Piece by piece

An introduction to jQuery-UI widget development

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Confoo.ca
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About Me

- More than 10 years of professional PHP experience
- More than 7 years of professional JavaScript experience
- Open source enthusiast
- Regular speaker at (inter)national conferences
- Consultant, Trainer and Author

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Qafoo

passion for software quality

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Questions answered today

1. What is jQuery?
2. What is jQuery UI?
3. What features and widgets does jQuery UI provide?
4. In which way can jQuery UI be used to write own widgets?
5. How does the jQuery UI Theme generation/usage work?

What comes next?

jQuery

jQuery about itself

- Fast and concise JavaScript library
- HTML document traversing
- Event handling
- Animation
- AJAX

Working with jQuery

```
$(".tooltip").addClass("highlight").fadeIn("slow");
```

Working with jQuery

```
$(".tooltip").addClass("highlight").fadeIn("slow");
```

- Document centric
- Operates on sets accessed using `$` or `jQuery`
  - `$(`css selector`).`operation
  - `jQuery(`css selector`).`operation
- Fluent interface paradigm
  - operation`().`operation`().`operation`()`

What comes next?

jQuery-UI

jQuery-UI about itself

From the jQuery-UI Website:

jQuery UI provides abstractions for low-level interaction and animation, advanced effects and high-level, themeable widgets, built on top of the jQuery JavaScript Library, that you can use to build highly interactive web applications.

jQuery-UI - A short overview

- A set of high level widgets
- Low level framework to create own Widgets, Behaviors and Effects
- Compatible with all major Browsers (thanks to jQuery)
- Modular code base between 5-220kb
- Fully themeable using a graphical tool: ThemeRoller
- Highly extensible
- Download: `http://jqueryui.com`

What comes next?

Widgets

Widgets included in jQuery UI

- Accordion
- Autocomplete
- Button
- Dialog
- Slider
- Tabs
- Datepicker
- Progressbar

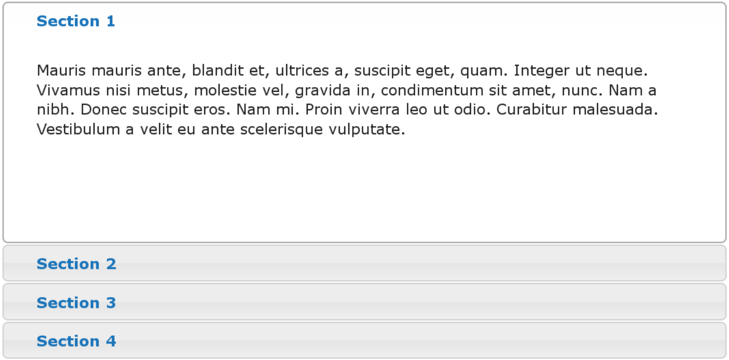
Live Demo

Live Demo - jQuery UI Widgets

Live Demo

▸ Next section

Accordion


Section 1

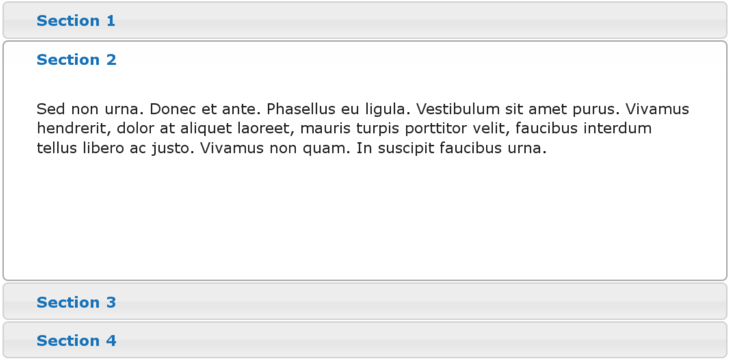
Mauris mauris ante, blandit et, ultrices a, suscipit eget, quam. Integer ut neque. Vivamus nisi metus, molestie vel, gravida in, condimentum sit amet, nunc. Nam a nibh. Donec suscipit eros. Nam mi. Proin viverra leo ut odio. Curabitur malesuada. Vestibulum a velit eu ante scelerisque vulputate.

Section 2

Section 3

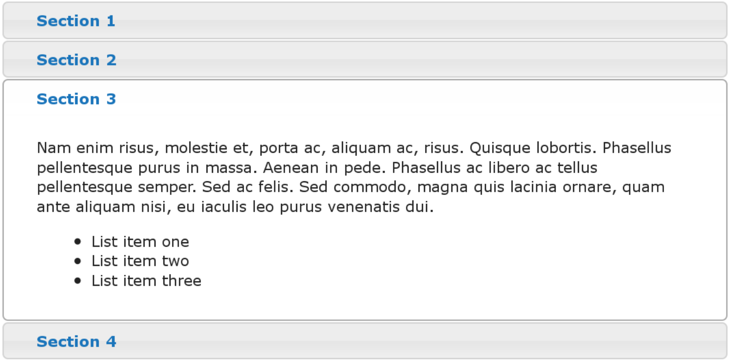
Section 4

Accordion



Sed non urna. Donec et ante. Phasellus eu ligula. Vestibulum sit amet purus. Vivamus hendrerit, dolor at aliquet laoreet, mauris turpis porttitor velit, faucibus interdum tellus libero ac justo. Vivamus non quam. In suscipit faucibus urna.

Accordion



Section 1

Section 2

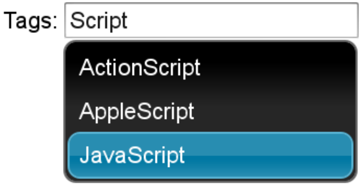
Section 3

Nam enim risus, molestie et, porta ac, aliquam ac, risus. Quisque lobortis. Phasellus pellentesque purus in massa. Aenean in pede. Phasellus ac libero ac tellus pellentesque semper. Sed ac felis. Sed commodo, magna quis lacinia ornare, quam ante aliquam nisi, eu iaculis leo purus venenatis dui.

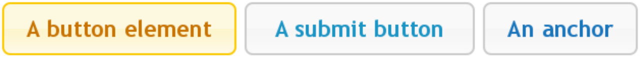
- List item one
- List item two
- List item three

Section 4

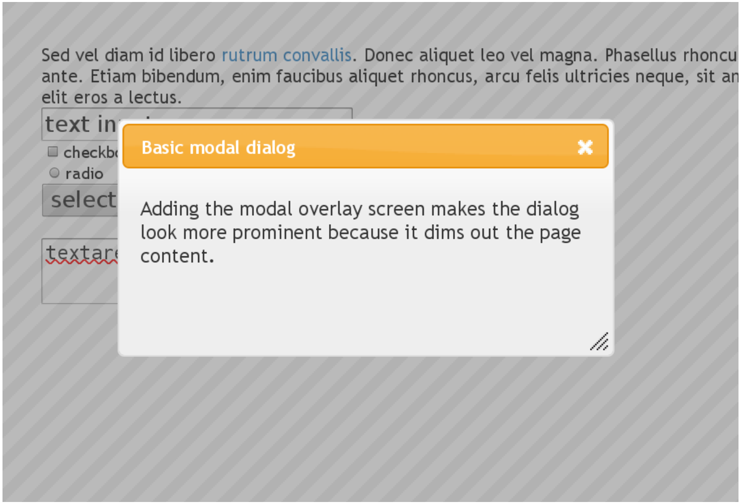
Autocomplete



Buttons



Dialog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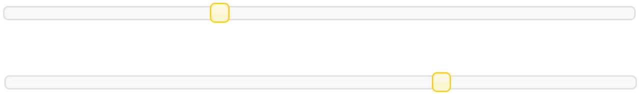
ante. Etiam bibendum, enim faucibus aliquet rhoncus, arcu felis ultricies neque, sit an
elit eros a lectus.

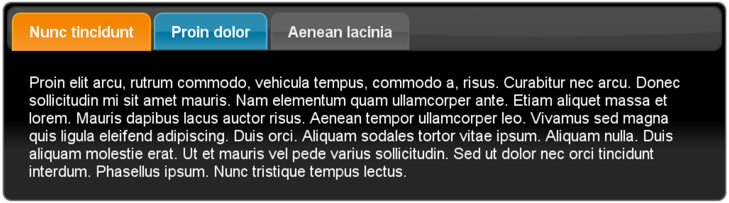
Basic modal dialog

Adding the modal overlay screen makes the dialog look more prominent because it dims out the page content.

Slider

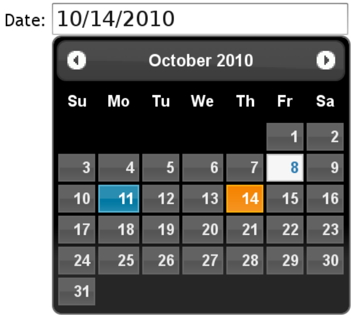


Tabs



Proin elit arcu, rutrum commodo, vehicula tempus, commodo a, risus. Curabitur nec arcu. Donec sollicitudin mi sit amet mauris. Nam elementum quam ullamcorper ante. Etiam aliquet massa et lorem. Mauris dapibus lacus auctor risus. Aenean tempor ullamcorper leo. Vivamus sed magna quis ligula eleifend adipiscing. Duis orci. Aliquam sodales tortor vitae ipsum. Aliquam nulla. Duis aliquam molestie erat. Ut et mauris vel pede varius sollicitudin. Sed ut dolor nec orci tincidunt interdum. Phasellus ipsum. Nunc tristique tempus lectus.

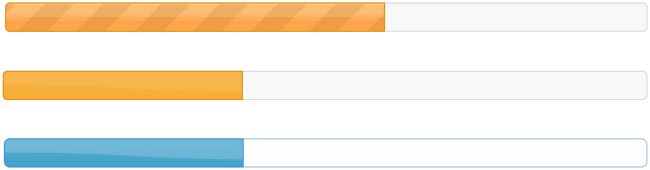
Datepicker



Date: 10/14/2010

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Progressbar



What comes next?

Behaviors

Behaviors included in jQuery UI

- Draggable
- Droppable
- Resizable
- Selectable
- Sortable

What comes next?

Effects

Effects included in jQuery UI

- Blind
- Bounce
- Clip
- Drop
- Explode
- Fold
- Highlight
- Pulsate
- ...

What comes next?

Animation Enhancements

Animation Enhancements over default jQuery

- Color animations
- New easing functions
  - `easeInBounce`
  - `easeInQuad`
  - ...
- CSS class based animation

What comes next?

Calling conventions

Calling conventions

- For each widget (behavior) one function is registered
- The function can be called on any created jQuery set (`jQuery.fn`)
- The widgets name is used as function name
- All interaction with the Widget is accomplished through this function

Calling conventions

- Widget creation

```
$("#id").autocomplete();
$("#id").autocomplete({...});
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- Invoking a method without arguments

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$("#id").autocomplete("method");
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```

- Invoking a method without arguments

```
$("#id").autocomplete("method");
```

- Invoking a method with arguments

```
$("#id").autocomplete("method", arg1, arg2, ...);
```

What comes next?

Creating your own Widget

Creating a Widget without jQuery-UI

- Widgets usually have a state
  - Excessive use of `.data` method
  - Nested closures and custom objects
- Different initialization phases
- Handling of default and user options
- Multiple public methods
- Destruct and remove Widget on request

What comes next?

Widget Factory

The Widget factory of jQuery-UI

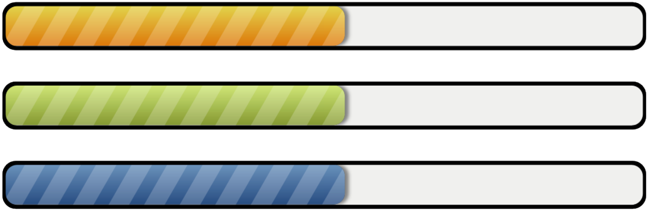
- DOM-Instance based persistent states
- ”Magic” methods for different initialization phases
- Automatic merging of default and user supplied options
- Custom methods without namespace pollution
- Distinguish between public and private methods

What comes next?

Example Widget

The SparkleBar Widget

- A custom made progressbar
- Less flexible due to heavy usage of images
- More sophisticated graphical design possible



Live Demo

Live Demo - SparkleBar

Live Demo

Filename conventions

- Name of this widget: `sparklebar`
- Namespace of this widget: `ui`
- All widgets should follow a certain filename convention:
  - `jquery.ui.sparklebar.js`
  - `jquery.ui.sparklebar.css`
  - `jquery.ui.sparklebar/image.png`
  - ...

The widget factory in action

- Call `$.widget` to create a new Widget
- First argument: namespace and identifier
- Namespaces do not protect against naming conflicts
- All default widgets use the `ui` namespace
- Using the `ui` namespace for your own widgets is just fine

The widget factory in action

```
$.widget(
        'ui.sparklebar',
        {
                /* Widget implementation */
        }
);
```

What comes next?

Initialization

”Magic” `_create` method

- `_create` function is automatically invoked on widget creation
- Only called once for each widget

Access to the targeted element

- Targeted element stored in `element` property
- Saved as jQuery set
- Other magic properties exist: `options`, `widgetName`, `widgetEventPrefix`

"Magic" _create method

```
$.widget( "ui.sparklebar", {
    _create: function() {

        this.element.empty();

        $( '<img␣/>' ).appendTo(
            this.element
        );

        // ... Set needed properties of img ...

    }
});
```

"Magic" _create method

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```

"Magic" _init method

- _init is invoked every time the widget function is called without a method name
  - $("#id").sparklebar()
  - $("#id").sparklebar({...})
- Little brother of the _create function
- Called after _create has been called

"Magic" _init method

```
$.widget( "ui.sparklebar", {
    _init: function() {

        // Set DOM properties based on provided options
        // Initialize state of the widget

    }
});
```

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`_init` and `_create`

- Use `_create` to prepare the DOM for the widget
- Use `_init` to initialize widget based on options

What comes next?

Methods / Properties

Widget methods and properties

- Use custom properties and methods to structure your code
- Both are defined in the Widget object

Widget methods and properties

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- Both are defined in the Widget object

```
$.widget(
        'ui.sparklebar',
        {
            'currentValue': 42
            'value': function() {...}
        }
);
```

One instance per Widget

- A new instance is created for each Widget invocation
- Properties are persistent

One instance per Widget

- A new instance is created for each Widget invocation
- Properties are persistent

```
$.widget( "ui.sparklebar", {

    "value": function(val) {
        this.currentValue = val;

        // Display progressbar change
    }

});
```

Fluent interface and returned values

- Widget factory takes care of fluent interface handling
- Returning a value from a method circumvents this behavior

Fluent interface and returned values

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```
$.widget( "ui.sparklebar", {
    getValue: function(val) {
        return this.currentValue;
    }
});
```

Private methods

- Methods prefixed with underscore (_) are private
- Properties are always private

Private methods

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```
$.widget( "ui.sparklebar", {
        _updateVisualRepresentation: function() {
                ...
        }
});
```

What comes next?

Options

Configuration options for your widget

- Most widgets need configuration in order to be reusable
- Named options can be provided during widget creation
- Remember: `$("#id").sparklebar({...})`

Handling of Options

- Options are stored in the *magic* `options` property
- Options are always optional
- Default values need to be provided for each option

Handling of Options - `options` property

```
$.widget( "ui.sparklebar", {
    options: {
        color: 'orange',
        initialValue: 0,
        animate: true
    },
});
```

Handling of Options - Access merged options

- Default options are automatically merged with user options
- Result is written back to the `options` property

Handling of Options - Access merged options

```
$("#id").sparklebar({initialValue: 40});

$.widget( 'ui.sparklebar', {
    _init: function() {
        this.currentValue = this.options.initialValue;
    },
});
```

What comes next?

Excursion: Event namespaces

Event namespaces - a mostly unknown feature

- Group registered events by a certain identifier
- As usual use `bind` in order to listen for events
- Namespaces and event types separated using a dot (`.`)
  - eg. `click.namespace`
- Namespaces allow easy de-registration/management
  - `.unbind("click.namespace")`
  - `.unbind(".namespace")`

Event namespaces in widget development

- Always use event namespaces inside your widgets
- Use the widget identifier as namespace
- No conflict between your event handlers and others
- Easy de-registration possible without remembering the callback

What comes next?

Visual Appearance

CSS formatting in widgets

- Use CSS rules for visual formatting if possible
- Decoupling of functionality and representation
- Store CSS in appropriate position
  - `jquery.ui.sparklebar.css`
- Always use classes not ids (multiple invocation)
- Use widget name and namespace as prefix
  - `ui-sparklebar-container`
- Follow the hierarchy of your elements
  - `ui-sparklebar-container-bar`

ThemeRoller - An online theme creator

- ThemeRoller is a WYSIWYG application to design themes
- Specifically written for jQuery UI
- Realized as a web application
- Creates needed CSS themes & images on the fly

ThemeRoller

- Custom Widgets can profit from ThemeRoller as well
- Use jQuery-UI CSS framework for your elements
- Just a set of predefined CSS classes

ThemeRoller

- Structural helper
  - `ui-helper-hidden`, `ui-helper-clearfix`, ...
- Widget look and feel
  - `ui-widget-header`, `ui-widget-content`, ...
- Button and input element marker
  - `ui-priority-primary`, `ui-state-default`, ...
- Visual states
  - `ui-state-highlight`, `ui-state-error`, ...
- Icons
  - `ui-icon`, `ui-icon-folder-collapsed`, ...

What comes next?

Conclusion

What you have learned today - In general

1. Obey the filename rules: `jquery.namespace.widget.js`

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2. Use the Widget factory (`$.widget`)
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4. Always use Event namespaces to register events

What you have learned today - In general

1. Obey the filename rules: `jquery.namespace.widget.js`
2. Use the Widget factory (`$.widget`)
3. Don't be afraid of using many options
4. Always use Event namespaces to register events
5. Prefix your CSS classes with the widget name, follow the hierarchy

What you have learned today - About the factory

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3. The fluent interface is taken care of if no value is returned
4. User options and defaults are automatically merged
5. `_create` is the right place to manifest your widget in the DOM
6. `_init` is the right place to initialize the widgets state

Thanks for Listening

Questions? Comments? Critics? Ideas?

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