Comp 424 - Client-side Web Design

Fall Semester 2016 - Week 9 Notes

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Contents

jQuery - basics - part 1

intro

- jQuery offers us a number of useful tools and options for building web apps
- packaged, prepared JavaScript library
  - *a lot easier to work with, and develop for, than standard JavaScript*
- features simpler syntax and a concise set of options for manipulating the DOM
  - *often simply quicker and easier to write our apps with jQuery than JavaScript*
- jQuery is an inherently expressive approach to working with JavaScript
  - *in particular, manipulating the DOM*
- consistent approach to handling events in the DOM
- includes useful, simplified approach to adding AJAX functionality

jQuery - basics - part 2

selectors

- jQuery works with selectors using a similar concept as CSS
- we can use CSS selectors as a jQuery selector

```
$("div")
$("p")
$(".note-input")
$(".note-input button")
$("p:nth-child(even)")
...
```

- jQuery may share many selectors with CSS
  - *some cases where jQuery will slightly differ*
- adds useful set of pseudoclasses and pseudoelements not in CSS

```
$("p:parent")
```

- use the above to find all paragraphs with children, including text
- a jQuery extension, and not part of the CSS specification

jQuery - basics - part 3

manipulate the DOM

```
<body>
  <!-- document header -->
  <header>
    <h3></h3>
    <p></p>
  </header>
  <!-- document main -->
  <main>
    <!-- note input -->
    <section class="note-input">
      <h5>add note</h5>
      <input><button></button>
    </section>
    <!-- note output -->
    <section class="note-output">
    </section>
  </main>
  <!-- document footer -->
  <footer>
    <p></p>
  </footer>
</body>
```

- benefits of using jQuery is the ease it offers for manipulating the DOM
- add elements, delete them, move them around...

jQuery - basics - part 4

add elements

- add a new element to our app
  - *simply append or prepend to a given position in the DOM*

```
//append note text to note-output
$(".note-output").append($note);
```

- adds our new element, and content to the DOM
  - *end of the selected element in document*

```
//append note text to note-output
$(".note-output").prepend($note);
```

- prepend to the document
  - *adds to the end of the selected element*
- additional options in jQuery, such as `prependTo()`
- differ slightly on the target for the content
- useful to select an element, then add to another elsewhere in DOM

jQuery - basics - part 5

remove elements

- also remove elements from the DOM
- easiest option is to use the `remove()` function on a given selector

```
$("p:nth-child(even)").remove();
```

- also empty an element, remove all child elements from selected element
  - *remove all of the notes, those we added in paragraph elements*

```
$(".note-output p").empty();
```

- also temporarily remove elements from the window

```
$note.fadeOut("slow");
```

- elements are not removed from the DOM, their style is updated

```
display: none;
```

jQuery - basics - part 6

events and async

- jQuery uses a standard pattern for events and handling

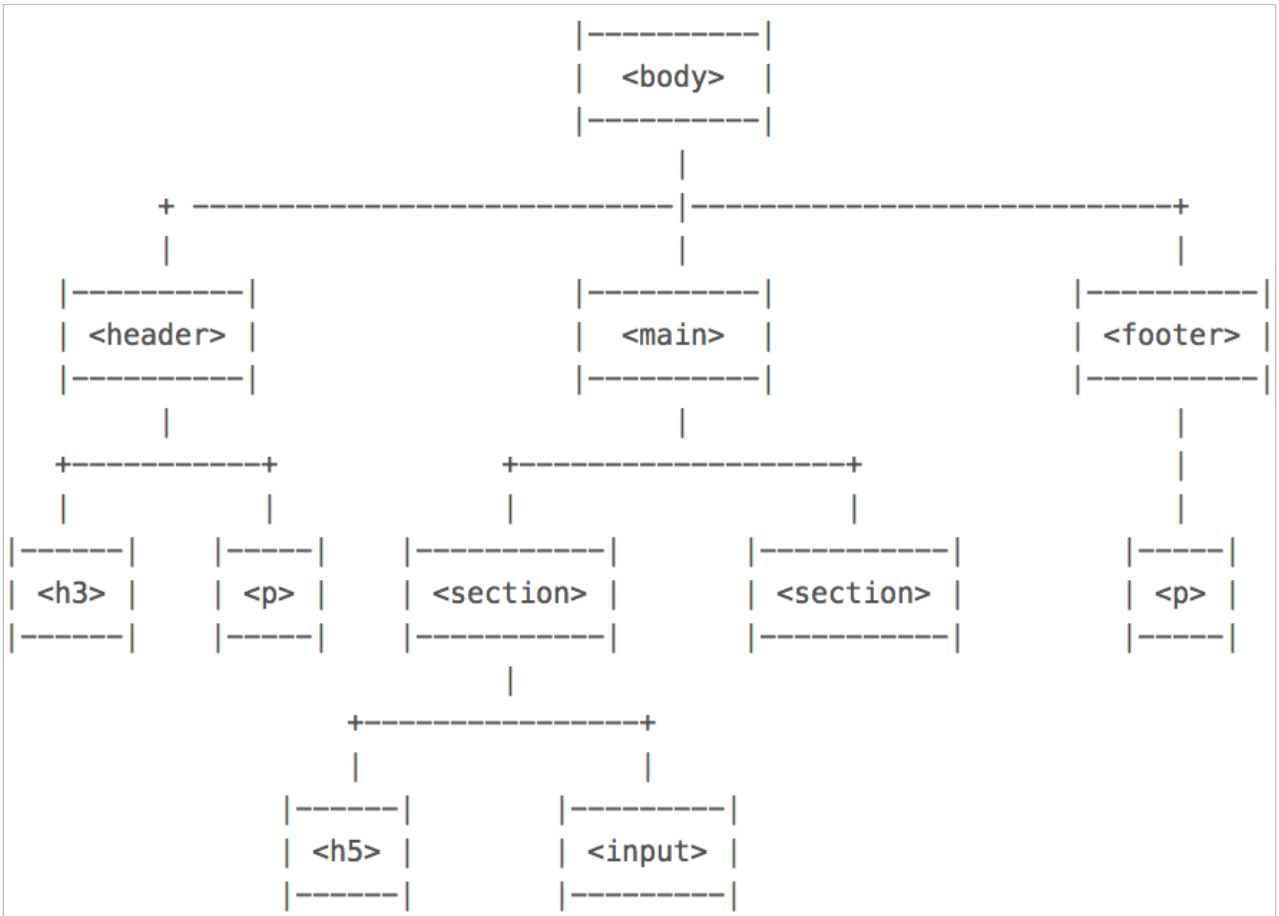
```
//handle user event for `add` button click
$(".note-input button").on("click", function(e) {
  ...
});
```

- allows us to set up listeners for many user triggered events
- commonly known as **event-driven** or **asynchronous** programming
- main difference with more traditional procedural patterns, is the way we use **callbacks**
  - *allow us to set functions for later execution*
- functions are set as parameters, then executed at the appropriate, required time
- callbacks are not only appropriate for interaction or user events
- use them throughout our programming to schedule functions and execution

```
setTimeout(function() {
  ...
}, 2000);
```

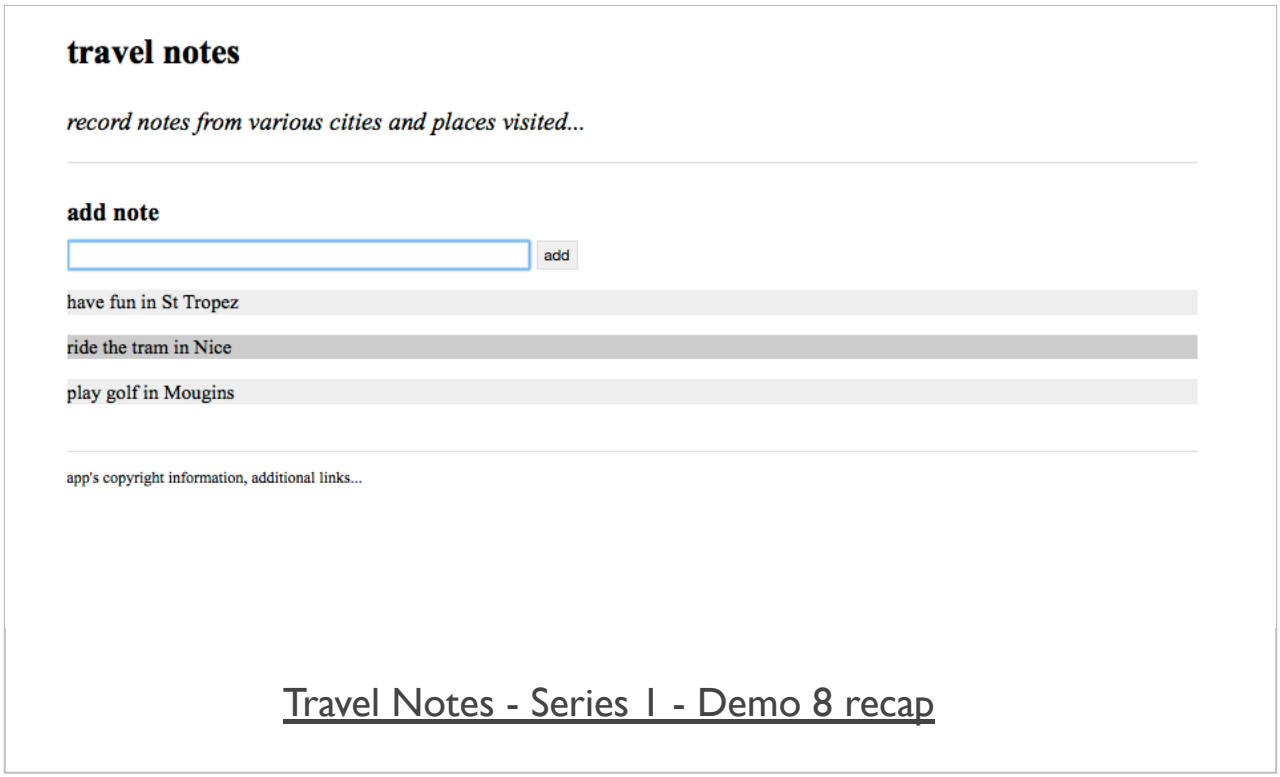
- an issue with **asynchronous** programming
  - *often simply being aware of the execution order or sequence of events*

Image - HTML5, CSS, & JS - DOM recap



Travel Notes - DOM recap

Image - Travel Notes - Series 1 - recap



Travel Notes - Series 1 - Demo 8 recap

HTML5, CSS, & JS - example - add-ons

new features and add-ons...

- delete all notes
- delete a single note
- new event handlers
- additional styling

HTML5, CSS, & JS - example - part I

delete option - all notes

- standard `remove()` function in jQuery

```
$("p").remove();
```

- option to **delete all** notes from `.note-output`
- add a new toolbar for note controls and options

```
<section class="note-controls">
  <button id="notes-delete">Delete all</button>
</section>
```

- then add some simple styling for this new toolbar

```
/* note controls */
.note-controls {
  margin: 10px 0 10px 0;
  padding: 2px;
  border-bottom: 1px solid #dedede;
  display: none;
}
/* simplify default button styles for note controls */
.note-controls button {
  padding: 2px;
  margin: 2px;
  border-radius: 0;
  border: 1px solid #dedede;
  cursor: pointer;
}
```

HTML5, CSS, & JS - example - part 2

delete option - all notes

- note controls toolbar is hidden, by default in the CSS
- need some way to check its visibility as we add our notes
  - *no notes, then the toolbar is not required*

```
//check element visibility - expects single element relative to display:none
function checkVisible(element) {
  if (element.is(":hidden")) {
    element.fadeIn();
  }
}
```

- simply checking a passed element to see whether it is hidden
  - *then `fadeIn()` as necessary*
- can update this method later on to check hidden and visible
- call this function as required

```
checkVisible($(".note-controls"));
```

HTML5, CSS, & JS - example - part 3

delete option - all notes

- add a note, the `.note-controls` toolbar is shown
  - ***delete all*** *button now becomes available to our users*

```
//handle deletion of all notes
$("#notes-delete").on("click", function(e) {
  var $note = $(".note-output p");
  $(this).parent().hide();
  $note.remove();
});
```

- creating a new handler for the click events on the `#notes-delete` button
- hides its own container, the notes toolbar
- then removes all of the notes, `p`, from the `.note-output` section

HTML5, CSS, & JS - example - part 4

JS code so far

```
//check element visibility - expects single element relative to display:none
function checkVisible(element) {
  if (element.is(":hidden")) {
    element.fadeIn();
  }
}
...
//handle deletion of all notes
$("#notes-delete").on("click", function(e) {
  var $note = $(".note-output p");
  $(this).parent().hide();
  $note.remove();
});
```

- DEMO 1 - travel notes - series 2

HTML5, CSS, & JS - example - part 5

delete option - all notes

- still making an assumption notes exist in the note-output section
- add an additional function to check element exists in the DOM or not
- use jQuery's `length()` function

```
$("p").length()
```

- new function for checking elements in the DOM is as follows,

```
//check elements exists
function checkExist(element) {
  if (element.length) {
    return true;
  } else {
    return false;
  }
}
```

HTML5, CSS, & JS - example - part 6

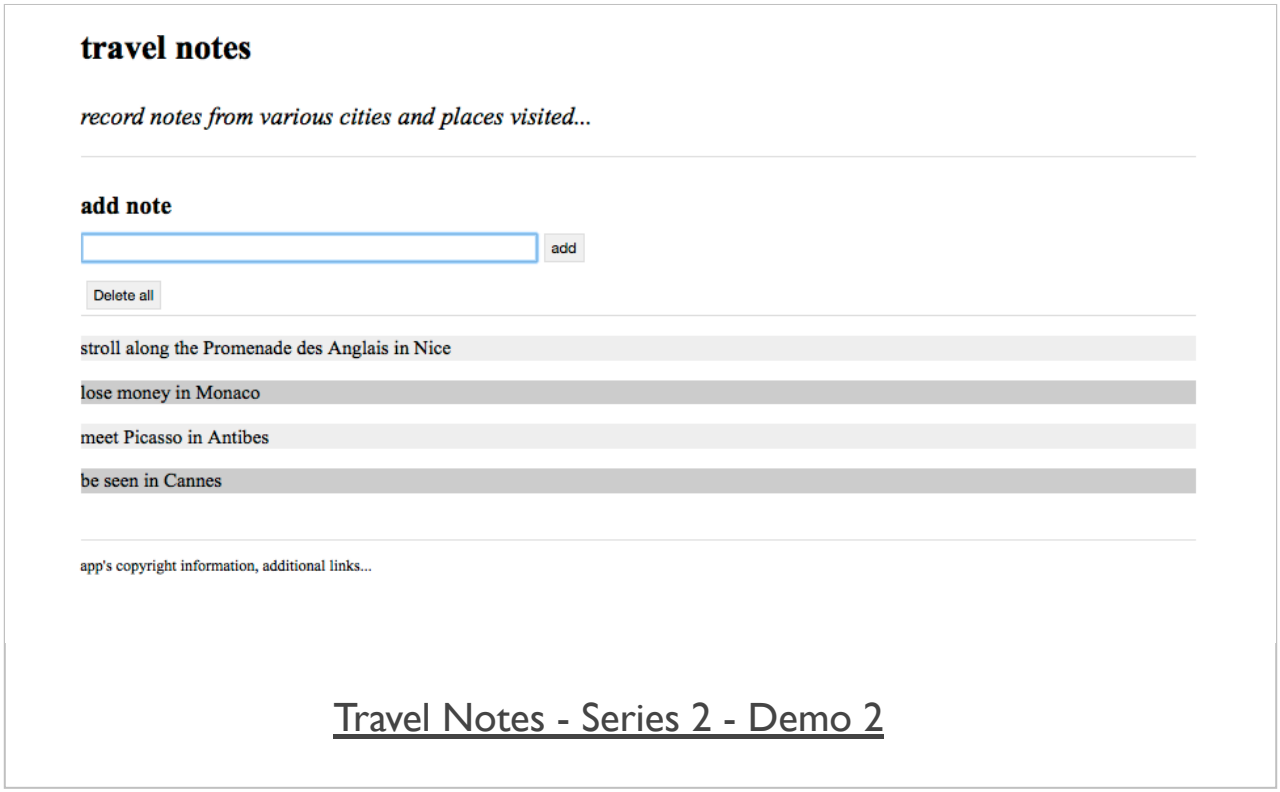
delete option - all notes

- updated delete all notes option to include check for notes
- call `checkExist()` function in conditional statement

```
//handle deletion of all notes
$("#notes-delete").on("click", function(e) {
  //set note selector
  var $note = $(".note-output p");
  //check $note exists
  if (checkExist($note) === true) {
    //hide note-controls
    $(this).parent().hide();
    //remove all notes
    $note.remove();
  }
});
```

- DEMO 2 - travel notes - series 2

Image - Travel Notes - Series 2 - demo 2



Travel Notes - Series 2 - Demo 2

HTML5, CSS, & JS - example - part 7

delete option - per note

- consider adding a single delete option per note
- allowing a user to selectively delete their chosen note
  - *regardless of hierarchical position within the* `.note-output` *section*
- design decisions for such an option might include
  - *do we offer a selection option, such as checkboxes, to select one or more delete items*
  - *perhaps a single delete button per note*
  - *a drag and drop to delete option*
  - *there are many different ways to present and use this option*
- programmatically follow a similar pattern for deletion of the note
- three jQuery functions can help us remove elements from a document
  - `remove()`
  - `detach()`
  - `replaceWith()`

jQuery - removing elements - quick overview

- used `remove()` function with delete all notes
  - *best used to remove elements permanently from a document*
  - *will **unbind** any attached event handlers for elements being removed*
  - *will return reference to removed elements, but not the original bound events*
- `detach()` often used for any temporary removal requirements
  - *eg: update a lot of the DOM, detach affected elements, then insert later...*
  - *retains its event handlers, and we can add these elements later*

```
$("p").detach();
```

- then append the attached elements as required

```
var $detachP = $("p").detach();

$detachP.appendTo("#detached");
```

- `replaceWith()` replaces an element, or group of elements, with passed element
- event handlers for the replaced elements are unbound

```
var $replacedP = $(".note-output p").first().replaceWith("<p>replaced...</p>");
```

HTML5, CSS, & JS - example - part 8

delete option - per note

- simply need to delete the selected note
  - *use the same `remove()` function for single and all notes*
- add option per note to allow user to delete a required note
- add a delete button for each note
  - *add programmatically with each new note*

```
function createButton(buttonClass, buttonText) {
  var $button = $('<button class="'+buttonClass+'">'+buttonText+'</button>');
  return $button;
}
```

- new function allows us to create simple buttons as required
  - *a specified class and button text passed as parameters*
  - *use function to build required delete button in `createNote()` function*

```
//create delete button
var $delete_button = createButton("note-delete", "delete");
```

HTML5, CSS, & JS - example - part 9

delete option - per note

- append delete option to note
  - *before adding note to the DOM in `createNote` function*

```
function createNote() {
...
//set content for note
$note.html($note_text.val());
//append delete button to each note
$note.append($delete_button);
...
}
```

HTML5, CSS, & JS - example - part 10

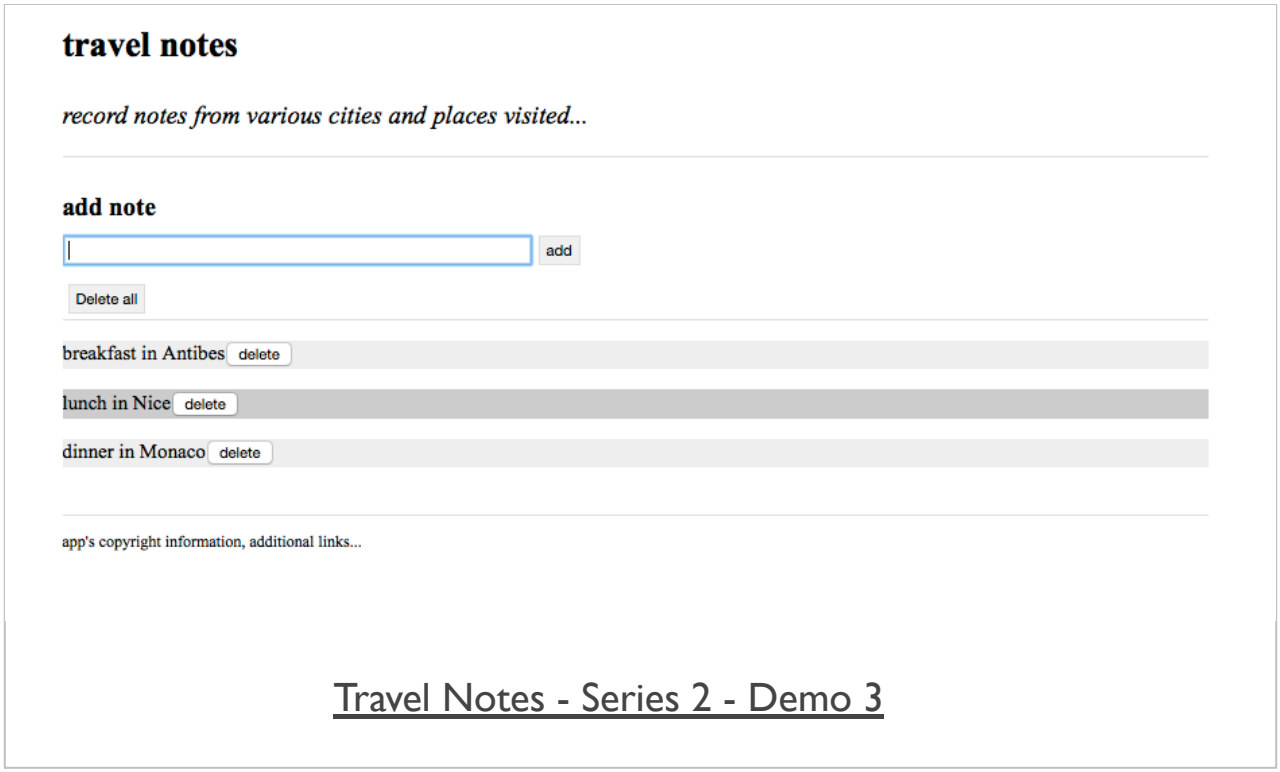
delete option - per note

- need to bind a click event to the dynamically created delete note button
- delete button is being added to the DOM dynamically
  - *need to add handler for single note deletion event to existing DOM element*
  - *add handler to parent `.note-output` and then new `button.note-delete`*

```
$(".note-output").on("click", "button.note-delete" , function() {
  //delete parent note
  $(this).parent().remove();
  //set note selector
  var $note = $(".note-output p");
  //check for empty notes, and then remove note-controls
  if (checkExist($note) === false) {
    //hide note-controls
    $(".note-controls").hide();
  }
});
```

- DEMO 3 - travel notes - series 2

Image - Travel Notes - Series 2 - demo 3



Travel Notes - Series 2 - Demo 3

HTML5, CSS, & JS - example - part 11

delete option - per note

- now allow our users to delete a single note
- single note option is awkward at the moment
- simply allow a user to either mouseover or select a note to show additional options
  - *showing the available delete button*
- enable a user to select their note of choice
  - *need to bind a click event to a note*

```
//handle click event per note
$(".note-output").on("click", "p", function() {
...
}
```

- user selects a note
  - *no check for previous other visible delete buttons*
  - *ensure only delete button for selected note is shown*

Image - HTML5, CSS, & JS - too many delete buttons

Travel Notes - Week 6 - Too many delete buttons

HTML5, CSS, & JS - example - part 12

delete option - per note

- return to our earlier function, `checkVisible()`
- modify to allow better abstraction and usage
- modify to test for visibility
  - *then simply return a boolean value*

```
//check element visibility - expects single element relative to display:none
function checkVisible(element) {
  //check if element is hidden or not
  if (element.is(":hidden")) {
    return true;
  } else {
    return false;
  }
}
```

- also need to modify check for the `.note-controls` in `createNote()` function

```
...
//check visibility of note controls
if (checkVisible($(".note-controls")) === true) {
  $(".note-controls").fadeIn();
}
...
```

HTML5, CSS, & JS - example - part 13

delete option - per note

- updated handler for note selection now checks for visible delete buttons

```
//handle click event per note
$(".note-output").on("click", "p", function() {
  //check if other delete buttons visible
  if (checkVisible($("button.note-delete")) === true) {
    $("button.note-delete").hide();
  }
  $(this).children("button.note-delete").show();
});
```

- bind handler for the user clicking on a note
- check whether other delete buttons are visible on any other notes
  - *if visible, we can simply hide these delete buttons*
  - *then show the delete option for the currently selected note*
- later abstract this function to handle other options associated with each note
- DEMO 4 - travel notes - series 2

HTML5, CSS, & JS - example - part 14

style note(s)

- add some additional styling to our notes
  - *start with some changes to the design of each note*
  - *then considered the overall* `.note-output` *section*
- remove styling for alternating notes, set uniform style per note

```
/* note paragraph output */
.note-output p {
  margin: 10px;
  padding: 10px;
  border: 1px solid #b1c4b1;
  cursor:pointer;
}
```

- need to add some styling for our delete button, and position it within each note

```
/* note delete button */
.note-output p button.note-delete {
  display: block;
  padding: 5px;
  margin: 5px 5px 10px 0;
  border-radius: 0;
  border: 1px solid #dedede;
  cursor: pointer;
}
```

HTML5, CSS, & JS - example - part 15

style note(s)

- add some styling for the button's hover pseudo-class
  - *acts as useful feedback to the user that the button is an active element*

```
.note-output p button.note-delete:hover {
  background-color: #aaa;
  color: #fff;
}
```

- also consider adding some similar feedback to our note
  - *a sign of active as the user moves their mouse cursor over each note*

```
/* note paragraph output hover */
.note-output p:hover {
  border: 1px solid #1a3852;
}
```

- DEMO 5 - travel notes - series 2

HTML5, CSS, & JS - example - part 16

style note(s)

- a couple of issues that still need to be fixed in the application
  - *first issue is lack of consistency in styling our buttons*
- fixed by abstracting our CSS styling for a default button
  - *specific button styles can be added later*

```
/* default button style */
button {
  padding: 2px;
  margin: 2px;
  border-radius: 0;
  border: 1px solid #dedede;
  cursor: pointer;
}
```

- removed the need for a ruleset to style the button for
  - *adding a note, delete all notes, and the single delete button per note*

HTML5, CSS, & JS - example - part 17

style note(s)

- also create a default ruleset for a button hover pseudo-class
  - *again reducing our need for repetition in the stylesheet*

```
/* default button hover style */
button:hover {
  background-color: #aaa;
  color: #fff;
}
```

- iterative development is fine
  - *continue to abstract styles, overall design, and logic as we develop an application*

HTML5, CSS, & JS - example - part 18

style note(s)

- second issue is the expected interaction with each note
  - *issue is simply that a user cannot choose to remove this option*
- should be able to toggle its view and options
- update interaction by modifying handler for click event on a note
  - ***NB:*** `toggle()` *for events was removed in jQuery 1.9*
  - *build our own*

```
//handle click event per note
$(".note-output").on("click", "p", function() {
  //check if other delete buttons visible
  if (checkVisible($("button.note-delete")) === true) {
    //set all siblings to active=false to ensure checks are correct
    $(this).siblings().attr("active", "false");
    $("button.note-delete").hide();
  }
  //then handle click event for current note
  if (!$(this).attr("active") || $(this).attr("active") === "false") {
  $(this).attr("active", "true");
  $(this).children("button.note-delete").show();
  } else if ($(this).attr("active") === "true") {
  $(this).attr("active", "false");
  $(this).children("button.note-delete").hide();
  }
});
```

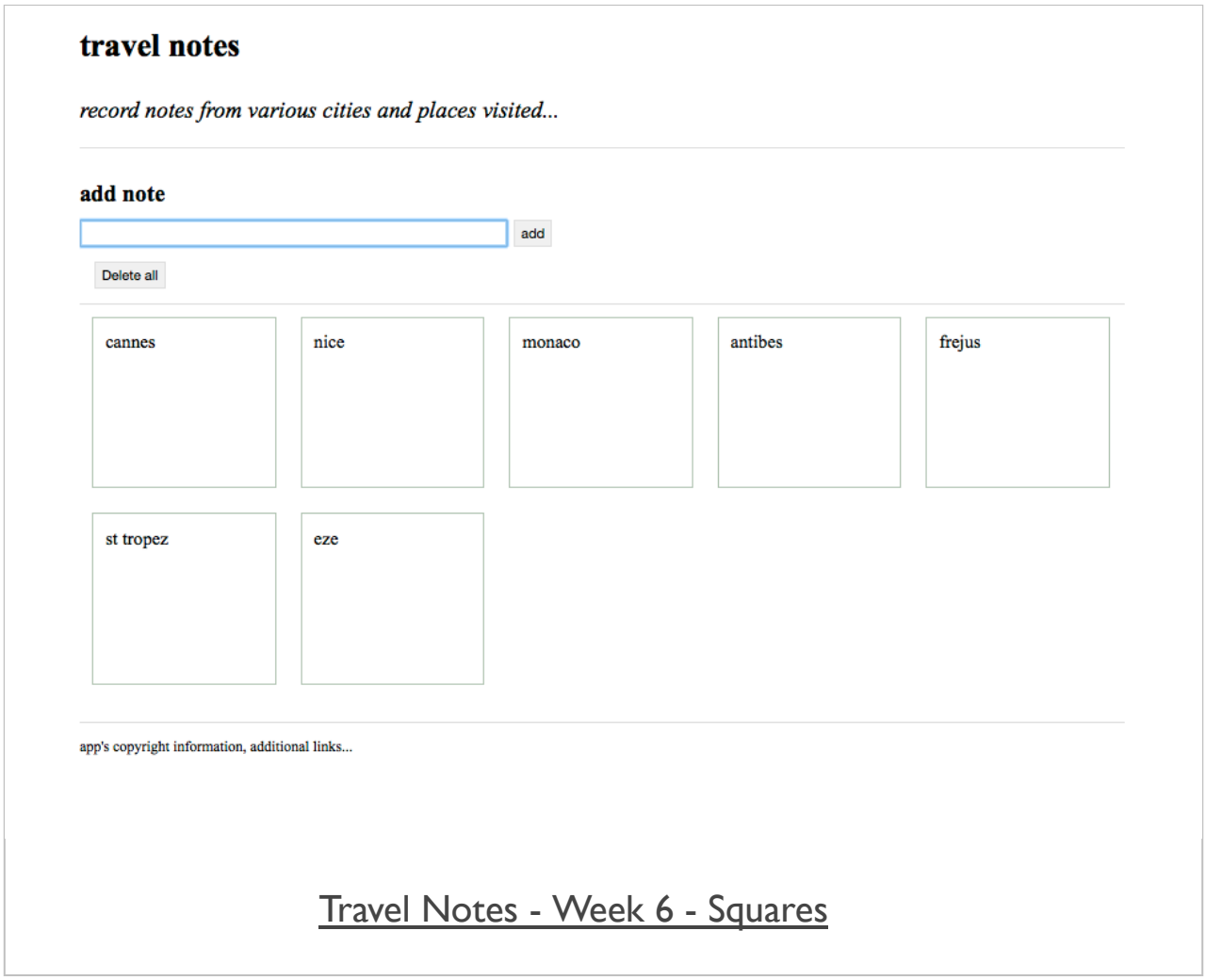
- DEMO 6 - travel notes - series 2

HTML5, CSS, & JS - example - part 19

a few extras to consider...

- alternative layouts
  - *grid*
  - *squares*
  - *snippet view*
  - *table*
  - *lists...*
- notifications
- snippets with expansion
- split views
  - *note snippet with contextual/media per note...*
- drag and drop delete
- filters
- sort options
- tags
- much, much more...

Image - Square notes - a bit of fun



Travel Notes - Week 6 - Squares

- DEMO - travel notes - squares

JS Objects - quick recap - part I

- important JavaScript primitive
  - *one of the most frequently used as well*
- created with curly braces,

```
var object1 = {
  "a":"nine",
  "b":"ten"
};
```

- access internal variables of this object using the dot `.` operator

```
console.log(object1.a);
```

- update the value of an internal variable

```
object1.a = "amelia";
```

JS Objects - quick recap - part 2

- also create an empty variable, and then assign values as necessary

```
var object1 = {};
```

- an object can contain variables with values of different types
- store variables in an object with types such as strings, arrays, and even other objects
- function variables behave just like any other variables in JavaScript
  - *we can also store them in our objects as needed*

```
var $a = $("p");
$a.hide();
```

- simply attach a function to a jQuery object

JSON - quick recap

- a JSON object is effectively a JavaScript object
  - *contained within curly braces*

```
{
  "country":"France",
  "city":"Marseille"
}
```

- objects can contain multiple name/value pairs
- object stored in the form of a string
- to send a JS object
  - *create it in the application's code*
  - *then convert it to a string*
  - *finally use it as required*
- a lot of the AJAX is abstracted to JavaScript libraries

JSON - pros and cons

useful pros

- more concise, less verbose than XML and HTML
  - *potentially faster execution of data...*
- regularly used with JavaScript
  - *includes good support*
- language agnostic, interoperability
  - *can be used with many different programming languages*
- can also be called from many different domains
  - *eg: JSON-P...*

some cons

- may present security risk
  - *malicious content due to JavaScript XSS*
  - *need to verify source for JSON...*
- syntax is precise, unforgiving

JS and JSON - functions

- creating some JSON string is easy enough
- also easily create a JSON string from a JavaScript object
  - *and vice-versa*
- use the JavaScript `stringify` function

```
var jsonObject1 = JSON.stringify(object1);

console.log(jsonObject1);
```

- similarly parse a JSON string to a JS object

```
var object2 = JSON.parse(jsonObject1);

console.log(object2);
```

AJAX and JSON - part 1

intro

- AJAX is as a simple way to load data
  - *often new or updated data*
  - *into a current page without having to refresh the browser window*
- common form of data for work with AJAX is JSON
- many common usage scenarios and examples for AJAX
  - *autocomplete in forms*
  - *live filtering of search queries*
  - *real-time updates for content and data streams*
- also use AJAX to help us load data behind the scenes
  - *preparing content for our users before a specific request is received*
  - *helps to speed up page responses and data load times*
- AJAX uses an asynchronous model for processing requests
- user can continue to perform various tasks, queries, and work
  - *whilst the browser itself continues to load data*
- inherent benefit of AJAX should include
  - *a more responsive site, intuitive usage and interface experience*

AJAX and JSON - part 2

asynchronous model

- traditional synchronous model normally stops a page
  - *until it has loaded and processed a requested script*
- AJAX enables a browser to request data from the server
  - *without this synchronous pause in usage*
- AJAX's **asynchronous processing model**
  - *often known as **non-blocking***
  - *allows a page to load data and process user's interactions*
- server responds with the requested data
  - *an event will be fired by the browser*
  - *event can then call a function to process the data*
  - *often JSON, XML, or simply HTML*
- browser will use an **XMLHttpRequest** object to help handle these AJAX requests
- browser will not wait for a response

Demos

Travel notes app - series 2

- DEMO 1 - Travel notes - demo 1
- DEMO 2 - Travel notes - demo 2
- DEMO 3 - Travel notes - demo 3
- DEMO 4 - Travel notes - demo 4
- DEMO 5 - Travel notes - demo 5
- DEMO 6 - Travel notes - demo 6

References - JS & Libraries

- jQuery
- jQuery API
- jQuery :parent selector
- MDN
  - *MDN - JS Objects*
- W3 - JS Object
- W3 - JS Performance