JQUERY

Agenda

- What is the jQuery?
- Wrapped Set
- Useful API
- DOM selection
- DOM traversal
- DOM creation
- DOM events

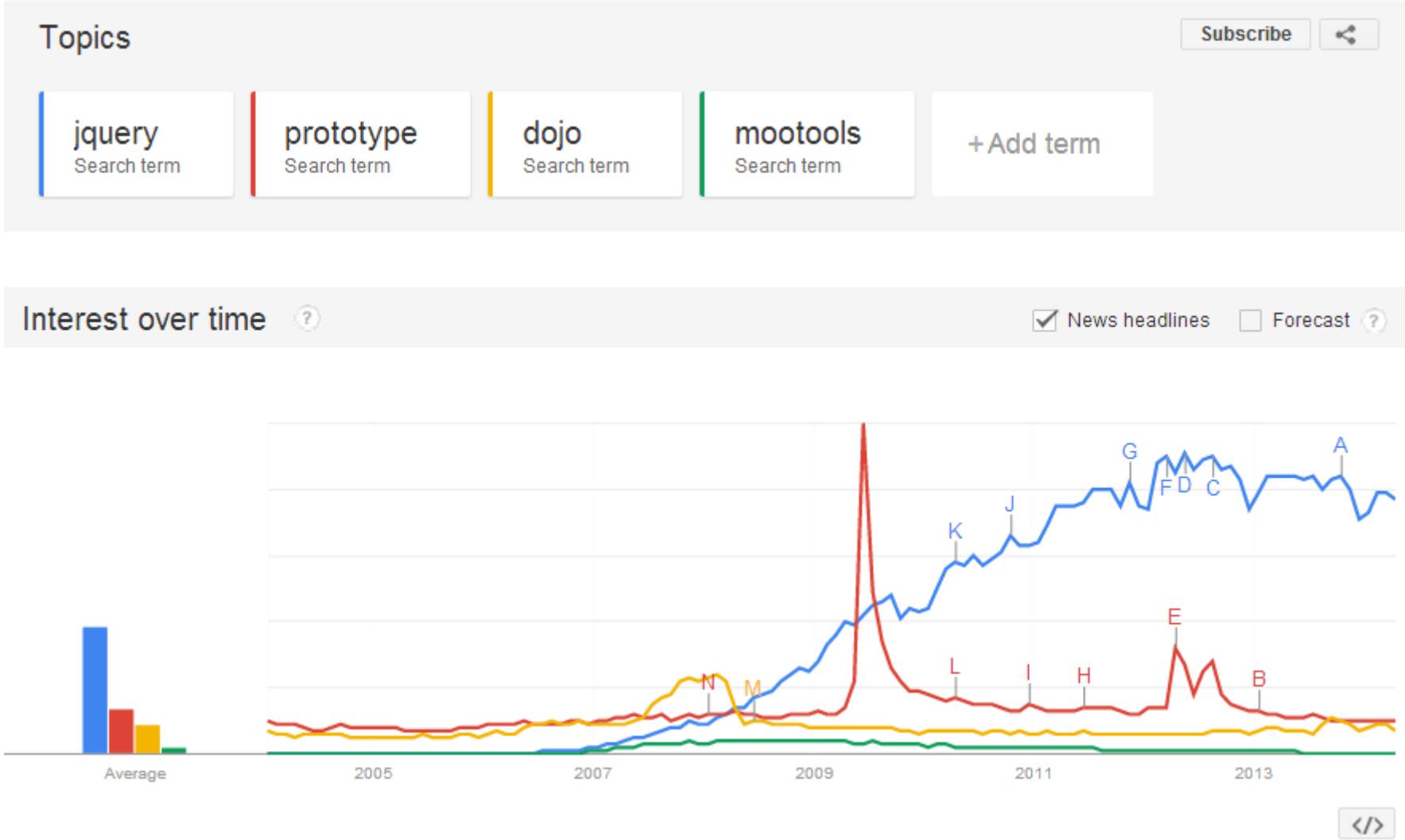
jQuery

- "Write less, do more"
- Open source JavaScript library
- Released at 2006
- Provides CSS 3 based syntax for DOM traversing
- Eliminates cross-browser differences
- Extensible
- Making DOM manipulation **easier**
- http://jquery.com/

Why jQuery ?

- You have no other choice ☺
- Open source
- Free
- Adopted by many leading companies
- Easy to integrate into existing application
- IE6+ (Wow …)
- Very active community
- Lightweight

Alternatives



Getting Started

- Download jQuery script from http://jquery.com/
  - Compressed
  - Uncompressed
- Can use CDN instead of local script
  - Google
  - Microsoft
  - jQuery
- Include it in your HTML
- Start using the jQuery global object

jQuery Global Object

- It is actually a function
- Has and alias named $
- There are different ways to use it
  - $("div") – Search
  - $(" ") – Create
  - $(function(){…}) – DOM Ready
  - $(element) – Wrap native DOM element
  - $.ajax – Global API
- See next slides

$ Conflicts

- $ alias is not reserved for jQuery
- Other 3rd party libraries might use it too
- How can we ensure no conflicts ?
  - Use closure
  - Never use the global $

```
(function ($) {
    //  $ here is for sure jQuery

    //  Ask jQuery to restore original $ value
    //  Can omit this line
    $.noConflict();
})(jQuery);
```

Initialization

- Most of the time we are using jQuery for DOM manipulation
  - For example, animation
- To manipulate the DOM we must first wait for it to be completely loaded
- There is a standard DOM event named DOMContentLoaded
  - However, is not supported under old browsers IE8-

Waiting for the DOM

- jQuery offers cross browser DOM ready event
  - On new browsers it uses DOMContentLoaded
  - Old browsers require some nasty tricks
- Two ways to do the same thing

```
<script>
    $(document).ready(function () {
        alert("DOM is ready");
    });

    $(function () {
        alert("DOM is ready");
    });
</script>
```

DOM Selection

- Construct a CSS selector
- Send it to $ as a string
- jQuery looks for all matching elements
- Returns an array of results
  - A.K.A jQuery wrapped set
  - Offers a rich API

```
// Change all links color to red

var res = $("a");
res.css("color", "red");
```

DOM Selection

- Select according to class

```
$(".items")
```

- Select according to html tag

```
$("div")
```

- Select according to id

```
$("#button1")
```

- Combination of above

```
$("#main input.simpleButton")
```

Wrapped Set – Be Aware

- jQuery wrapped set is an array of DOM elements
- Not array of jQuery objects !!!

```
$(function () {
    var set = $(".items .item");
    for (var i = 0; i < set.length; i++) {
        var item = set[i];

        alert(item.innerHTML);
    }
});
```

Method Chaining

- Most jQuery functions return the original result set
- This allow us to chain method calls

```
//
//  Change all links color to red and text to XXX
//
$("a").css("color", "red").text("XXX");
```

- This style of writing is very popular amongst jQuery developer
- However, code is not clear

Attribute selectors

- Attribute starts with

```
$(".item[type^=button]")
```

- Attribute contains

```
$(".item[type*=button]")
```

- Attribute equals

```
$(".item[type=button]")
```

- Has attribute

```
$(".item[type]")
```

Pseudo selectors

- Select even element

```
$("tr:even")
```

- Select N child

```
$("tr:nth-child(3n)")
```

- Do not match

```
$("input:not([type=button])")
```

Form Selectors

- Input tags of type button and buttons tags

```
$(":button")
```

- All input tags, select, and textarea

```
$(":input")
```

- Only checked checkboxes and radio buttons

```
$(":checked")
```

- Selected option inside select tad

```
$(":selected")
```

Position Selectors

- Select by index

```
$("div:eq(2)")
```

- Select elements with index greater than

```
$("div:gt(1)")
```

- Select elements with index less than

```
$("div:lt(4)")
```

- Select first and last element

```
$("div:first") $("div:last")
```

Working with a jQuery Object

- Assuming you hold a reference to jQuery object
- You can invoke any of jQuery DOM element APIs
  - Too many to cover
- Important ones
  - html & text
  - css & addClass
  - attr & prop
  - bind & delegate & on

html vs. text

- Get/set the content of an element

```
$("div").html()
```

```
$("div").html("New Content")
```

- Get/set the text of an element
  - All tags are removed

```
$("div").text()
```

```
$("div").text("New Text")
```

Styling - css

- Get/set the inline styles of an element

```
$("div").css("background-color")
```

```
$("div").css("background-color", "red")
```

- Multiple styles

```
$("button").css({
    color: "red",
    "font-size": "2em",
});
```

Styling - addClass

- Using css method is considered poor design
- Managing inline-styles at runtime is complex
- You should consider adding a CSS class to the element and set the styles on this class

```
<style>
    .btn {
        color: red;
        font-size: 2em;
    }
</style>
```

```
$(document).ready(function () {
    $("button").addClass("btn");
});
```

- Use hasClass to determine if a CSS class is present on an element

Attributes

- Get/set the value of a specific attribute

```
$("div").attr("checked")
```

- Returned value may be a
  - string – Attribute's value
  - undefined – Attribute is not present on the element
- Attribute may be empty
- Hence, below code is problematic

```
if (!$("input").attr("xxx")) {
    //  Not sure if attribute is missing or just empty
}
```

```
<input type="checkbox" xxx />
```

Size & Position

- width/height – Content size
  - Read/write API
- innerWidth/innerHeight – Include padding
- outerWidth/outerHeight – Include border
  - Send true to include margin too
- position – Relative to its non static parent
  - Read-only
- offset – Relative to the document
  - Read/write

DOM Traversal

- Search inside a DOM element

```
$(".items").find(".item")
```

- Get only direct children

```
$(".items").children(".item");
```

- Get the list of parent elements

```
$(".items").parents();
```

- Get sibling elements

```
$(".items").siblings();
```

DOM Traversal (2)

- Previous sibling element

```
$("#header").prev()
```

- Next sibling element

```
$("#header").next()
```

- Get the list of parent elements

```
$(".items").parents();
```

- The first matching ancestor

```
$(".items").closest("li");
```

DOM Creation

- Construct HTML string and send it to $
- Get back a reference to the newly created DOM element
- The newly created element is detached from the DOM
- Insert the new element into the document

```
var button = $("<button>Click Me</button>");
$("body").append(button);
```

DOM Creation Techniques

- Append HTML string

```
$("body").append("<button>Click Me</button>");
```

- Create and appendTo

```
$("<button>Click Me</button>").appendTo("body");
```

- Other techniques
  - Before/insertBefore
  - after/insertAfter
  - prepend/prependTo
  - replaceWith/replaceAll

Moving Element

- No special API
  - Select existing element
  - Append it to another → It will be moved not copied

```
$("button").appendTo("div");
```

- If target is an array the moved element will be removed and then copied to all targets

Removing Element

- Clear content – The element itself is not removed

```
$("#header").empty()
```

- Totally Remove an element

```
$("#header").remove()
```

- Remove an element but keep any jQuery related data
  - Event handlers
  - Attached user data

```
$("#header").detach();
```

Event Handling

- Native DOM offers the addEventListener API
- jQuery offers several methods instead
  - bind/unbind
  - delegate/undelegate
  - live/die
  - on/off
- on/off is the latest and can be used instead of all others

bind

- Accepts the following
  - Event name – click, blur, focus, …
  - Data object – User defined state
    - Is used rarely
  - Callback – A function to be invoked when event is raised

```
var input = $("input");
input.bind("click", function () {
    alert("Button was clicked");
});
```

unbind

- Registering event handler means that the DOM holds a reference back to your objects
- This reference holds your objects alive
- When building SPA it is important to clear event handlers to allow GC collection

```
// specific handler
input.unbind("click", handler);

// all handlers for a specific event
input.unbind("click");

// all handlers for all events
input.unbind();
```

Bind Shortcuts

- For some common events, jQuery offers shortcut methods instead of bind
  - click
  - dblclick
  - blur
  - focus
  - keywodn/keyup/keypress
  - mouseup/mousedown
  - Change
  - More …

```
$("button").click(function () {
    console.log("Button was clicked");
});
```

What did happen to my this ?

- Inside a DOM event handler the this keyword points to the DOM element that raised the event

```
$("button").click(function () {
    //  outputs true
    alert(this.nodeName == "BUTTON");
});
```

- Consider wrapping it inside jQuery object
  - Get back access to all jQuery APIs

```
$("button").click(function () {
    var button = $(this);
    alert(button.text());
});
```

Event Handler inside a Class

- Writing Object Oriented JavaScript and handling DOM event is tricky

```
function HomeView(element) {
    this.element = element;
    this.buttonLogin = this.element.find("button.login");
    this.buttonLogin.click(this.login_Clicked);
}

HomeView.prototype.login_Clicked = function () {
    // Exception is thrown here, why ?
    this.buttonLogin.attr("disabled", "disabled");
}

$(document).ready(function () {
    var homeView = new HomeView($(".home-view"));
});
```

```
<body>
    <div class="home-view">
        <button class="login">Login</button>
    </div>
</body>
```

Event Object

- An optional object that is sent to the event handler
- Contains information about the event itself
  - Mouse position, Keyboard state, …
- jQuery normalizes the event, ensuring that all standard properties exist

```
$(document).ready(function () {
    $("button").click(function (e) {
        //  True if alt key was pressed during button click
        console.log(e.altKey);
    });
});
```

Event Object is a Clone

- jQuery clones the browser's original event object and normalizes it
- To get access to non standard fields that are not copied by jQuery
- Use originalEvent

```
$("button").click(function (e) {
    console.log(e.originalEvent.dataTransfer);
});
```

- Or, ask jQuery to always copy field from original object

```
jQuery.event.props.push("dataTransfer");
```

Challenge

- Suppose we have a table with 5000 rows
- We want to handle dblclick on each row
- Naïve solution

```
$("table tr").dblclick(function () {
    alert("Row was double clicked");
});
```

- Bad performance
  - Selecting 5000 DOM elements into memory
  - Invoking addEventListener 5000 times

Solution

- Register dblclick handler only once
  - On the root table element
- The browser propagates dblclick events from a DOM element to its parents hierarchy

```
$("table").dblclick(function () {
    alert("Row was double clicked");
});
```

- Cons
  - Not clear which row was clicked
  - The handler is invoked even when clicking on non row element
  - Not every DOM event is propagated

delegate

- Installs event handler on a root object
- The handler is invoked only when source DOM element matches a specified selector

```
$("table").delegate("tr", "click", function () {
    //  this is row not a table
    var row = $(this);
});
```

- The this reference points to the clicked row
  - Not to the table

live

- A deprecated method
- Same as delegate but the root object is always the document
- Therefore less optimized
- You might still encounter it in old jQuery based code
- live was removed from jQuery 1.9 !!!

```
$("tr").live("click", function () {
    var row = $(this);
});
```

on

- A replacement for bind and delegate
- An overloaded method
- bind like usage

```
$("tr").on("click", function () {
    console.log("Row was clicked");
});
```

- delegate like usage

```
$("table").on("click", "tr", function () {
    console.log("Row was clicked");
});
```

Summary

- jQuery is a de-facto standard for DOM manipulation
- Many 3rd party libraries are using it
  - Telerik
  - Angular
- Is a library, not a framework
  - Easy to integrate into existing code
  - However, does not help you with modeling/layering