

Training course:

Real-world web applications implemented in Dojo, Dijit and HTML 5

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0. Introduction

This document describes the training course: Real-world web applications implemented in Dojo, Dijit and HTML 5.

0.1. Readers guide

This document is divided in two parts:

- The Introduction outlining the training course objectives and requirements to the students.
- A detailed description of the training course. The detailed description starts in chapter 1. In the current version of the document, the contents of the lessons are described in bullet form only.

Each chapter describe a lesson of 2 hours. It is expected that the student use Min. 2 hours between each session to review the material and to make exercises.

The course described below will require approx. 100 hours study time: That is 20 sessions of 2 hours and 60 hours of own study time (Reading (10 hours) and own programming exercises (50 Hours)).

0.2. Training course objectives

After completion of the Training course the students will be able to:

- Understand and elaborate object oriented design and programming in Java Script.
- Understand interaction and dynamics between DOM and JavaScript.
- Get an insight to the newest development in standardization and work with HTML5 and CSS3.
- And under supervision, be able participate in a development team programming larger JavaScript applications using all parts of the Dojo Toolkit framework.

0.3. Overall Training Course description

Over the last 10 years more and more applications has been moved from the traditional desktop to the web based application. This has been boosted by the mobile market, the SaaS market, increased use of central databases sources and industrial needs.

The fact that more applications have been moved to the web browser does put increased usability requirements to the web solution. Usability that can only be achieves by apps, JavaScript, and new web technologies.

Flash was once believed to be part of the answer, however, the decision taken by Apple years ago to discontinue the Flash support appears now proven. Therefore, there will be an increased need for frontend engineers knowledgeable in the area of JavaScript and new web technologies' such as HTML5 and CSS3.

This training course will fill the gap using real-world implementation examples based on the Dojo Toolkit framework.

There are more than 60 JavaScript libraries¹ and Frameworks available for front end development. Among these less than ten have more than 1% market share.ⁱ Even though Dojo toolkit is in the top ten, Dojo has for the time being only a small market share. However, we evaluate Dojo to have a great potential because:

- Dojo and Dijit is very well integrated to HTML5
- Dojo have an open source community not controlled by a single company (like e.g. YUI)
- Dojo is one of the most comprehensive toolkits available.
- Dojo mobile is very promising.

0.4. Details about the course

The course contains 18 sessions. Each session contains two hours of theory and one hour of practical programming work.

The practical programming work will be a continued project that at the end of the course will consist of a small application that is able to communicate with a back office data server.

0.5. Training material

Dojo Dijit and HTML5 Real world applications use the following own resources:

The training material is placed in different resources. The plan is to stream-line the material from the following resources owned by Virtual Team A/S:

[http://pmis.biz/wiki/Dojo Dijit and HTML5 in Real world applications](http://pmis.biz/wiki/Dojo_Dijit_and_HTML5_in_Real_world_applications)

Basic and advanced JavaScript: <http://pmis.biz/training/javascript/index.php>

Dojo: <http://pmis.biz/rwa/>

Furthermore, a long list of foreign material is used. Please refer to the list of references.

¹ http://en.wikipedia.org/wiki/List_of_JavaScript_libraries

In each sessions the students receive a print-out of all programming code explained in the theory session.

0.6. Requirements to the students

The students need profound knowledge in the area of object oriented design and programming e.g. by successful completion of a C, C++, C#, VB, Java or equivalent programming language course. Furthermore, a basic knowledge of web technology might be required, such as, but not limited to: Web protocols (IP, TCP, HTTP), HTML and CSS. Basic experience in PHP programming or .NET programming and SQL will also be valuable.

0.7. Evaluation of students achievements

The students will be evaluated based on the quality of the completed project (see 0.4 Details about the course). There will be no final exam.

The evaluation of the project will be given in the range of 0-100%. 60 % is required to pass the course. 60% and above is achieved on projects where the students have demonstrated basic understanding of the course curriculum shown by the programming code written in the project.

Four code reviews will be carried out during the course: The student must submit their work to the teacher for evaluation. The work will be commented when returned.

0.8. Required software

Required setup in the computer lab for the Course / recommended software for the students:

- Firefox with firebug installed.
- Local host webserver (apache), preferable with PHP support
- Text editor e.g. Eclipse
- Access to internet

0.9. References

Javascript specification:

<http://www.ecma-international.org/publications/files/ECMA-ST/Ecma-262.pdf>

http://en.wikipedia.org/wiki/JavaScript_library

CreateElement with JavaScript in DHTML:

<http://www.adp-gmbh.ch/web/js/elements/createelement.html>

dijit.form.Select

http://archive.dojotoolkit.org/nightly/dojotoolkit/dijit/tests/form/test_Select.html

0.10. Course description by session

In the following 18 chapters the subjects and references to the course materials are provided. Each chapter refer to one session.

The course material for each session may be found here:

[http://pmis.biz/wiki/Dojo Dijit and HTML5 in Real world applications/University](http://pmis.biz/wiki/Dojo_Dijit_and_HTML5_in_Real_world_applications/University)

(Available one week prior to the session).

1. Introduction

- Introduction to the course.
- The invention of JavaScript: JavaScript history
- Ecma document
- ReservedWord
- My first dojo function: `dojo.byId()`
- `document.getElementById()`, element id
- Document Object Model
- Object, method, property, value
- `window.location.reload()`
- CSS: display vs. This text is not shown when the page is loaded visibility

2. Advanced Java script I

- JavaScript Objects: Arrays, Objects, functions, strings, int...
- Variable scope
- Reflection
- Function call
- Constructor: new Object
- Proto type (based object oriented language).
- This
- Differential inheritance
- Try, throw, catch

3. **Advanced Javascript II**

- Document Object Model (4)
- AJAX
- Dojo. dojo.xhrPost
- Closures
- Private members in JavaScript²
- How to make objects with callback functions (With pure Javascript and with Dojo)
- dojo.deferred
- Callback functions:
rwa/dijit.Dialogue_2.php
Softloader
Dojo.require
- Programmatic vs. Declarative

4. **Javascript frame works**

http://en.wikipedia.org/wiki/Comparison_of_JavaScript_frameworks

In this section we will review different JavaScript libraries. And look into highlight programming examples.

4.1. **Ext JS**

Proprietary framework with functionality equal to Dojo Toolkit owned and maintained by <http://www.sencha.com/>. Read more:

[http://en.wikipedia.org/wiki/Ext_\(JavaScript_library\)](http://en.wikipedia.org/wiki/Ext_(JavaScript_library))

4.2. **JQuery**

<http://jquery.com>

4.3. **YUI**

<http://developer.yahoo.com/yui/>

4.4. **Dojo**

<http://dojoToolkit.com>

² <http://javascript.crockford.com/private.html>

5. DojoToolkit I

In this session we will work with all the basics functionality in Dojo:

- Manipulation of arrays
- Dom manipulation
- Declarative VS. Programmatic dijit widget

6. DojoToolkit II

- Dokumentation³ vs.
- API browser⁴
- Dojo.fx

7. Dijit

How to use a dijit widget and

How to make a dijit widget

8. Dojox.Data.filestore I

We learn how to get data from the server – manipulate the data and return the data to the server.

9. Dojox.Data.filestore II

Continued.

10. Dijit.menu and Dijit.Dialog

Use of containers such as tab's and menues.

11. Dijit.form

We will make an application to collect data and store the data at the server.

We make a form that include more elements from dojo.form

³ <http://dojotoolkit.org/documentation/>

⁴ <http://dojotoolkit.org/api/>

12. Dijit.Tree

- `dijit.tree.ForestStoreModel` Vs.
- `dijit.tree.TreeStoreModel`

13. HTML 5

Review of new functions in HTML5

(Basic knowledge of HTML is expected)

14. CSS3

In this section we will build an application using CSS3.

We will also discuss strategies for backwards comparability:

- Gracefull degradation and
- Progressive Enhancement

15. Dojo.Mobile I

The first versions of mobile browsers did not provide real internet browsing capability. In the resent years the mobile browsers have gained the same functionality as the desktop computer versions. Today the most advanced browsers are the mobile versions, supporting HTML5 and part of the CSS3 specification. Therefore, it is relevant to make applications using this technology. Part of the apps industry will move to web applications⁵.

In this session we will learn to make specific web applications that are supported by all major mobile platforms.

16. Dojo.Mobile II

Continued..

17. Native apps with PhoneGap

In this session we will learn how to make Native mobile apps based on HTML5/CSS3/Dojo.mobile and the PhoneGap application.

⁵

[http://www.dannotes.dk/dannotes/arrangem.nsf/0/3A4EEDB2B55564A4C1257950003AC136/\\$file/Mobilisation.pdf](http://www.dannotes.dk/dannotes/arrangem.nsf/0/3A4EEDB2B55564A4C1257950003AC136/$file/Mobilisation.pdf)

18. Security concerns

- <http://www.sitepen.com/blog/2008/09/25/security-in-ajax/>
- Cross-site scripting (Non-persistent and Persistent)
http://en.wikipedia.org/wiki/Cross-site_scripting
- http://en.wikipedia.org/wiki/Code_injection
- <http://www.cgisecurity.com/xss-faq.html>

19. References

Javascript libraries (The 60 more known):

http://en.wikipedia.org/wiki/List_of_JavaScript_libraries

http://dojocampus.com/explorer/#Dijit_Tree_With%20Popup%20Menu

20. Document information

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1	14 Sep 11	PSA	Approved	
2	10 Dec 11	PSA	Approved	The latest changes to the training program added.
3	14 Feb 12	PSA	Approved	Course adjusted to UCB requirements: Sessions 18 of 2 hours of theory and 1 hour of laboratory work. Section 0 rewritten.

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ⁱ Usage of JavaScript libraries for websites:

http://w3techs.com/technologies/overview/javascript_library/all