



# Web Development Module Overview

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# 12 Topics – one topic per week

Each Topic  
builds on  
concepts, tools  
and techniques  
from previous  
weeks.



## 1: Introducing HTML



web · client/server · browser ·  
html · documents · elements ·  
attributes · links · images ·  
nesting · block · inline

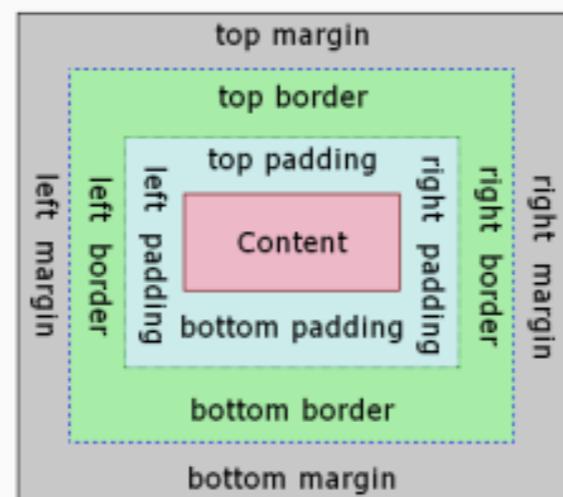
## 2: Introducing CSS



markup · style · function ·  
stylesheet · rules · selectors ·  
declarations · properties ·  
values · classes · ids ·  
inheritance

# Core HTML + CSS

### 3: The Box Model



content · padding · border ·  
margin · style · width · colour ·  
dom · layout · float · left · right

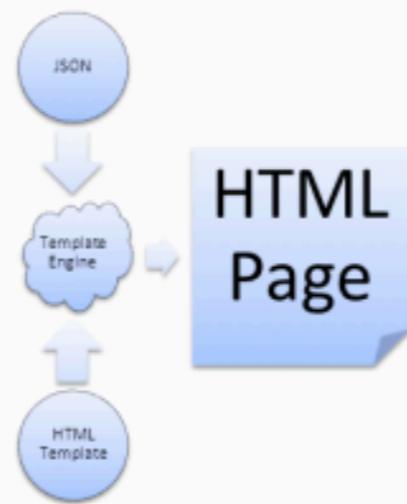
### 4: Navigation



html versions · header · main ·  
nav · primary · secondary ·  
footer · semantic elements ·  
html style guide

# Laying out pages with CSS Structuring a Navigation Metaphor

## 5: HTML Templates



servers · hosting · deployment  
· dns · local server · dry ·  
template engine · ejs · partials  
· layouts

## 6: CSS Frameworks



### Programming

Learn a broad range of programming and problem solving skills, including exciting new platforms, software tools and languages. Use these skills to build apps for mobile, cloud and device based IoT applications. Evolve a portfolio of fascinating applications.



### Networks

This strand will explore modern networks and cloud technology. Be able to configure, network and manage all categories of computer systems from simple controllers to single board board computers, mobiles and full workstations.



### Data Science

At the heart of many IoT applications is data: measurements, events alarms and other information that must be relayed, stored and ultimately turned into knowledge. Learn the fundamentals of modern approaches to data in this strand.



### Project

Building exciting IoT projects in every semester of the programme. Your projects will combine skills acquired from the other strands and enable you to build a comprehensive and compelling portfolio of IoT applications and services.



Modularising  
a web site

Professional  
Styling with  
CSS Libraries

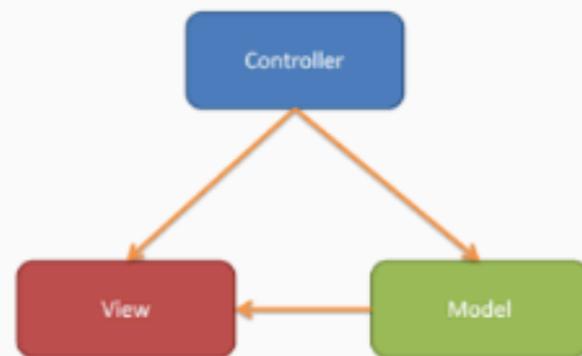
# From Web Sites to Web Applications

7: Applications



sites · apps · frameworks ·  
command line · ide · java ·  
request · response · front-end  
· back-end

## 8: Model View Controller



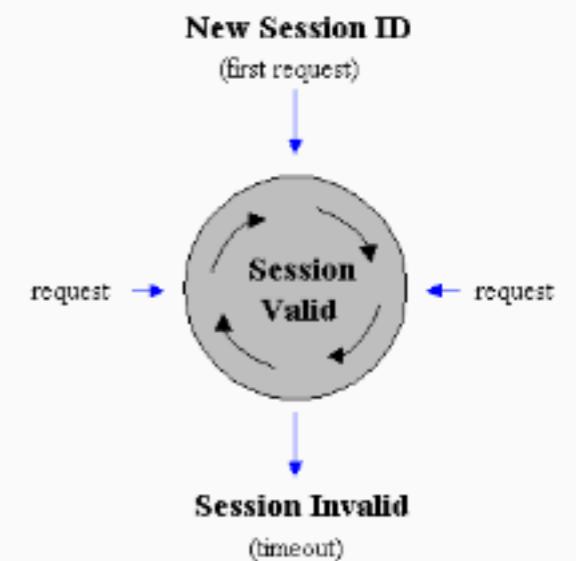
model · view · controller ·  
config · template · layout ·  
database · table · entity ·  
onetomany

## 9: Forms



routes · get · post · delete ·  
template loops · submit ·  
buttons · 404

## 10: Sessions



stateless · stateful · tracking ·  
cookies · signup · login ·  
logout · session object ·  
clearing

# Fundamentals of Web Application Development

## 11: Sessions & Models



song · playlist · session · add ·  
delete · login · signup

## 12: Deployment



heroku · cli · config · database  
· dashboard · logs · startup ·  
management · shutdown

Moving an Application to  
the Cloud

## 1: Introducing HTML



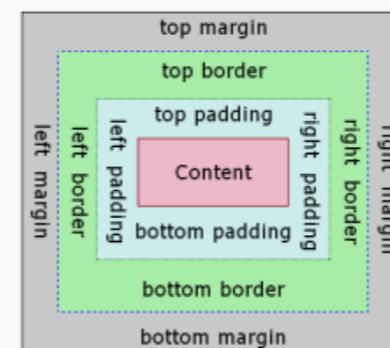
web · client/server · browser ·  
html · documents · elements ·  
attributes · links · images ·  
nesting · block · inline

## 2: Introducing CSS



markup · style · function-  
stylesheet · rules · selectors ·  
declarations · properties ·  
values · classes · ids ·  
inheritance

## 3: The Box Model



content · padding · border ·  
margin · style · width · colour ·  
dom · layout · float · left · right

## 4: Navigation



html versions · header · main ·  
nav · primary · secondary ·  
footer · semantic elements ·  
html style guide

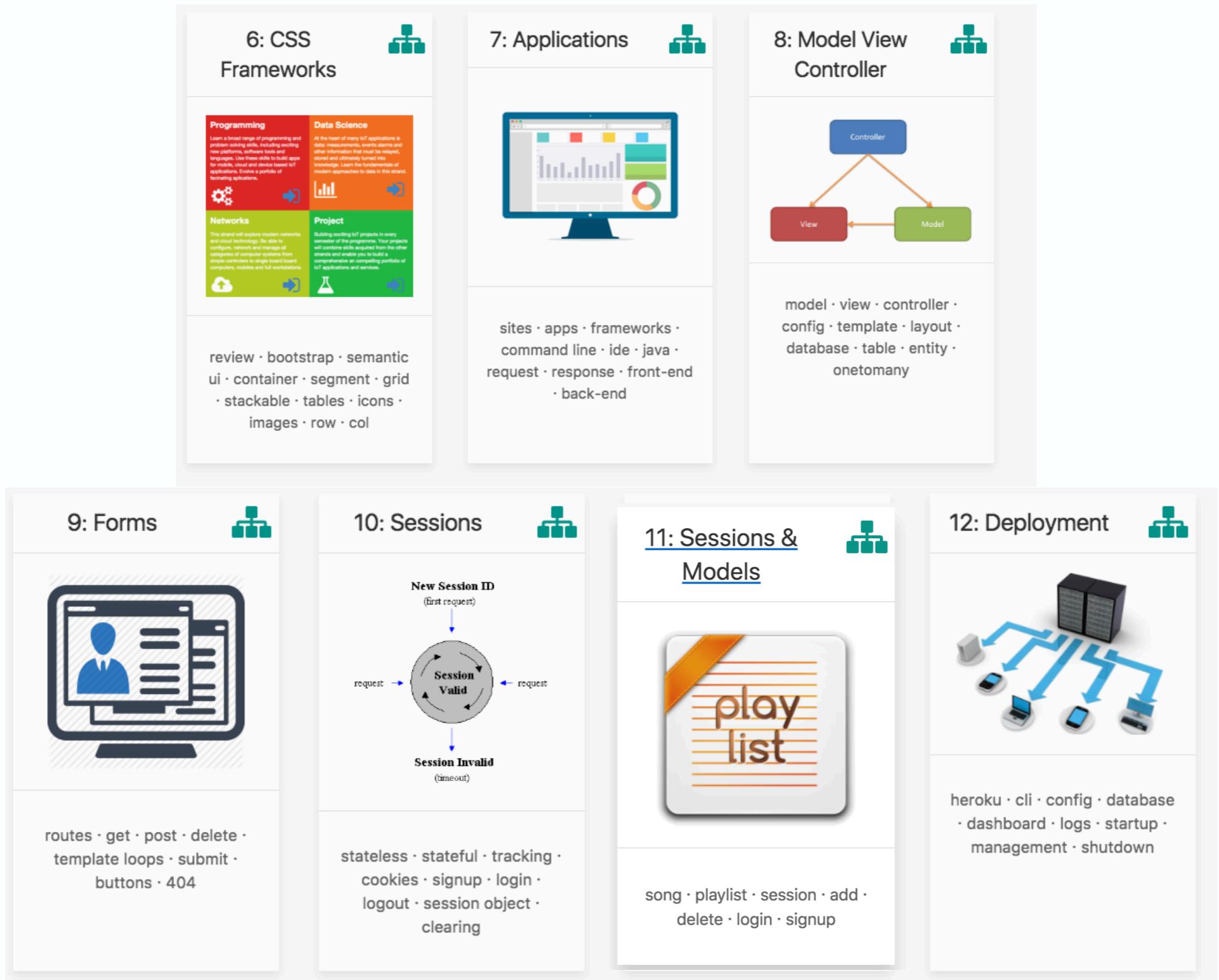
## 5: HTML Templates



servers · hosting · deployment  
· dns · local server · dry ·  
template engine · ejs · partials  
· layouts

Assignment 1 based on skills acquired in topics 1-5

Allocated 40% of overall module grade



Assignment 2 based on skills acquired in topics 6-12

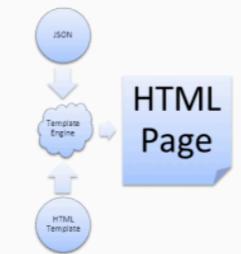
Allocated 60% of overall module grade

## 1: Introducing HTML



web · client/server · browser · html · documents · elements · attributes · links · images · nesting · block · inline

## 5: HTML Templates



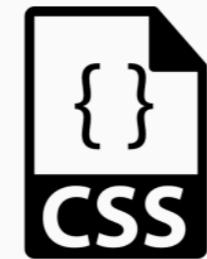
servers · hosting · deployment  
· dns · local server · dry · template engine · ejs · partials · layouts

## 9: Forms



routes · get · post · delete · template loops · submit · buttons · 404

## 2: Introducing CSS



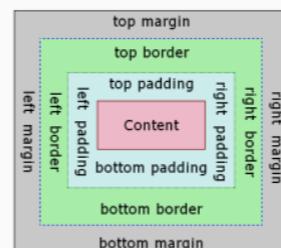
markup · style · function-stylesheet · rules · selectors · declarations · properties · values · classes · ids · inheritance

## 6: CSS Frameworks



review · bootstrap · semantic ui · container · segment · grid · stackable · tables · icons · images · row · col

## 3: The Box Model



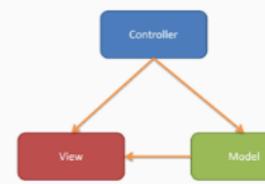
content · padding · border · margin · style · width · colour · dom · layout · float · left · right

## 4: Navigation



html versions · header · main · nav · primary · secondary · footer · semantic elements · html style guide

## 8: Model View Controller



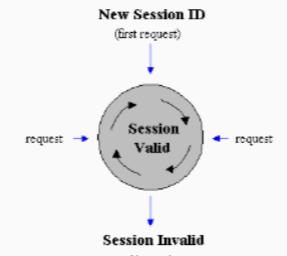
model · view · controller · config · template · layout · database · table · entity · onetomany

## 11: Sessions & Models



song · playlist · session · add · delete · login · signup

## 10: Sessions



stateless · stateful · tracking · cookies · signup · login · logout · session object · clearing

## 12: Deployment



heroku · cli · config · database · dashboard · logs · startup · management · shutdown

## The Nature of the Web



code · html · http · standards ·  
evolution · role of client · role  
of servers · learning resources

## HTML Basics



elements · attributes · paths ·  
absolute · relative · nesting ·  
block · inline · labs

## Lab-1.1: Editing HTML

```
index.html
1 <html>
2   <head>
3     <title>Starbucks Coffee</title>
4   </head>
5   <body>
6     <h1>Starbucks Coffee Beverages</h1>
7     <ul>
8       <li>House Blend, $1.49</li>
9       <li>Smooth, wild blend of coffees from Mexico, Bolivia and Guatemala.</li>
10      <li>Mocha Latte, $2.75</li>
11      <li>Espresso, steamed milk and chocolate syrup.</li>
12      <li>Cappuccino, $2.89</li>
13      <li>Latte or espresso, steamed milk and foam.</li>
14      <li>Chai Tea, $1.85</li>
15      <li>Spicy drink made with black tea, spices, milk and honey.</li>
16   </body>
17 </html>
```

editor · files · text · tags ·  
browser · reference

## Lab-1.2: HTML Structure



### Welcome to the App Bundle Store

This store brings you great app bundles week after week. We select the best power user apps from a broad range of super high-quality apps from the best publishers, at great prices.  
Whether you are interested in gaming or graphics design, software development or media production - we have the one for the other, delivering you an exciting take-on-a-scene.

#### Favourites

- Haga by Tantit
- Monitors by iowa
- Sublime by sublimetext.com
- Desktop Utility by Sweet Productions

folders · head · title · link ·  
image · references

# Topic 01

## Introducing HTML

## HTML Elements



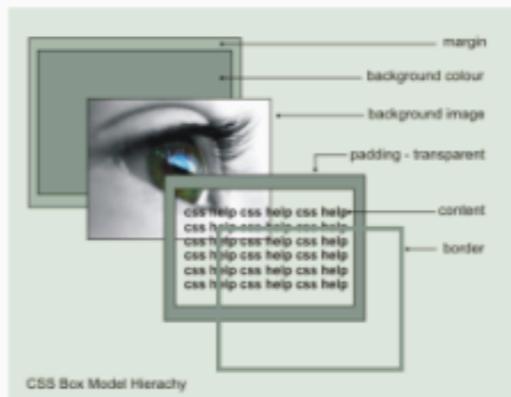
structural elements · head  
elements · text elements · list  
elements · image elements ·  
shared attributes

## CSS Basics



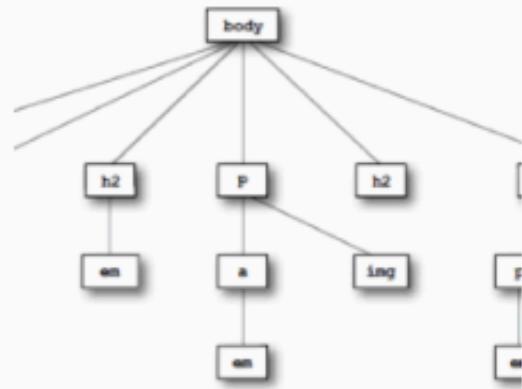
markup · presentation · style  
· rules · selectors ·  
declarations · properties ·  
values

## CSS Rules



combining rules · combining  
selectors · class · id · div

## CSS Cascade



rules · class · elements ·  
explicit · inheritance · default  
· most specific · order

## Lab-2 CSS Intro

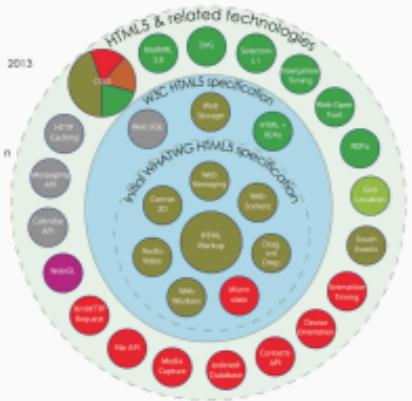
```
<!DOCTYPE HTML>
<html>
  <title>APP Scores</title>
  <link type="text/css" rel="stylesheet" href="style.css" media="screen" />
</head>
<body>
  <h1>Scores: Apps, Movies, Music, Books</h1>
  <ul>
    <li><a href="apps.html">Apps</a></li>
    <li><a href="movies.html">Movies</a></li>
    <li><a href="music.html">Music</a></li>
  </ul>
  <div class="main_panel">
    <div>New Games!</div>
    <ul>
      <li>Clear All</li>
      <li>Google Now</li>
      <li>Squircle</li>
    </ul>
  </div>
</body>
</html>
```

inheritance · classes · fonts ·  
colours · indentation · best  
practices

# Topic 02

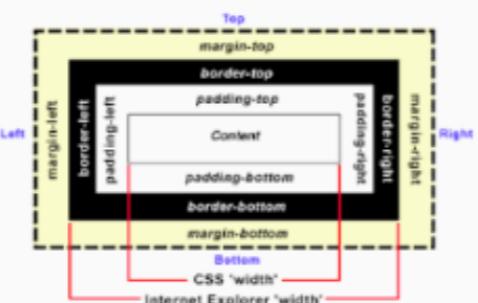
# Introducing CSS

## Web Standards Evolution



standards · w3c · whatwg ·  
sgml · xhtml · html5 ·

## Box Model Fundamentals



content · padding · border ·  
margin · variations · fonts ·  
dimensions

## Box Model Example

Our guarantee: at the lounge, we're committed to providing with an exceptional experience every time you visit. Whether stopping by to check in on email over an elixir, or are here ordinary dinner, you'll find our knowledgeable service staff every detail. If you're not fully satisfied, have a Blueberry B

ut that's not all; at  
ance and drumble  
ne of our comfy w  
ne main lounge rig  
jungle area to relax  
nnected with our

**.guarantee**  
`border-color: black;  
border-width: 1px;  
border-style: solid;`

border-width · border-style ·  
padding · width · margin-left ·  
text-align · float

## Multicolumn Layout



box structure · containing  
block · margins · floating ·  
clearing · multicolumn layout

## Lab-3a Layout

Welcome to the App Bundle Store. This store brings you great app bundles week after week. We select the best power user apps from a broad range of sources and combine them into great deals. These are the highest quality apps from the best publishers, at great prices.

Whether you are interested in gaming, or graphics design, software development or media production - we have the bundle for you. Each app bundle is designed to accomplish the tasks, delivering you an exciting take on a genre.

Our promise is that the items, will be committed to providing you, with an exceptional quality and reliability. Every application is checked in detail, for stability, usability and interoperability. If you are unhappy with any individual app in a bundle we will refund you the full amount for the complete adds, no questions asked.

We sell over the bundles on a weekly basis, so be sure to check back regularly for bundles that suits your tastes. If you don't see application bundles that suit your interests - please let us know! We are always interested in combining new and interesting bundles and will strive to figure out your needs and match them to current or upcoming offerings.

Now that you've got some idea of what we do, why not call into our store? We have created some [contact details](#) so you can reach us in record time. Come and join us anytime.

What's Apps we Like

fonts · content · images ·  
classes · folding editor ·  
sidebar · float

## Lab-3b Multicolumn

### Lorem ipsum dolor sit

<ul style="list-style-type: none"><li>Mauris</li><li>Cras</li><li>Proin</li><li>Integer</li><li>Carasina</li><li>Integer</li><li>Suspensione</li><li>Quisque</li></ul>	<p>Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed feugiat nisi at sapien. Phasellus varius incident ligula. Praesent nisi. Duis sollicitudin. Donec dignissim, est veluctor blandit, ante est looreet neque, non pellentesque massa turpis eu purus.</p> <p>Suspendisse mollis leo nec diam. Vestibulum pulvinar tellus sit amet nulla fringilla semper. Aenean aliquam, urna et accumsan sollicitudin, tellus pede loboris velit, nec placerat dolor pede nec nibh. Donec fringilla. Duis adipiscing diam at enim. Vestibulum nibh.</p>
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header · maincontent ·  
navigation · footer · primary ·  
secondary

# Topic 03

## Box Model

## HTML Style Guide



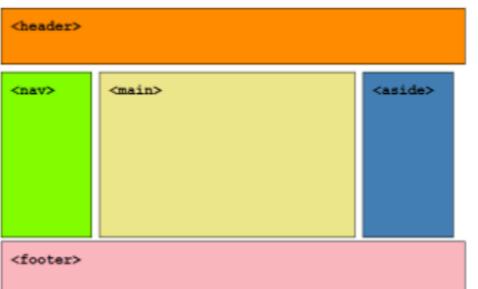
indentation · encoding ·  
doctype · validity · semantics ·  
entities · type attributes ·  
quotations

## Navigation



nav · tab · current · padding ·  
border · menu · li · ul

## Semantic HTML



header · main · nav · aside ·  
article · footer · section · figure

## CSS Style Guide



validity · names · name style ·  
selectors · shorthand ·  
delimiters · order · stops ·  
quotations

## Lab-4a Navigation

**Lorum ipsum dolor sit**

Home Case Print Integer Caribiner Integer Suspendisse Quisque

Lorum ipsum dolor si amet, consecetur adipiscing ellit. Sed fringilla nisi at sapien. Phasellus varius tincidunt ligula. Praesent nisi. Duis sollicitudin. Donec dignissim, est vel auctor blandit, ante est laoreet neque, non pellentesque mauris tempor et purus.

Suspendisse mollis leo et diam. Vestibulum pulvinar tellus sit amet nulla fringilla scelerisque. Aenean aliquam, urna et accumsan sollicitudin, tellus pede lobortis velit, nec pharetra dolor pellentesque nibh. Donec magna. Donec adipiscing diam et orci. Vestibulum nibh.

Nulla facilisi. Aliquam dapibus leo eget leo. Etiam vitae turpis sit amet massa posuere cursus. Sed vitae justo quis tortor facilisis ultricies. Integer id erat. Donec at foliis et erat interdum. Quisque euismod. Donec ultricies.

Tellus semper enim, in elementum quam sapien ex lectus. In dolor utra, ullamcorper vol, tempus sit amet, semper ut, felis. Presente sapien.

Proin quis orci eu etiam molestie varius. Praesent condimentum erat in lectus. Ut ipsum. In hac habitasse platea dictumst.

nav · tab · current · padding ·  
border · menu · li · ul

## Lab-4b Case Study



header · main · nav · aside ·  
article · footer · section · figure

# Topic 04

## Navigation, Semantics & Style Guides

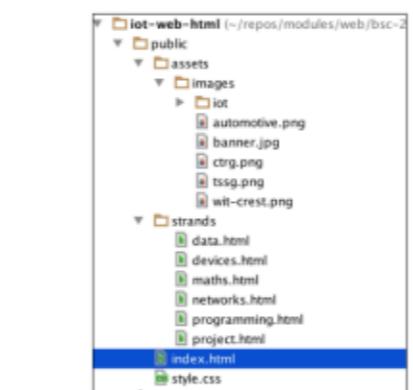
## Deployment

clients · servers · hosting · domains · dns · paths · http · response codes

## Harp & Surge

command prompt · node · harp · surge · server · compile

## Case Study



structure · layout · semantic elements · fonts · web safe fonts · images · picture element

## Templates

EJS · dry · wet · engine · partials · includes · layouts · paths · compile

### Lab-5a Harp & Surge



Install software tools to serve a web site locally and also to deploy the web site to a public web server.

### Lab-5b Templating

```
harp.json
public
assets
...
includes
  _curriculum.ejs
  _footer.ejs
  _header.ejs
  _sponsors.ejs
  _summary.ejs
index.ejs
strands
  _layout.ejs
  data.ejs
  devices.ejs
  maths.ejs
  networks.ejs
  programming.ejs
  project.ejs
style.css
```

Rebuild the IoT web site from the last lab using templating. This version of the site will aim to significantly reduce the content the author has to manage by reusing 'templates' containing common sections.

### Lab-5c Templating & Nav



Rework the tabbed navigation site from lab 04 to use EJS template

Topic 05  
HTML  
Templates &  
Deployment

## Lab Review



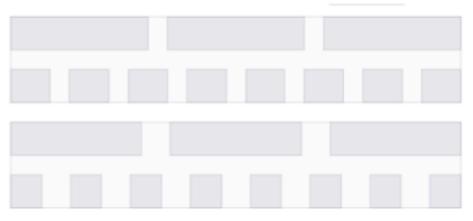
### Semantic-UI I: Container & Segment

	Mobile	Tablet
Width	100%	723px
Gutter Size	1em	Fluid
Responsive Visibility	mobile only	tablet only
Device Width	below 768px	768px - 991px

project structure · semantic ui archive · container · segment · raised · stacked

lab-1 · lab-2 · lab-3 · lab-4 · lab-5 · lab-6

### Semantic-UI II: Grids & Images



row · column · aligned · center · top · image · small · medium · large

### Semantic-UI III: Tables

Employee	Correct Guesses
Lena Human Resources	22
Matthew Fabric Design	15
Lindsay Entertainment	12
Mark Executive	11

table · celled · padded · single line · striped · inverted

## Semantic Part IV: Layout



**Programming**  
Learn a broad range of programming and problem solving skills, including existing new platforms, software tools and languages. Use these skills to build apps for mobile, cloud and device based IoT applications. Evolve a portfolio of fascinating applications.

**Data Science**  
At the heart of many IoT applications is data: measurements, events alarms and other information that must be relayed, stored and ultimately turned into knowledge. Learn the fundamentals of modern approaches to data in this strand.

**Networks**  
This strand will explore modern networks and cloud technology. Be able to configure, network and manage all categories of computer systems from simple controllers to single board based computers, modules and full workstations.

**Project**  
Building exciting IoT projects in every semester of the programme. Your projects will combine skills acquired from the other strands and enable you to build a comprehensive and compelling portfolio of IoT applications and services.

## Lab-6a Semantic UI 1

**Department of Computing & Mathematics**  
BSc (Hons) the Internet of Things

**BACHELOR OF SCIENCE IN THE INTERNET OF THINGS**  
APPLIED COMPUTING IN THE INTERNET OF THINGS

**Program your World**  
An exciting new level 8 module for 2019-2020! Learn how to program IoT devices and learn how to code cool dashboards, web pages, mobile and desktop applications, and much more!

**Programming**  
Learn a broad range of programming and problem solving skills, including existing new platforms, software tools and languages. Use these skills to build apps for mobile, cloud and device based IoT applications. Evolve a portfolio of fascinating applications.

**Data Science**  
At the heart of many IoT applications is data: measurements, events alarms and other information that must be relayed, stored and ultimately turned into knowledge. Learn the fundamentals of modern approaches to data in this strand.

**Devices**  
The 'Things' we connect to are often physical devices. These can range from simple temperature sensors to sophisticated control systems like traffic lights or cameras. Connecting to and interacting with the physical world is the subject of this strand.

grid · stackable · padded · aligned · color · icons · cdns

Rebuild the iot web site using semantic-ui

## Lab-6b Semantic UI 2

**Department of Computing & Mathematics**  
BSc (Hons) the Internet of Things

**APPLIED COMPUTING IN THE INTERNET OF THINGS**

**Program your World**

**Programming**  
Learn a broad range of programming and problem solving skills, including existing new platforms, software tools and languages. Use these skills to build apps for mobile, cloud and device based IoT applications. Evolve a portfolio of fascinating applications.

**Data Science**  
At the heart of many IoT applications is data: measurements, events alarms and other information that must be relayed, stored and ultimately turned into knowledge. Learn the fundamentals of modern approaches to data in this strand.

**Devices**  
The 'Things' we connect to are often physical devices. These can range from simple temperature sensors to sophisticated control systems like traffic lights or cameras. Connecting to and interacting with the physical world is the subject of this strand.

**Mathematics**  
Mathematics is the language of science and engineering. It is used to describe the world around us and to predict future events. It is also used in many other fields such as economics, finance, and medicine.

**TSSG**  
**cfrg**  
**Information Systems Group**

Continue to enhance the IoT web site with additional Semantic-UI styles & Components

Topic 06  
CSS Frameworks

## Web Sites/Applications



theme · content · navigation ·  
structure · templates · style ·  
interaction · business logic ·  
context · static · dynamic

## Starting to Play

```
~ [DESKTOP-1I1K6D1] ~  
~ play! 1.5.0, http://www.playframework.org  
~ Usage: play cmd [app_path] [--options]  
~ with, new Create a new application  
~ run Run the application in the  
~ help Show play help
```

download · expand · path ·  
verify · run · idealize · skeleton  
app

## Web App Introduction



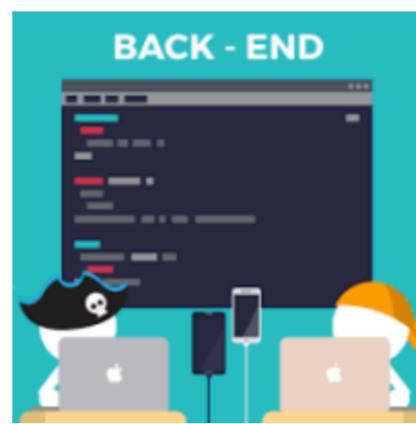
structure · front-end · backend  
· router · model · view ·  
controller

## Front-end



layout · partials · views · tags ·  
about · dashboard · main · start

## Back-end



request · router · controller ·  
view · response

## Lab-07a Play Setup

```
~ [DESKTOP-1I1K6D1] ~  
~ play! 1.5.0, http://www.playframework.org  
~ The new application will be created in c:\  
~ What is the application name? [playdemo]
```

Install and test Git + the Play  
Framework

## Lab-07b Playlist 1

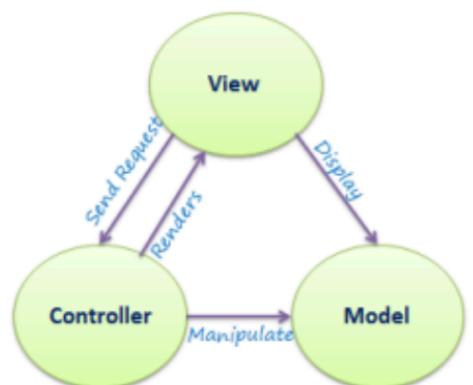


Import, rename and run a new  
starter project. Extend the  
project to include a Model.

# Topic 07

# Applications

## Model View Controller



request · router · controller ·  
view · response

## Views



### Beethoven Sonatas

Song	Artist
Piano Sonata No. 3	Beethoven
Piano Sonata No. 7	Beethoven
Piano Sonata No. 10	Beethoven

### Beethoven Concertos

Song	Artist
Piano Concerto No. 1	Beethoven
Piano Concerto No. 12	Beethoven
Piano Concerto No. 23	Beethoven

```
{#extends /} · {#set /} · {#list /} ·  
{#list /} · {#menu /} ·  
{#listsongs /}
```

## Models



SELECT \* FROM SONG;

ID	ARTIST	DURATION	TITLE
1	Beethoven	0	Piano Sonata No. 3
2	Beethoven	0	Piano Sonata No. 7
3	Beethoven	0	Piano Sonata No. 10
4	Beethoven	0	Piano Concerto No. 27
5	Beethoven	0	Piano Concertos No. 17
6	Beethoven	0	Piano Concerto No. 10

(6 rows, 6 ms)

Edit

table · row · mem · yaml · Song  
· Playlist · ArrayList ·  
OneToMany ·  
OnApplicationStart

## Lab-08a Playlist-2



Move the playlist model into the database. Prime the database from a YAML file.

## Lab-08b Playlist-3



Move the playlists into their own view. Introduce routes for opening the playlist and also deleting individual songs.

# Topic 08

## Models & Views

## Todo



A Separate case study - a simple todo list application

## Add Todo



```
new="title">
>do</button>

```

Dashboard.addTodo

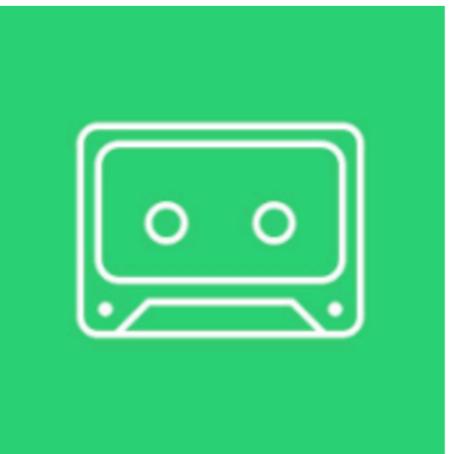
```
ic class Dashboard extends Controller
public static void addTodo(String title)
Todo todo = new Todo(title)
```

add item to todolist - detailed walkthrough

## Playlist



## Management



List, add and delete playlists

## Song

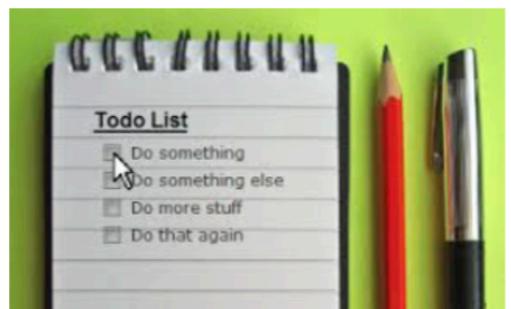


## Management



List, add and delete Songs

## Lab-09b Todolist-1



Develop a completely new application, using the techniques we have explored so far.

## Lab-09a Playlist-4



Introduce forms into a play application to enable the user to create playlists.

# Topic 09

# Forms

## Todo Review



A quick tour of the Todo app so far

## Sessions



Sessions enable us to track a user, enabling login, logout and also to follow the user from page to page in an application

## Sessions in Todo

Log-in

Email  
homer@simpson.com

Password  
\*\*\*\*\*

Login

Introduce session management into the Todo app



## Lab-10 Todolist-2

Name	Type
session-cookies	Session Storage

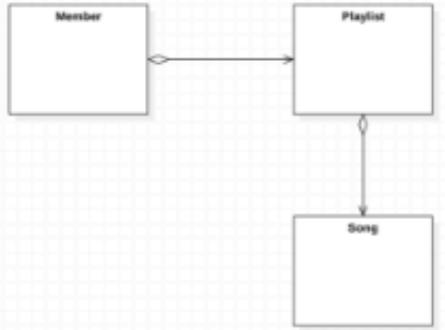
Incorporate sessions tracking into the todo app

# Topic 10

## Sessions

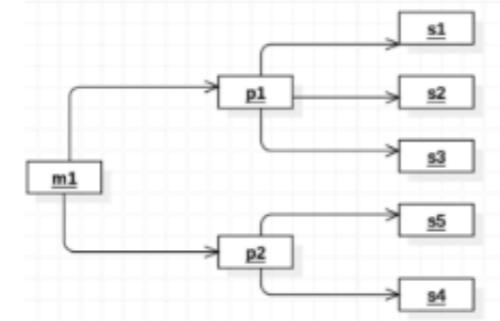


## Playlist Sessions



Introduce session management into the Playlist 4 Application

## Playlist Models



Review the structure and manipulation of the Playlist Model

## Project 2 Specification



Draft specification for Assignment 2

## Lab-11a Playlist Review



Review the Playlist Application

## Lab-11b Playlist 5



Incorporate Sessions into the latest Playlist Application

# Topic 11

## Sessions & Models