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Advanced Web Programming

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A compact JavaScript framework

MOOTOOLS

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What is MooTools?

- MooTools is a JavaScript framework
  - MooTools is a lightweight abstraction layer between the browser and the code you write.
- It is Object-Oriented
- It allows to write cross-browser code.
- It respects standards and it's extensively documented.
- It is released under Open Source MIT license

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What is MooTools?

- Wikipedia:

  – MooTools is an open source, lightweight, modular object-oriented programming JavaScript web application framework.

  – It includes built-in functions for manipulation of CSS, DOM elements, native JavaScript objects, Ajax requests, and more.

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What is a Framework?

- It is an abstraction in which common code providing generic functionality can be overriden by user code providing specific functionality.

- The idea is similar to SW libraries: they are reusable abstractions of code in a well defined API.

- In other words: it is a SW layer between the programmer and the developing platform in order to help building programs.

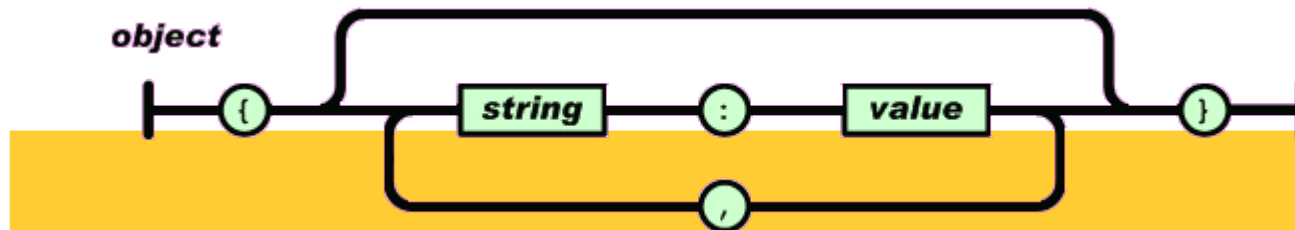Universitat d'Alacant
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What can I do?

- Some examples of things you can do with MooTools:
  - Code Javascript easily: Mootools features improve Javascript capabilities.
  - Code Client-Side Object Oriented: Create your own classes with Javascript.
  - Work with JSON: sending and reciving data.
  - Create FX with Javascript: user interaction, dinamic menus, transitions (tween, morphs), slides, scrolls, etc.
  - Work with AJAX and interact with your server scripts.

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What is JSON?

- JSON stands for Javascript Object Notation

- It is a data interchange format

- JSON information is in text format

- It is supported by many languages: Javascript, C, PHP, ASP.NET, Java, Python, etc.

- JSON data takes this form:

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Where to find?

- http://mootools.net, home page.
- http://mootools.net/download, download page.
- http://mootools.net/docs, documentation page.
- http://www.mootorial.com/wiki, a good tutorial
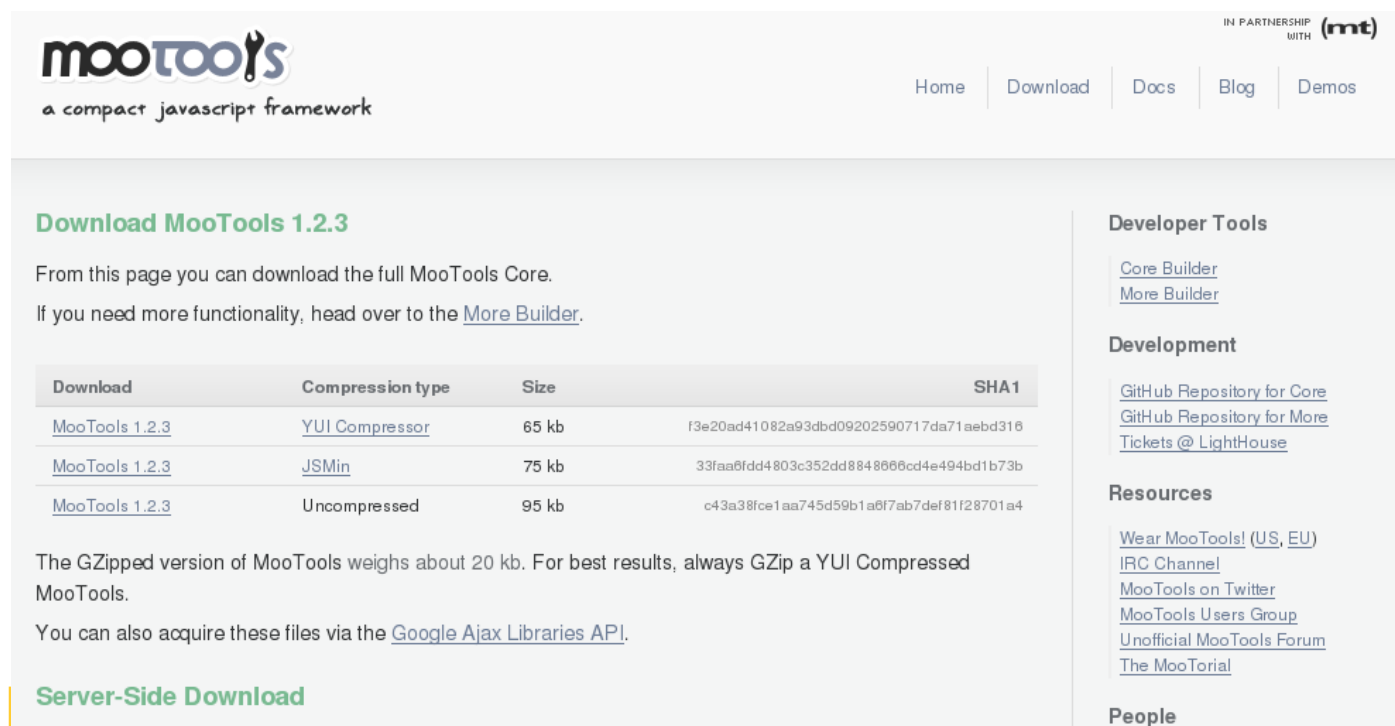
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How to download?

- Go to www.mootools.net/download

- Here you can download the MooTools core.

- Use the uncompressed version for development and the compressed one for the real site.

- The core download includes: library base, ajax working, effects, classes and extensions.

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How to download?

- The download page:

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How to download?

- The 'more Builder' link allows you to get the MooTools Add-ons:
  - Classes
  - Native Objects, Element classes
  - Forms
  - FX, Drag, Request
  - Utilities, Interface, etc.
- Just check the scripts you want, choose a compression type and then donwload the include file.

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How to download?

- The 'more Builder' page with some options:

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How to download?

- Tip: choose the whole library for development only if you don't know which script you will need to use.

- Compression types remove extra blank spaces and rename variables in a shorter way, making a much smaller file.

  - YUI compressor is the most efficient. It will be very useful when releasing your code.

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Before start working...

- Firebug:
  - Extension for Firefox
  - allows debugging, editing, and monitoring CSS, HTML, DOM, and JavaScript code, and provides other Web development tools.
  - https://addons.mozilla.org/en-US/firefox/addon/1843

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Before start working...

- Web developer toolbar:
  - Extension for Firefox
  - adds a menu and a toolbar with various web developer tools.
  - https://addons.mozilla.org/en-US/firefox/addon/60

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How to add to my pages

- It's easy, just include the MooTools file with the 'script' tag.

```
<script type="text/javascript"
src="path/to/MooTools.js"></script>
```

- You can also include your own javascript files or even code javascript lines inside the web page.

- The MooTools file include must be the first one in your web page.

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How to add to my pages

- Here is an example document

```
<!DOCTYPE ...>

<html ...>

<head>...

<script type="text/javascript"
  src="path/to/MooTools.js"></script>

<script type="text/javascript"
  src="path/to/MyJSFile.js"></script>

<script>My own Javascript code</script>

</head>

<body>...</body>

</html>
```

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Hello world example

- First, write a 'Hello world' page with only HTML.
- After, write a second page using javascript&DOM.
- Finally, let's display a 'hello world' message from MooTools code:

```
<script>
window.addEvent("domready", function(){
$('text').appendText("Hello World! (from
  MooTools code!).");
});
</script>
```

- And the body code:

```
<p id="text"></p>
```

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Hello world example

- AddEvent: allows to match a handler function to an HTML element event.

- Domready: is the event triggered when the DOM is ready and it has loaded all code and data.

- $('id-of-tag').method-or-property: when we want to access to an element's method or property.

- AppendText: a method allowing us to add some text inside an element.

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A little bit of knowlegde

- http://mootools.net/docs/core/Element/Element
- $('theID'), select one element identified by 'theID'.
- $$('something'), select one or more elements matching 'something' string.
  - It returns an array or collection of elements
  - You can use tags names, classes, identifiers, etc.
- Event 'DomReady', It fires when the DOM (and all of its objets) is ready. So, in this moment you are sure you can work with all objects in the page.
  - This event is only available from the window Element.

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A little bit more of knowlegde

- $('myID').getElement(),
- $('myID').getElements()
- $('myID').getElementsById()
- Get children elements from our 'myID' element.
- $('myID').get('property')
- $('myID').set('attribute', 'value')
  - Set a value into a property of our 'myID' element.

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A little bit more of knowlegde

- myElement.erase(property), deletes the element's property.
- myParent.adopt(newChild, ...)
  - insert 'newChild' as child of 'myParent' element.
- myElement.inject(element2, where)
  - Insert 'myElement' in 'where' position from 'element2'.
- Others: appendText, dispose, replaces, etc.

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Core functions

- http://mootools.net/docs/core/Core/Core
- $$('aTag').each(new function {something...})
  - Calls the function for each element in the collection retrieved by $$.
- $chk, $defined, $type, $random, etc.
- $A, creates an iterable array.
- $H, creates a hash table (=Hash())

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Creating a console

- Let's create a 'console', that is, a layer allowing us to put some text in order to debug or to display results of some actions.

- Here is the needed code:

```
function toConsole(theText){
    if (!$('console')) {
        var element = new Element('div',
{'id':'console'});
        $$("body")[0].adopt(element);
    }
  var element = new Element('div');
  element.appendText(theText);
  $("console").adopt(element);
}
```

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Creating a console

- You can write this code directly inside the HTML file or put it into an extern javascript file, and then include it from the web page (the best choice).

- Once you have typed the previous code, let's test it by creating a new page with

  – a command button (<input type="button"...) with an 'id' attribute.

  – coding the 'window.onload' event and attaching a handler function to our button's 'onclick' event.

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Creating a console

- The button code:

```
<input type="button" value="click me!"
    id="write" />
```

- The handler code:

```
window.onload = function() {

        var button=$('write');

        button.onclick=function() {

            toConsole('You have clicked on
    the button, so I am writing in the
    console...');

            return false;

        }

    }
```

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Try to do yourself…

- What happens if you click the button several times?

- Modify the code in order to put a counter counting the times the button is clicked.

- Modify the code in order to clean the console each time the button is clicked.

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Defining classes

```
Var myClass= new Class({
MyAttr: 'value',
...
Initialice: function(...){
    ...},
MyMethod: function(...) {
    ...}
});
Var myObj = new myClass(...);
myObj.MyMethod(..);
```

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Form data validation

- One of the most useful things we can do with javascript is to validate correctness of HTML forms.

- Using MooTools we can also validate HTML forms.

- We can build a class containing methods for validate every type of field in our forms:

  - Mandatory fields (text boxes, selects, radiobuttons)
  - Text boxes containing specific data (numeric, date, an interval of values, etc.)
  - Text boxes and text areas with a maximum length.
  - And any other kind of validation.

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Form data validation

- Let's create our own form validation class:
  - First, we will design a one mandatory field form called user name, and a command button to send the form data.

Testing a form

Your name: [   ]

[send data]

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Form data validation

- The next is to implement our class

```
var cTestOK = new Class ({
    error1: 'This field cannot be empty.',
    isEmpty: function(pField){
        var field = $(pField);
        if (field.get("value")=="") {
            alert(this.error1);
            return true;
        } else {
            return false;
        }
    }
});
```

This class has
- one attribute (a message error)
- and one method: a function receiving a field name to test its emptyness.

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Form data validation

- Finally, we are going to handle the onclick button event to trigger our class method.

```
window.addEvent("domready", function(){
  var oTesting = new cTestOK("myForm");
  $("sending").addEvent("click", function()
  {oTesting.isEmpty("pName");});
});
```

- This instruction allows us to link a function to the onclick button event.

- In this way, we will invoke the method 'isEmpty' of our class and we send it, as an input argument, the name of the field we want to test its correctness.

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Try to do yourself...

- Add a select control with a product list.
  - This field is also mandatory.
- Add a new text field to the form asking for the amount of products the user wants to buy.
  - This field will have a default value: 1.
  - This field is also mandatory.
  - This field is a numeric value starting from 1.
- Finally, add a textarea field asking for any comment about the user order.
  - This field is optional.
  - This field has a maximum lenght of 200 chars.

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References

- Webs:
  - mootools.net
  - www.mootorial.com
  - json.org
  - wikipedia.org
- Books:
  - MootTools Essentials, Aaron Newton. Apress / firstPress. 2008

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Exercices

- Managing select options: changing options depending on other select value.
- Accordion FX.
- Tween FX.
- Sorting lists
- A game: guess the words I've though about...

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Managing select options

- Let's make a web page with two select fields, the content of one of them depending on the other's selected option.

- Suppose we have two selects like shown in the figure:

choose a country ⌄ | choose a city ⌄

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Managing select options

- First of all, we declare an array of cities for each country in the select.

```
var theWorld = [
$H({1: 'Warszawa', 2: 'Bialystok', 3:
   'Lublin', 4: 'Krakow'}),
$H({1: 'Madrid', 2: 'Barcelona', 3:
   'Alicante', 4: 'Valencia'}),
$H({1: 'San Francisco', 2: 'Washington',
   3: 'New York', 4: 'Los Angeles'})];
```

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Managing select options

- Next, we attach a handler to the 'onchange' event of the country select.

```
window.addEvent("domready",
   function(){

var country = $("countries");


country.addEvent("change", function()
   {putCities();});
});
```

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Managing select options

- Finally, we implement the handler.
- It will change all the options in the city select loading the selected country cities.
  - Test if the selected country is the 'non-selection' value '-1', and decide what to do if so.

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Accordion menu

- Let's create a dinamic menu with expanding/contracting options, a.k.a. Accordion menu.

- First: type the HTML code of our menu.
  - The first level options
  - For each first leve option, type its second level options.

- Second: label all the first level options with a CSS class, i.e.: level1.
  - Do the same with each element containing the second level options: 'level2' CSS class.

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Accordion menu

- Finally: create and Accordion object in the 'Domready' event.

```
window.addEvent("domready",
  function(){

    var myAccordion = new
  Accordion($$("li.level1"), $$
  ("ul.level2"));

});
```

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Tween FX

- Tween FX change a CSS property from one value to another.
- We can set the duration, start and end values, property to change, etc.

```
window.addEvent("domready", function(){

var myFX = new Fx.Tween($('myP'), {property:
  'left', duration: 3000})

myFX.start(0, 100);

});
```

- And in the Body

```
<p id="myP" style="position: absolute; left:0px;
  top:0px;">Hello world!</p>
```

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Sorting lists

- Design a list of items with HTML.
- Add two buttons to each item.
  - One of then will by the up button and the other the down one.
- Implement client-side code with MooTools to add the necessary functionality

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Sorting lists

- Design a list of items with HTML

```
<div id="toSort">
<div id="1" class="item">First item</div>
<div id="2" class="item">Second Item</div>
<div id="3" class="item">Third item</div>
<div id="4" class="item">Fourth item</div>
</div>
```

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Sorting lists

- Add the up&down buttons
- Each item will chage as follows:

```
<div id="1" class="item">
<div class="img UP"></div>
<div class="img DW"></div>
First item
</div>
```

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Sorting lists

- Define some CSS styles to adjust the layout:

.img {

float:left;

width: 17px;

height: 17px;

padding: 2px;

background-repeat: no-repeat;

background-position: 0px 0px;}

.UP { background-image: url('up.png'); }

.DW { background-image: url('down.png'); }

.item { clear: both; vertical-align: top; }

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Sorting lists

- Program the sorting functionality.
  - For each image, add a handler to its event 'onclick'.
    - If it is a get-up image, add a 'get up' event
    - If not, then add a 'get down' event.
  - Implement both previous events: 'get up' and 'get down'.
    - 'get up' event will move the list item to the next, if exists.
    - 'get down' event will put the clicked list item before its previous, if exists.