages now has the values -1,4,10,12,14
// segment has the values 5,6,8
```

Passing One-Dimensional Arrays

- How are one-dimensional arrays pass to a function?
- Let’s see a memory diagram.

Two-Dimensional Arrays

- JavaScript does not support actual two-dimensional arrays
- You can simulate two-dimensional arrays by using arrays of arrays.
- About two-dimensional arrays
  - You can pass them and return them from functions like one-dimensional arrays.
  - Any modifications in the function will be permanent.
  - You can have ragged arrays.
- **Example:** TwoDimensionalArrays.html

Functions as Data

- In JavaScript functions are considered data.
- That means they can be assigned to variables, stored as properties of objects or elements of arrays, passed as arguments to functions, etc.
- **Example:** FunctionsAreData.html
- Where have we seen this?

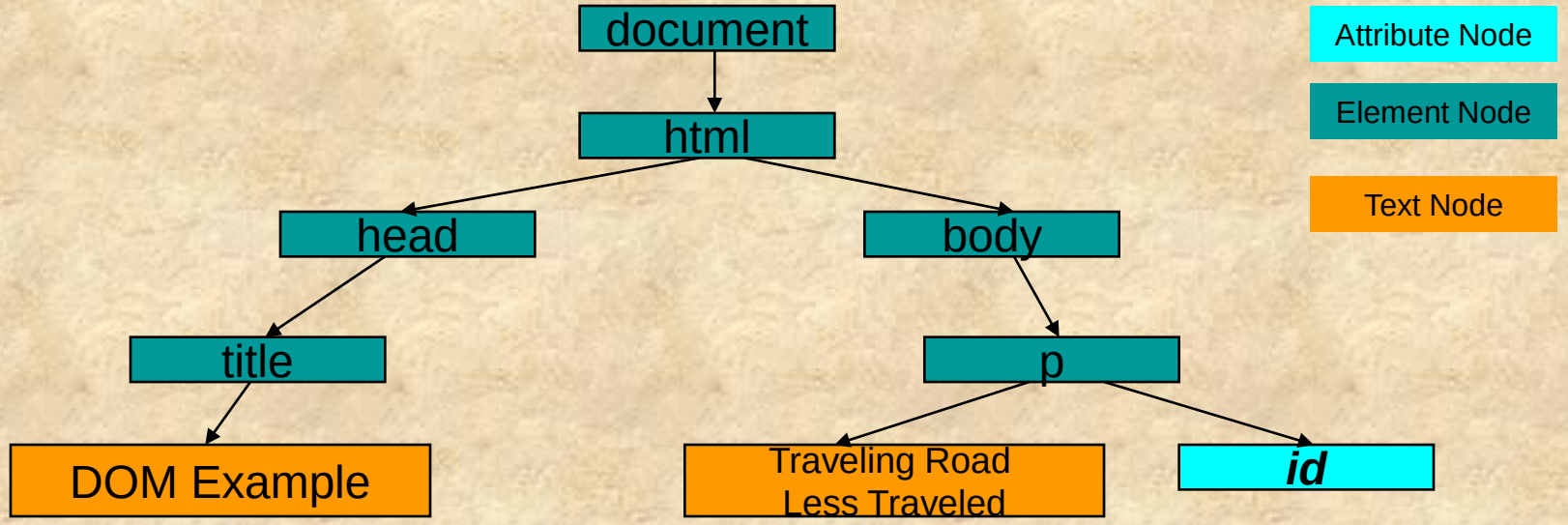
DOM (Document Object Model)

- **DOM** – representation of the elements of a web page (e.g., headings, lists, paragraphs, styles, etc.) used by a JavaScript programs to manipulate web page elements.
- **DOM** – Allows JavaScript programs to **dynamically** access and update the content, structure, and style of documents.
  - From a JavaScript program you can control the image displayed in your page every hour.
  - From a JavaScript program you can let users decide what background color to use.
  - You could add/remove new items from a list.
  - Others.

DOM (Document Object Model)

- DOM represents elements of a web page as a tree structure consisting of nodes.
  - Each pair of tags (.e.g, ,) is represented by a node.
  - Three types of nodes:
    - text nodes
    - element nodes
    - attribute nodes
- Manipulation of these node allows a JavaScript program to access any information present in a web page.

Example DOM for HTML File




```
<html>
        <head><title>DOM Example</title></head>
        <body>
                <p id="message">Traveling the road less traveled. </p>
        </body>
</html>
```

DOM (Document Object Model)

- To access any element of your web page you could traverse the tree.
  - Easier approach:
    - **document.getElementById** method
      - Returns element with specified id
    - **getElementsByTagName** method
      - Can be used with document and every single element node
      - Returns a list of nodes (array)
- To read and write attributes of an element “elem”
  - elem.getAttribute(“*nameOfAttribute”*)
  - elem.setAttribute(“*nameOfAttribute*”, “*newValue*”)
- **Example:** AccessingDom.html

Animations

- We can create animations by using the DOM
- **Example:** AccessingDOMII.html

DHTML

- **DHTML (Dynamic HTML)** – It is a combination of HTML, CSS, and JavaScript where scripts dynamically alter the style of a document.

Form Validation

- Forms – We can validate the data associated with a form by recognizing the submit event.
- Keep in mind that JavaScript can be disabled therefore always validate data on the server side.
- **Example:** FormValidation.html
  - Illustrates fieldset/legend.
  - Illustrates alternatives to access form values.
    - elements array
    - document.getElementById

Debugger

- Allow us to see values of variables.
- Allow us to execute statements one at a time.
- Firebug Debugger.
  - https://addons.mozilla.org/en-US/firefox/addon/1843?id=1843&application=firefox
- Firebug 1.2 requires Firefox 3. Firefox 2 users should install the older 1.05 version of Firebug.
- Demo