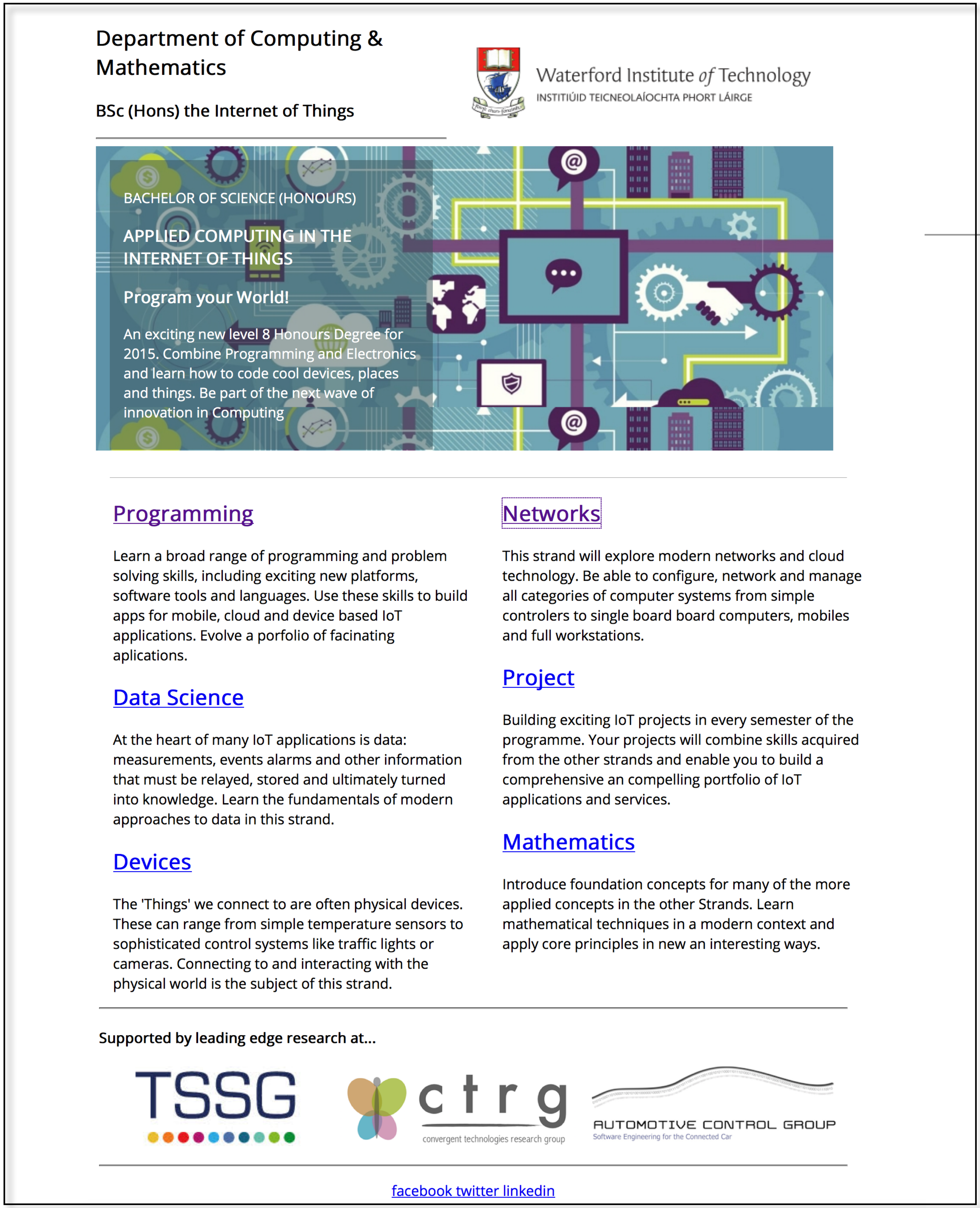
Web Development

Templates



Department of Computing & Mathematics

BSc (Hons) the Internet of Things

Waterford Institute *of* Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

BACHELOR OF SCIENCE (HONOURS)

APPLIED COMPUTING IN THE INTERNET OF THINGS

Program your World!

An exciting new level 8 Honours Degree for 2015. Combine Programming and Electronics and learn how to code cool devices, places and things. Be part of the next wave of innovation in Computing

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 porfolio of facinating aplications.

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.

Networks

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

Project

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Mathematics

Introduce foundation concepts for many of the more applied concepts in the other Strands. Learn mathematical techniques in a modern context and apply core principles in new an interesting ways.

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convergent technologies research group

AUTOMOTIVE CONTROL GROUP
Software Engineering for the Connected Car

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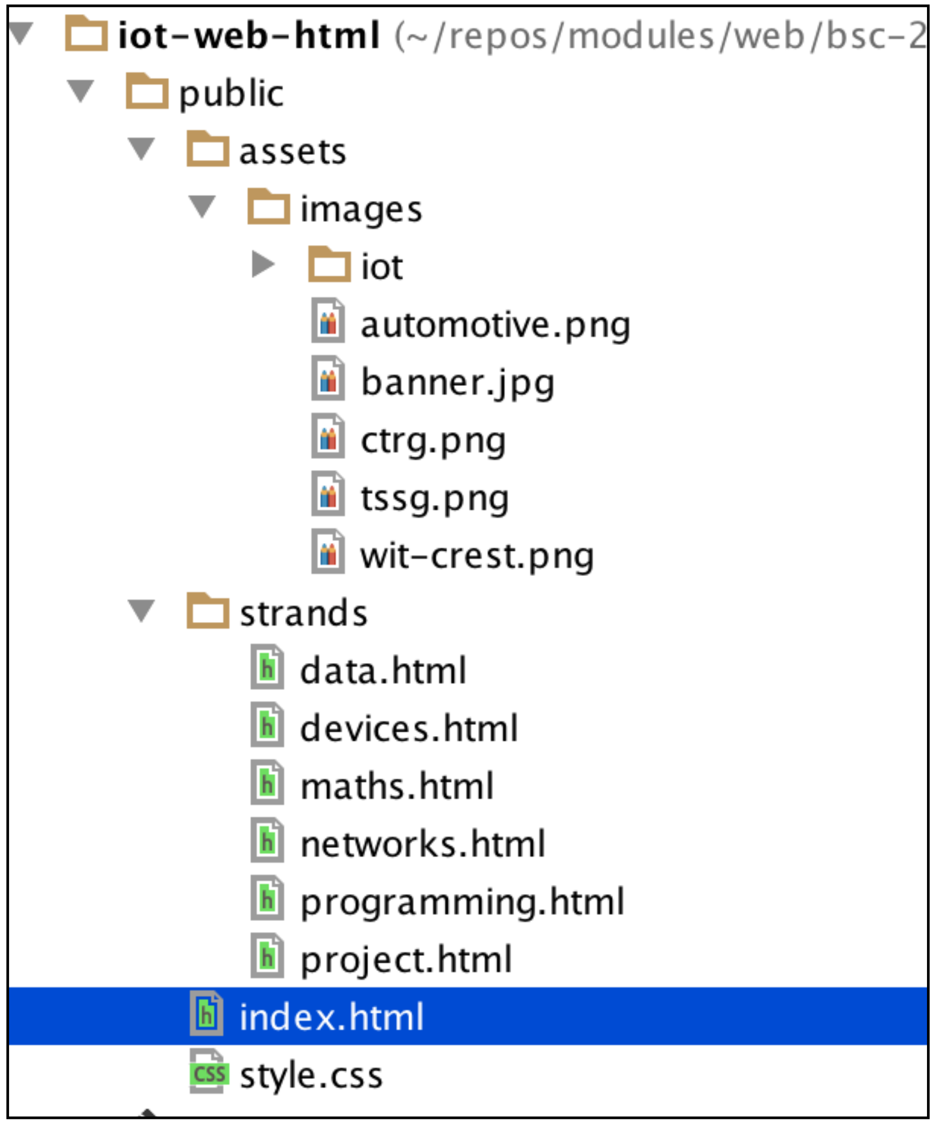
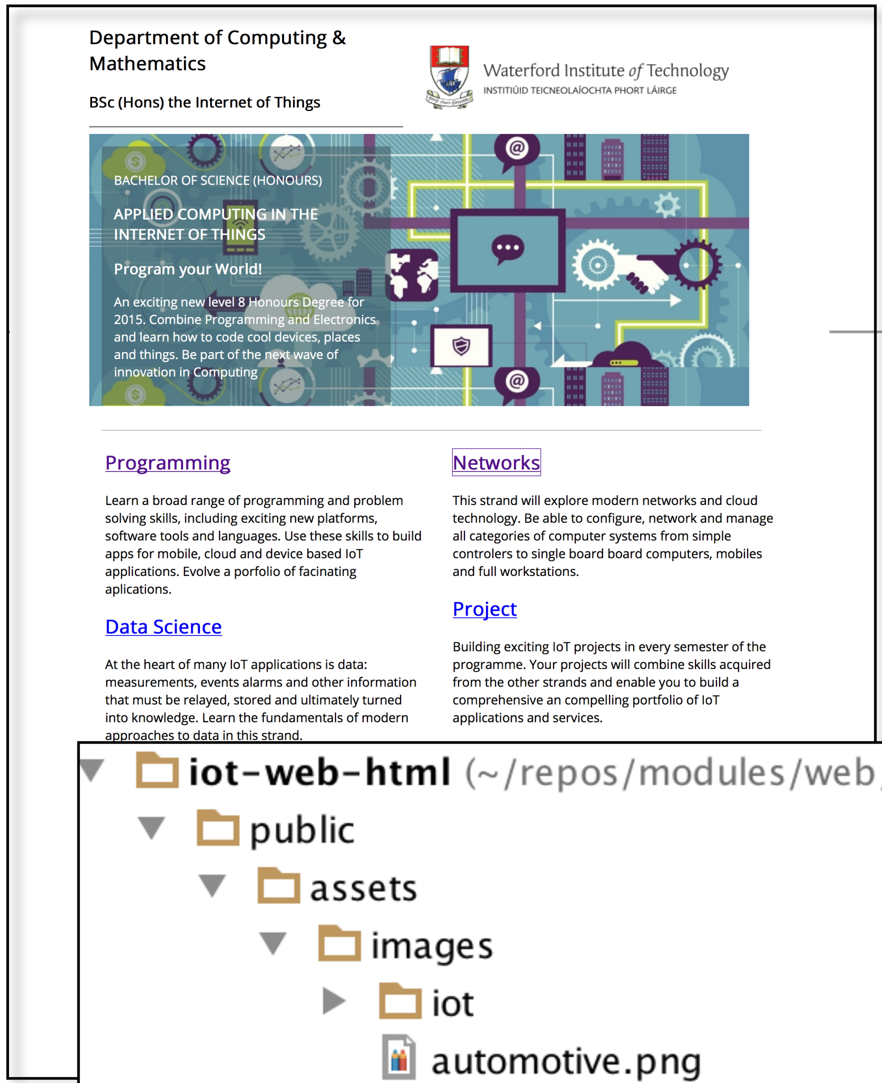


```
▼ iot-web-html (~/repos/modules/web/bsc-2
  ▼ public
    ▼ assets
      ▼ images
        ▶ iot
          automotive.png
          banner.jpg
          ctrg.png
          tssg.png
          wit-crest.png
    ▼ strands
        data.html
        devices.html
        maths.html
        networks.html
        programming.html
        project.html
      index.html
      style.css
```

Templates Why?



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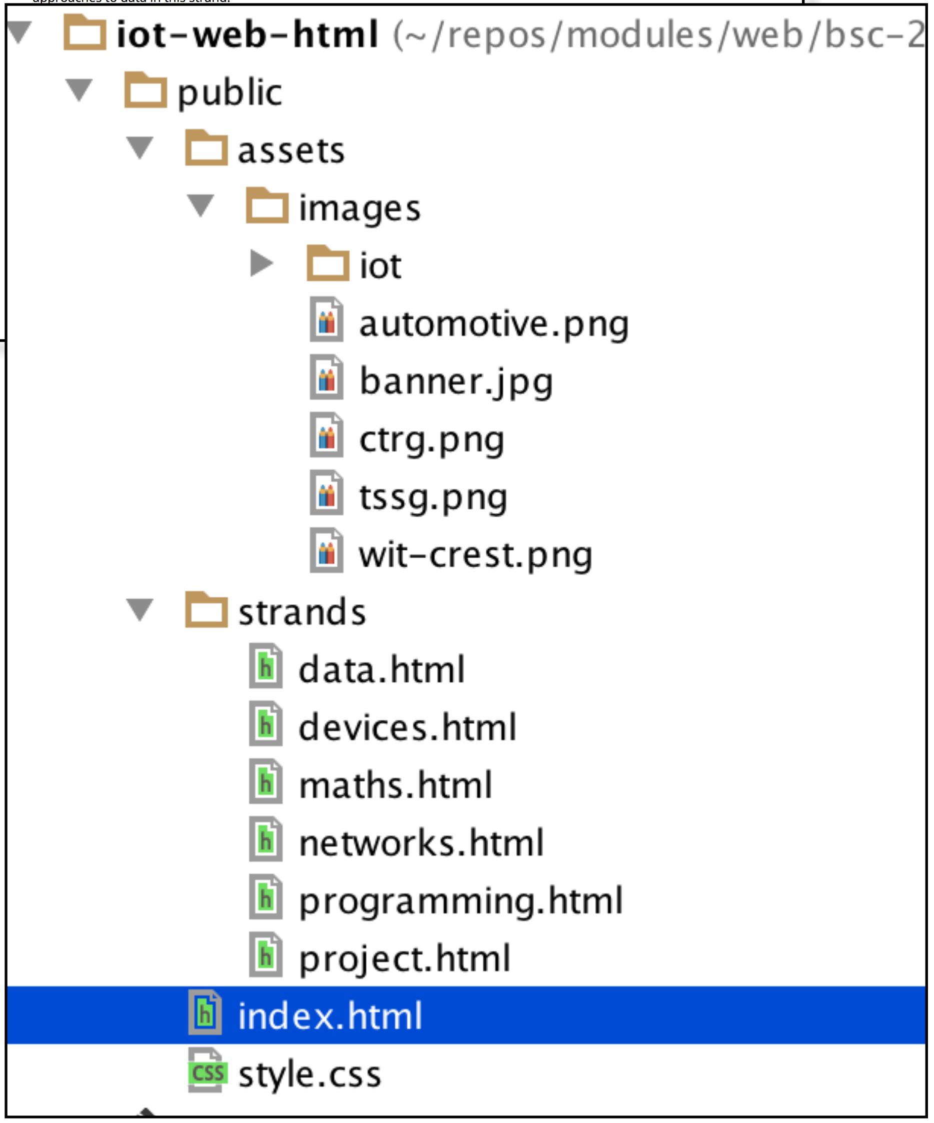
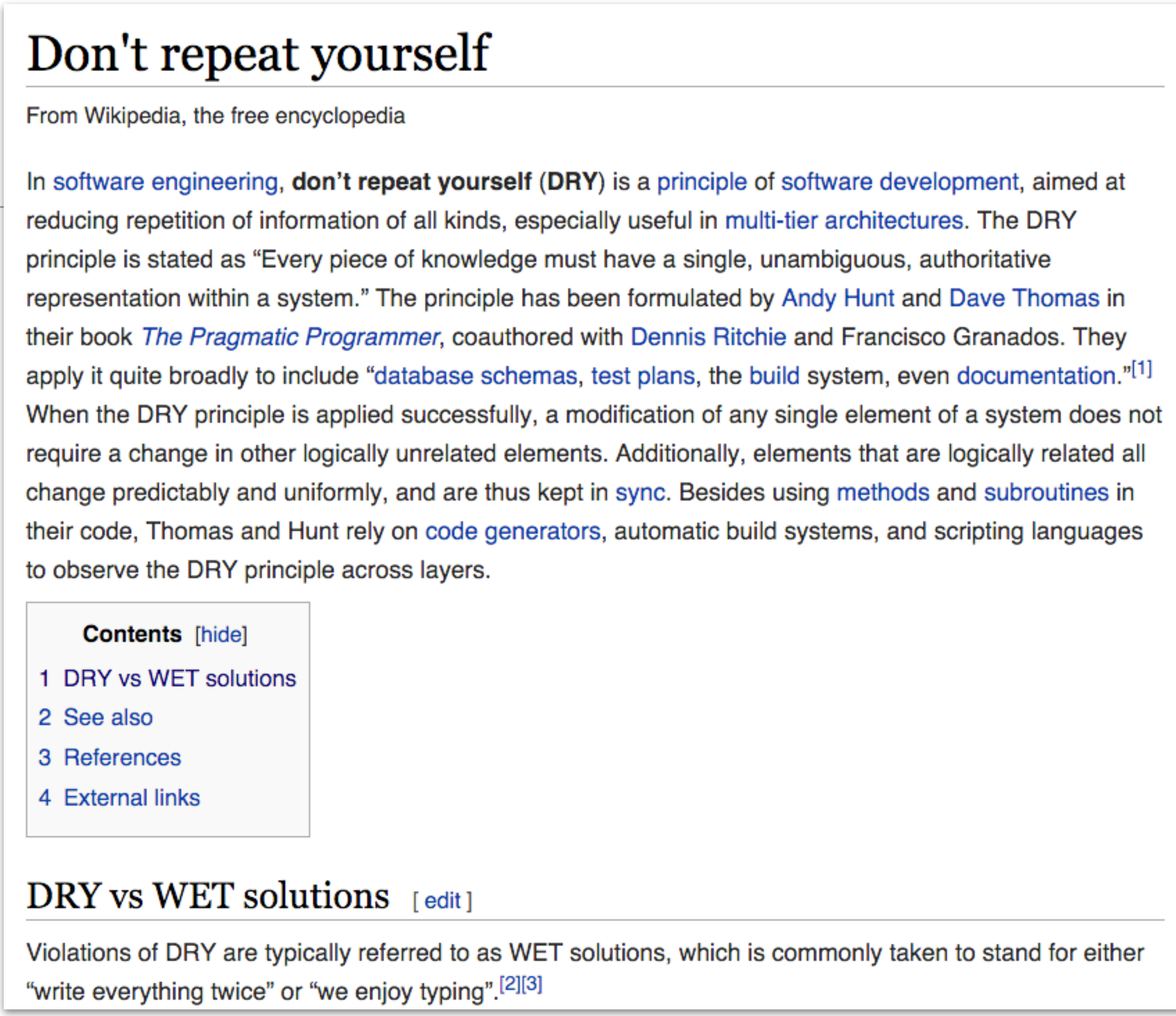


```
iot-web-html (~/repos/modules/web/bsc-2
  public
    assets
      images
        iot
        automotive.png
        banner.jpg
        ctrg.png
        tssg.png
        wit-crest.png
    strands
      data.html
      devices.html
      maths.html
      networks.html
      programming.html
      project.html
    index.html
    style.css
```

- This web site has 7 pages.
- Each page has:
  - Head Section
  - Body Section
- Each Body Section has
  - Header
  - Footer
- —>
  - 7 Identical Head Section
  - 7 Identical Header's
  - 7 Identical Footer's
- —>

21 Repeated Sections

- Its got its own Wikipedia Page!



Don't repeat yourself

From Wikipedia, the free encyclopedia

In software engineering, **don't repeat yourself** (**DRY**) is a principle of software development, aimed at reducing repetition of information of all kinds, especially useful in multi-tier architectures. The DRY principle is stated as "Every piece of knowledge must have a single, unambiguous, authoritative representation within a system." The principle has been formulated by Andy Hunt and Dave Thomas in their book *The Pragmatic Programmer*, coauthored with Dennis Ritchie and Francisco Granados. They apply it quite broadly to include "database schemas, test plans, the build system, even documentation."[1] When the DRY principle is applied successfully, a modification of any single element of a system does not require a change in other logically unrelated elements. Additionally, elements that are logically related all change predictably and uniformly, and are thus kept in sync. Besides using methods and subroutines in their code, Thomas and Hunt rely on code generators, automatic build systems, and scripting languages to observe the DRY principle across layers.

Contents [hide]

DRY vs WET solutions [edit]

Violations of DRY are typically referred to as WET solutions, which is commonly taken to stand for either "write everything twice" or "we enjoy typing".[2][3]

https://en.wikipedia.org/wiki/Don%27t_repeat_yourself

DRY vs WET

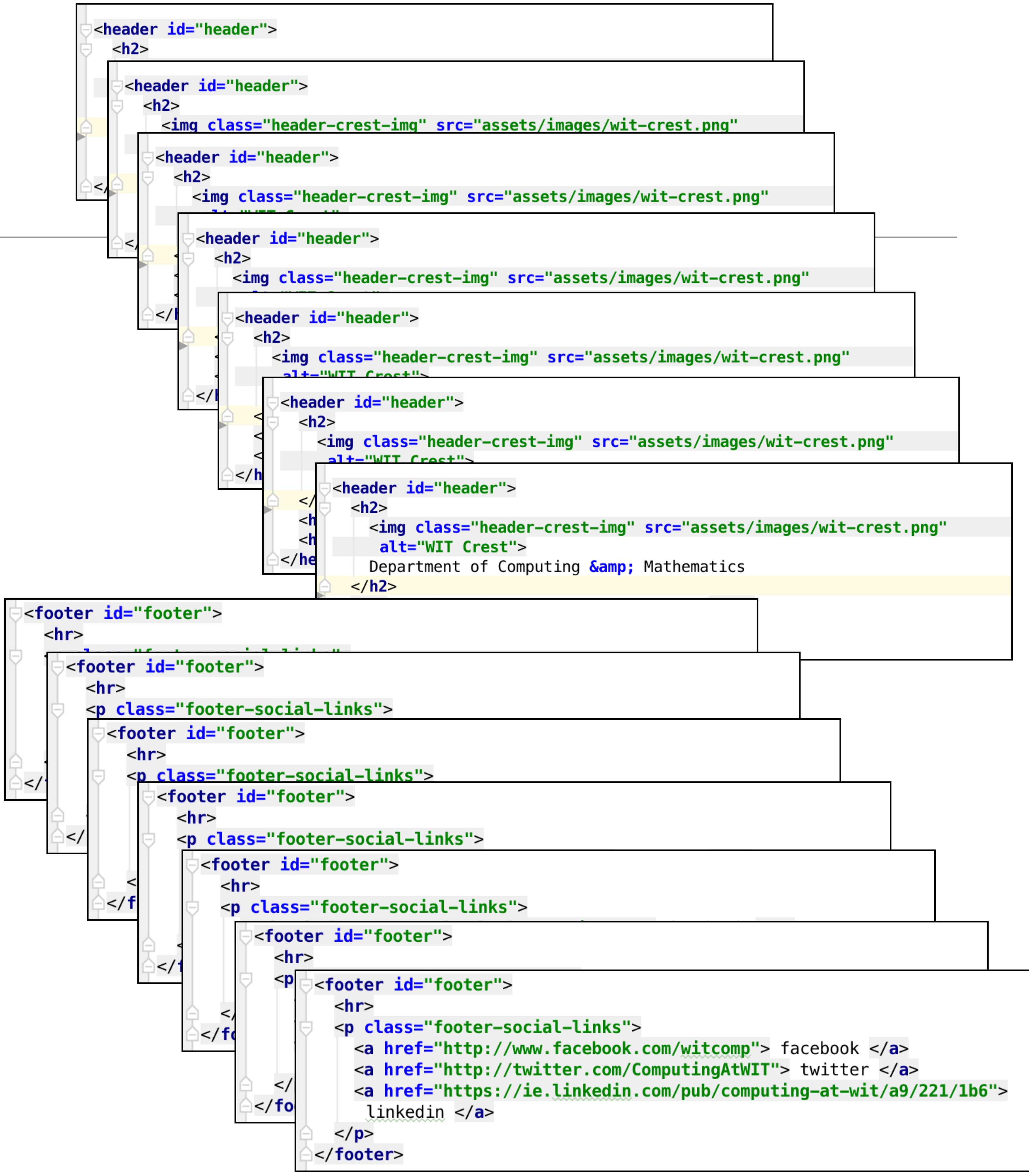
Don’t Repeat Yourself

vs

Write Everything Twice

OR

We Enjoy Typing

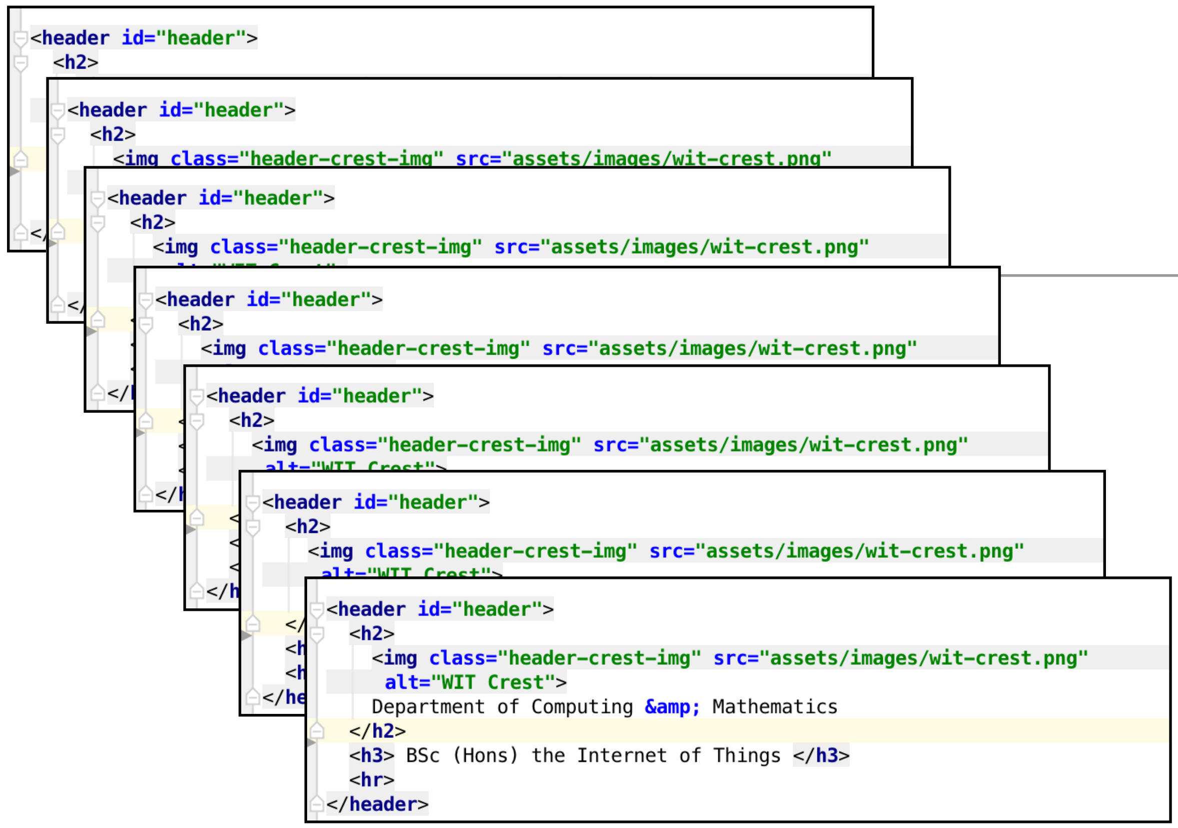


```
<header id="header">
  <h2>
    <img class="header-crest-img" src="assets/images/wit-crest.png"
     alt="WIT Crest">
    Department of Computing &amp; Mathematics
  </h2>
```

```
<footer id="footer">
  <hr>
  <p class="footer-social-links">
    <a href="http://www.facebook.com/witcomp"> facebook </a>
    <a href="http://twitter.com/ComputingAtWIT"> twitter </a>
    <a href="https://ie.linkedin.com/pub/computing-at-wit/a9/221/1b6">
     linkedin </a>
  </p>
</footer>
```

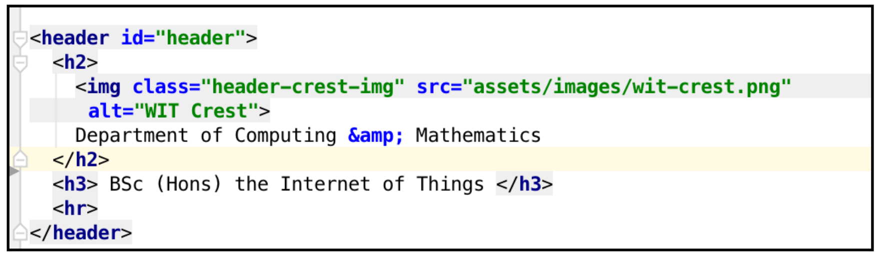
DRY

Single Header + Footer Template

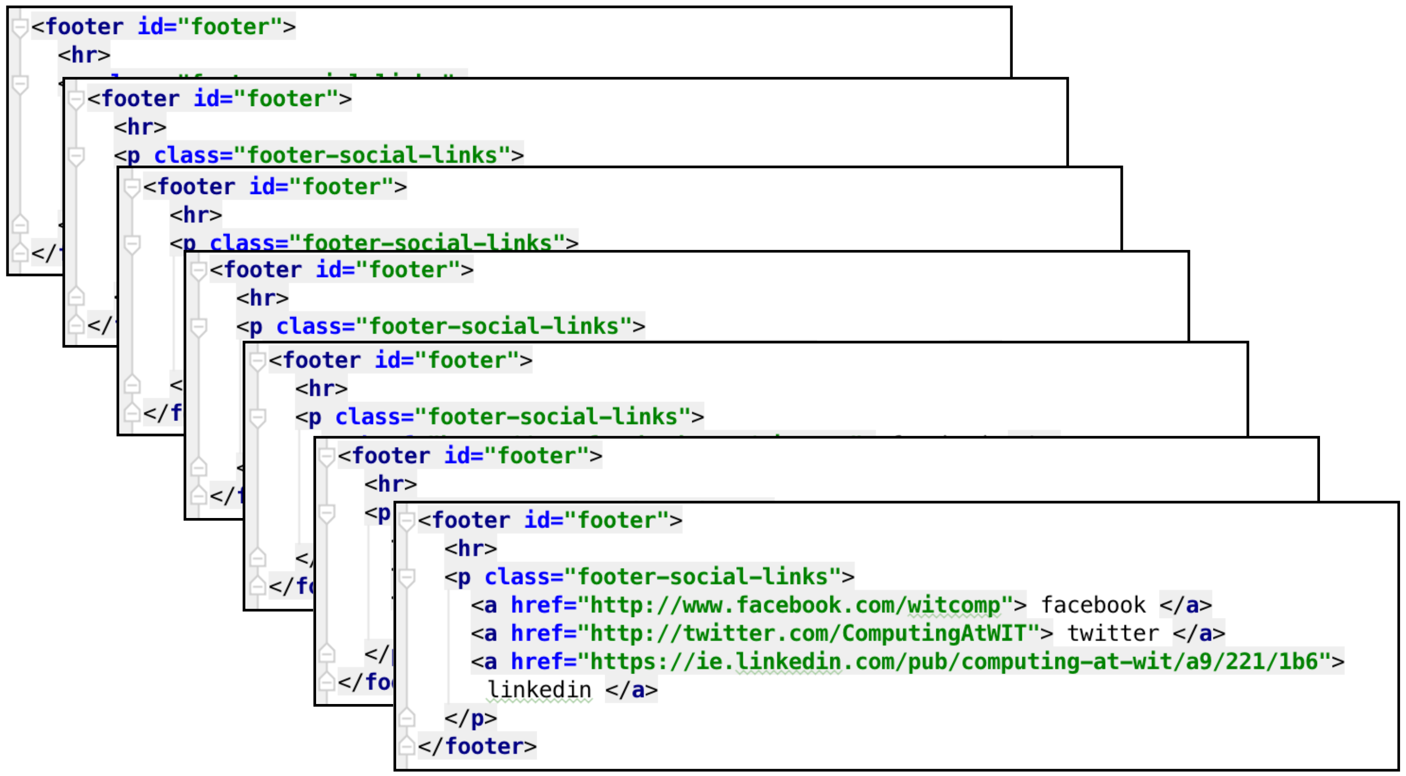


```
<header id="header">
  <h2>
    <img class="header-crest-img" src="assets/images/wit-crest.png"
     alt="WIT Crest">
    Department of Computing &amp; Mathematics
  </h2>
  <h3> BSc (Hons) the Internet of Things </h3>
  <hr>
</header>
```

- Incorporate the SAME single header/footer into ALL pages

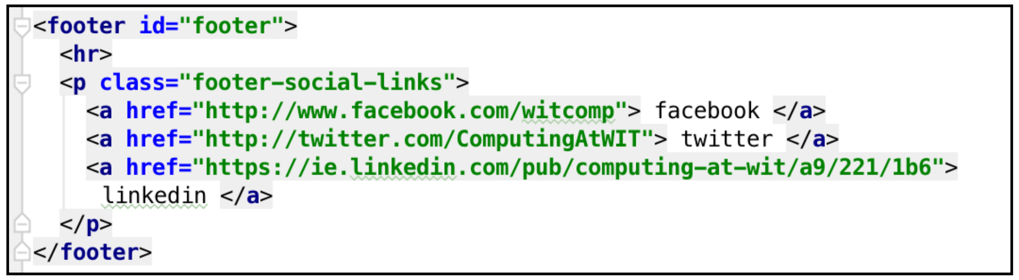


```
<header id="header">
  <h2>
    <img class="header-crest-img" src="assets/images/wit-crest.png"
     alt="WIT Crest">
    Department of Computing &amp; Mathematics
  </h2>
  <h3> BSc (Hons) the Internet of Things </h3>
  <hr>
</header>
```



```
<footer id="footer">
  <hr>
  <p class="footer-social-links">
    <a href="http://www.facebook.com/witcomp"> facebook </a>
    <a href="http://twitter.com/ComputingAtWIT"> twitter </a>
    <a href="https://ie.linkedin.com/pub/computing-at-wit/a9/221/1b6">
     linkedin </a>
  </p>
</footer>
```

- Any changes - made just once in the single header/footer

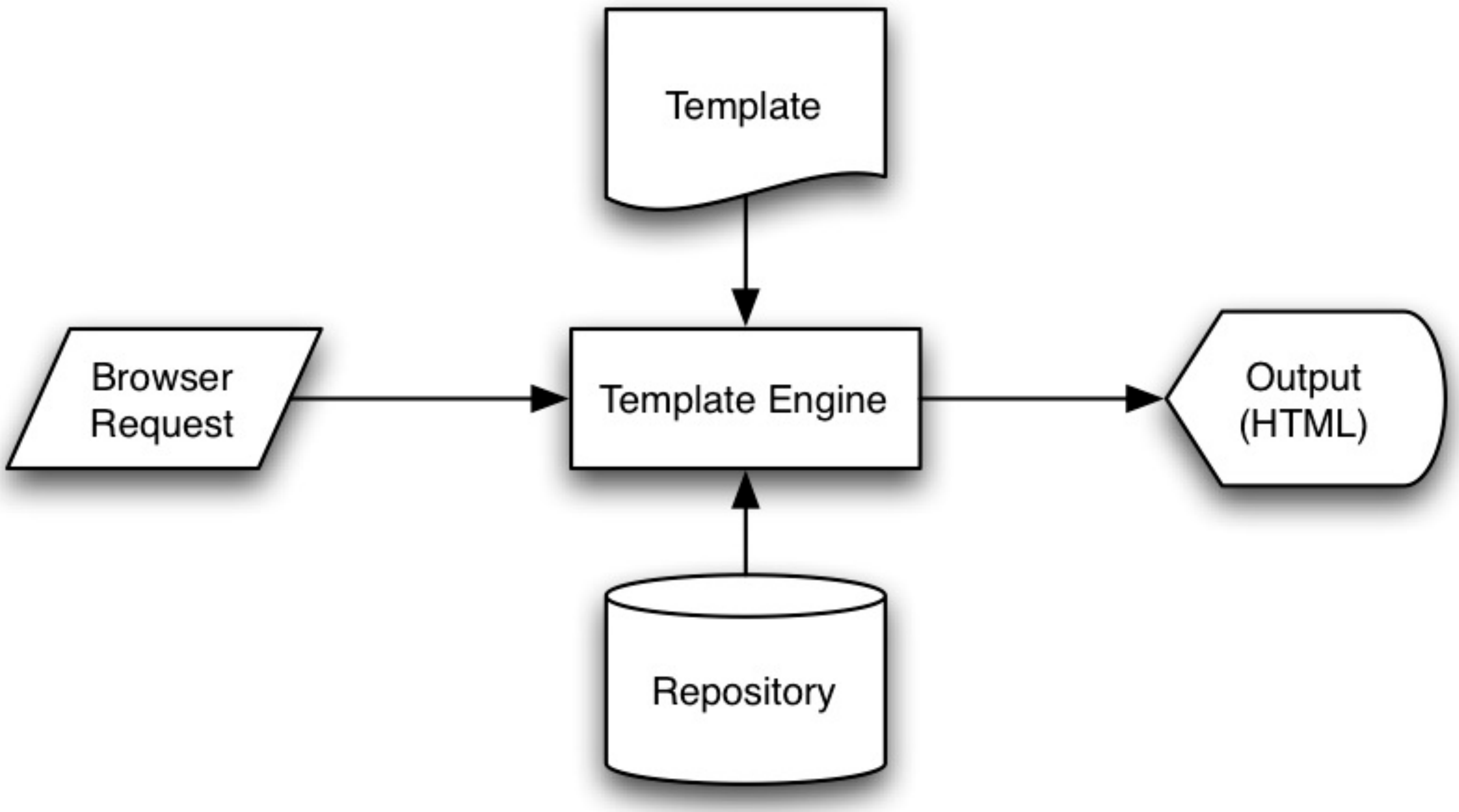


```
<footer id="footer">
  <hr>
  <p class="footer-social-links">
    <a href="http://www.facebook.com/witcomp"> facebook </a>
    <a href="http://twitter.com/ComputingAtWIT"> twitter </a>
    <a href="https://ie.linkedin.com/pub/computing-at-wit/a9/221/1b6">
     linkedin </a>
  </p>
</footer>
```

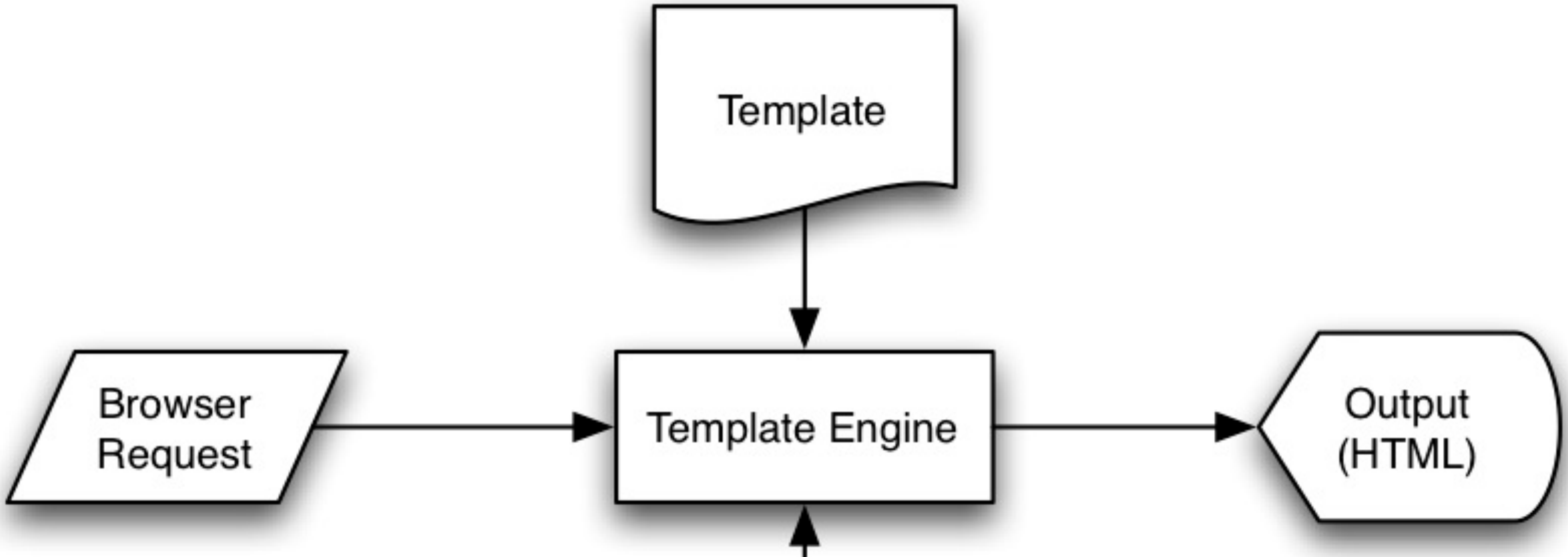
Web Template System

A web template system uses a template processor to combine web templates to form finished web pages, possibly using some data source to customize the pages or present a large amount of content on similar-looking pages. It is a web publishing tool present in content management systems, web application frameworks, and HTML editors.

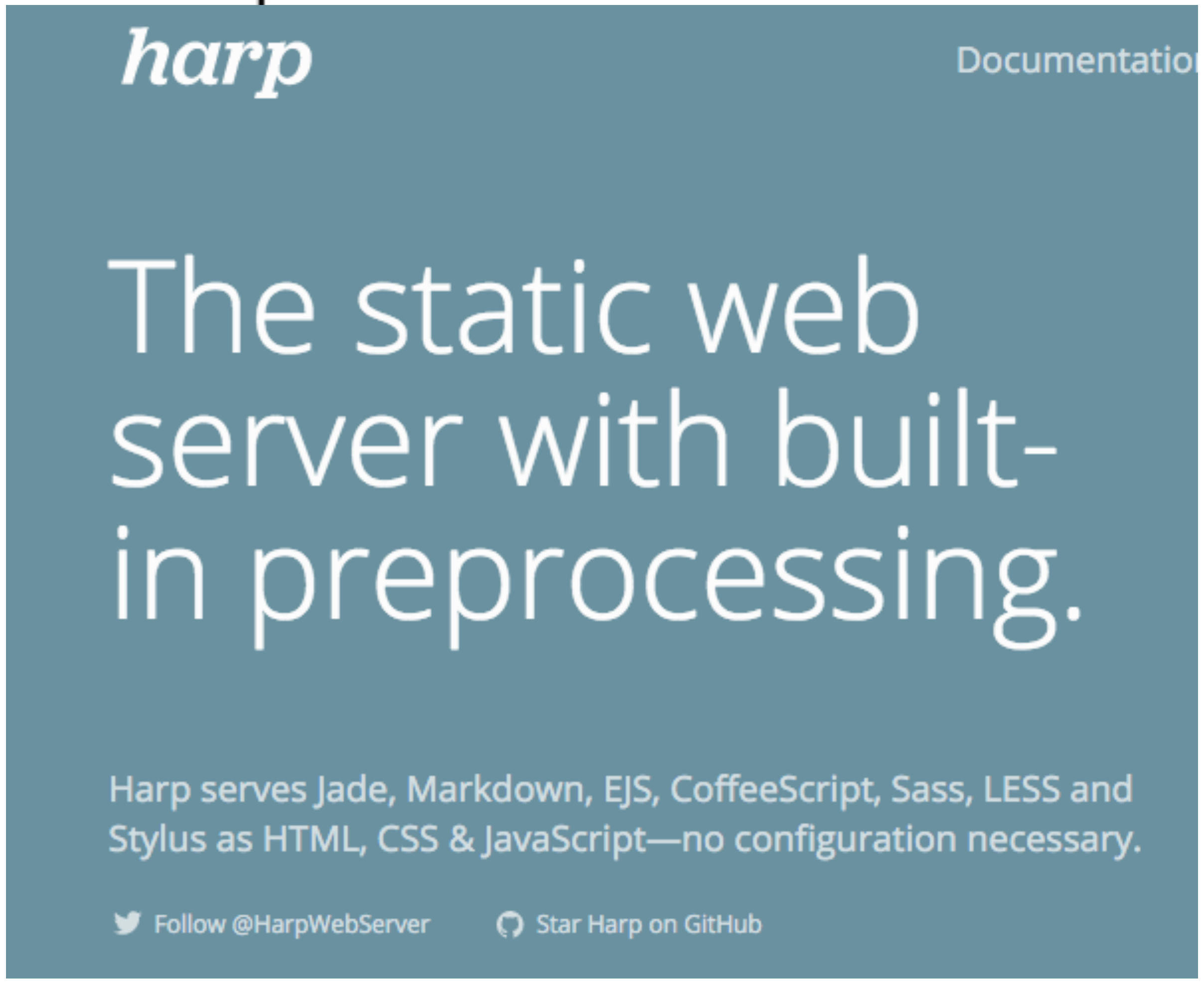
https://en.wikipedia.org/wiki/Web_template_system


Template
Browser Request
Template Engine
Output (HTML)
Repository

Harp.js



- Harp.js is our Template Engine
- It 'serves' the site
- If *Request* is for ordinary page the page is 'rendered' without modification
- If *Request* is for a page that is composed of templates, harp assembles the page and renders the complete page to the browser


harp

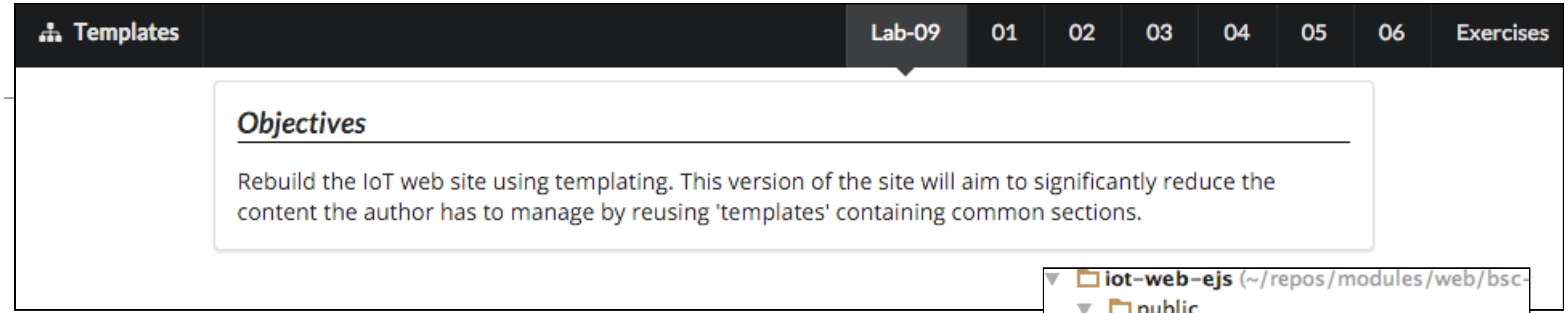
Documentatio

The static web server with built-in preprocessing.

Harp serves Jade, Markdown, EJS, CoffeeScript, Sass, LESS and Stylus as HTML, CSS & JavaScript—no configuration necessary.

Follow @HarpWebServer   Star Harp on GitHub

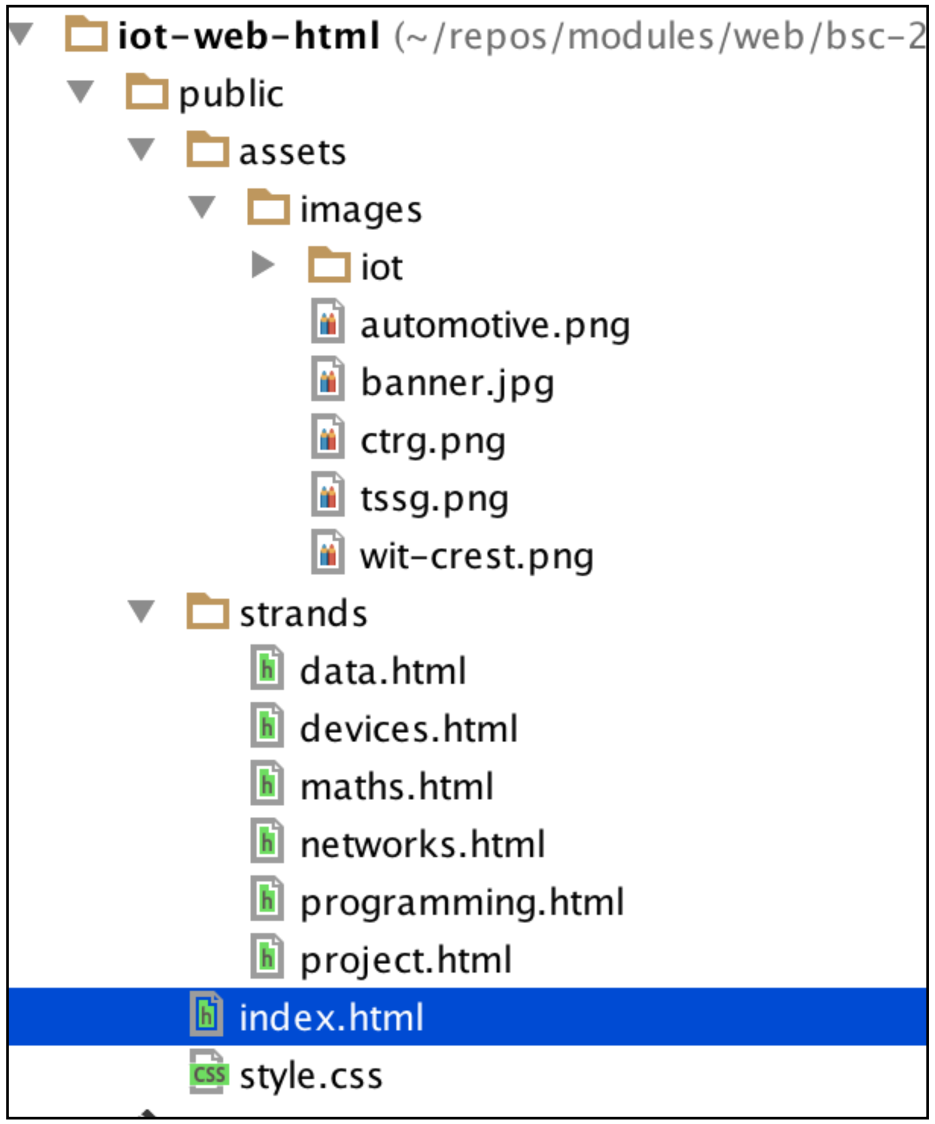
Lab09



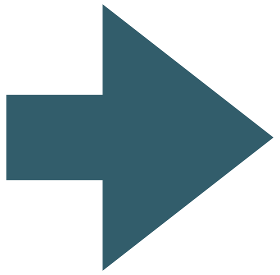
Templates | Lab-09 | 01 | 02 | 03 | 04 | 05 | 06 | Exercises

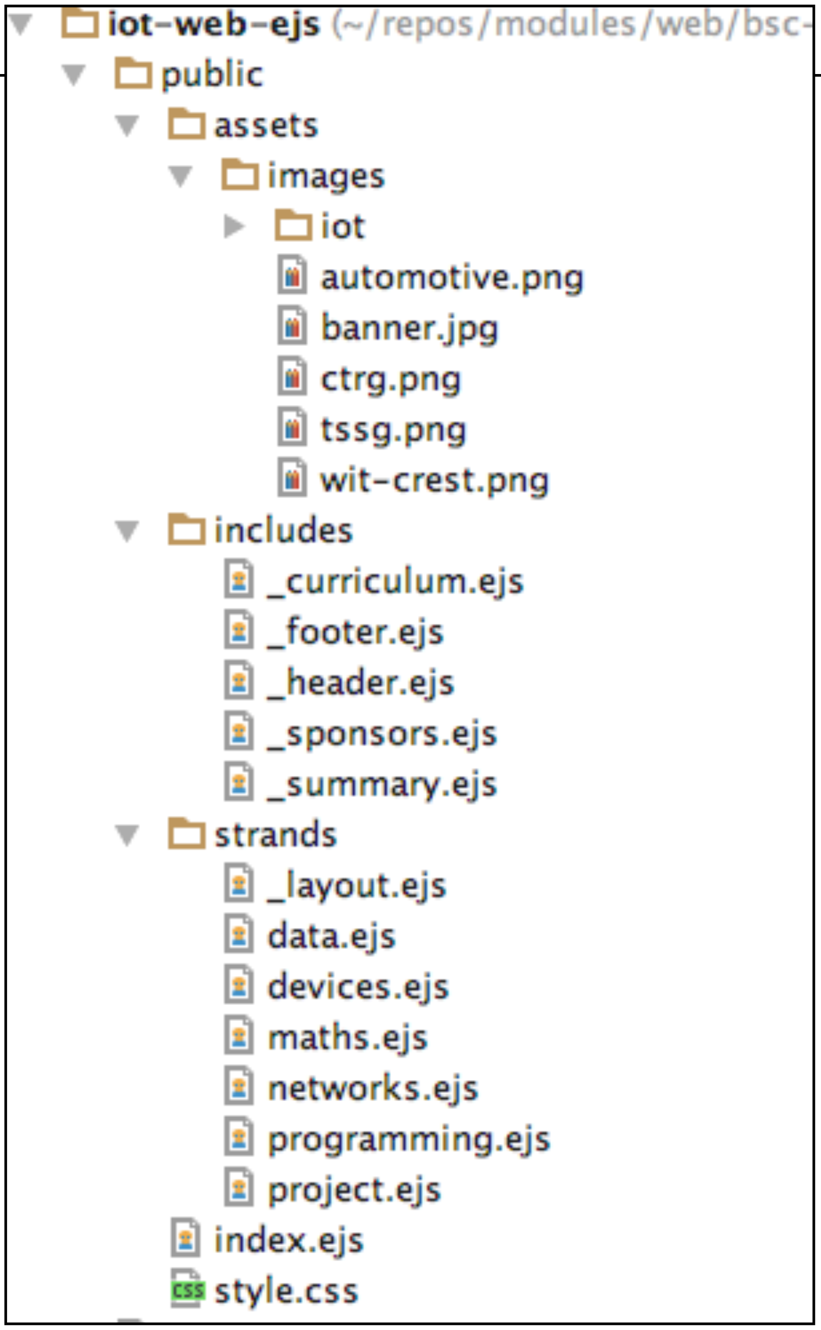
Objectives

Rebuild the IoT web site 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.



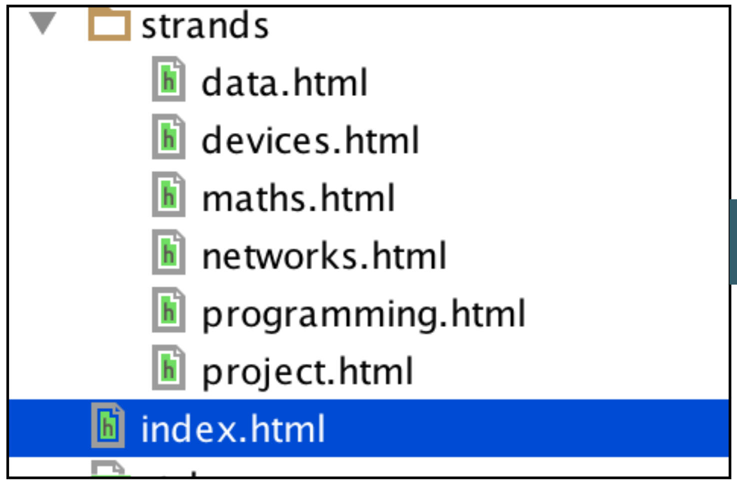
```
iot-web-html (~/repos/modules/web/bsc-2
  public
    assets
      images
        iot
        automotive.png
        banner.jpg
        ctrg.png
        tssg.png
        wit-crest.png
    strands
      data.html
      devices.html
      maths.html
      networks.html
      programming.html
      project.html
    index.html
    style.css
```





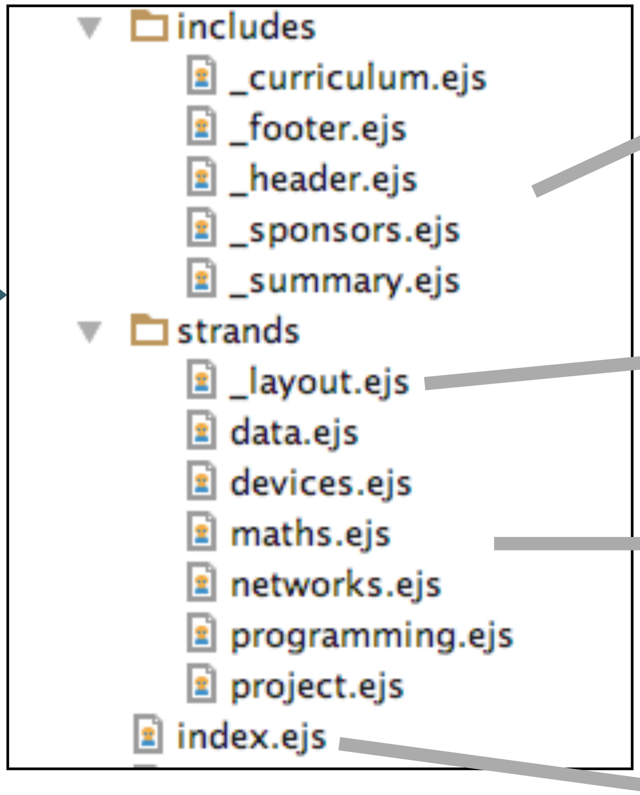
```
iot-web-ejs (~/repos/modules/web/bsc-
  public
    assets
      images
        iot
        automotive.png
        banner.jpg
        ctrg.png
        tssg.png
        wit-crest.png
    includes
      _curriculum.ejs
      _footer.ejs
      _header.ejs
      _sponsors.ejs
      _summary.ejs
    strands
      _layout.ejs
      data.ejs
      devices.ejs
      maths.ejs
      networks.ejs
      programming.ejs
      project.ejs
    index.ejs
    style.css
```

Lab09



```
▼ strands
    data.html
    devices.html
    maths.html
    networks.html
    programming.html
    project.html
  index.html
```

WET Version



```
▼ includes
    _curriculum.ejs
    _footer.ejs
    _header.ejs
    _sponsors.ejs
    _summary.ejs
▼ strands
    _layout.ejs
    data.ejs
    devices.ejs
    maths.ejs
    networks.ejs
    programming.ejs
    project.ejs
  index.ejs
```

DRY Version

- reusable templates included in various pages
- reusable layout
- reworked pages based on layout
- simplified home page

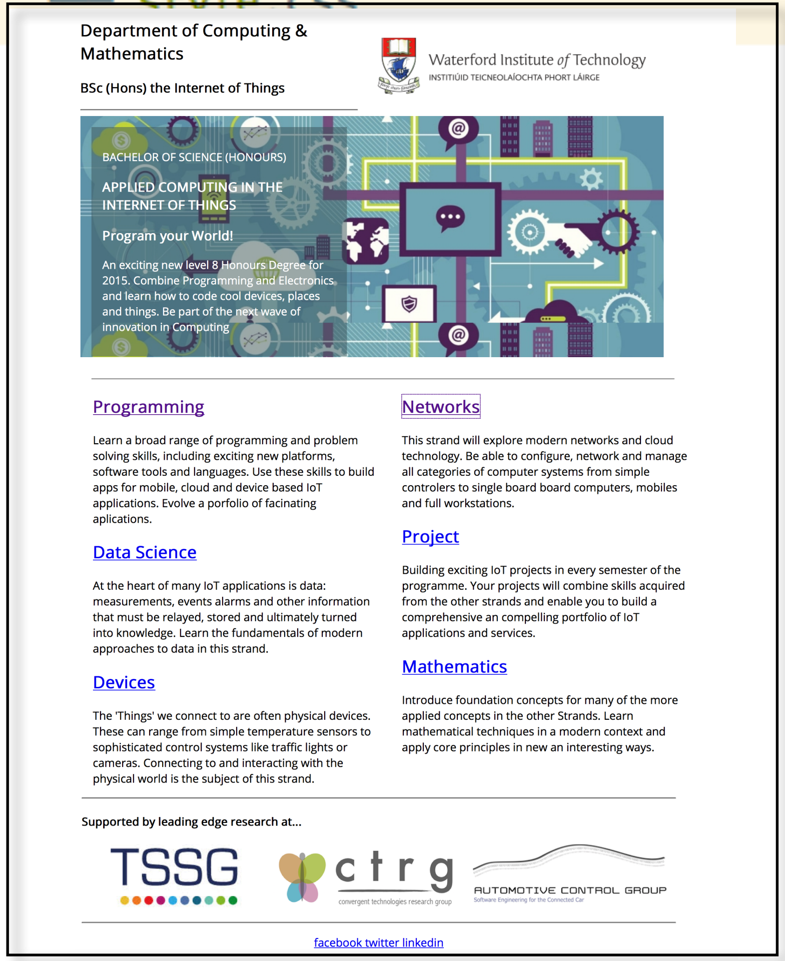
- Overall - more files
- But less content!

Step 1

```
C:\My Documents> G:
G:\> node\init
G:\> cd iot-web-ejs
G:\iot-web-ejs> harp server
Your server is listening at http://localhost:9000/
Press Ctl+C to stop the server
```

```
iot-web-ejs
├── harp.json
└── public
    ├── assets
    |   └── images
    |       ├── automotive.png
    |       ├── banner.jpg
    |       ├── ctrg.png
    |       | ....
    |       ├── tssg.png
    |       └── wit-crest.png
    ├── index.html
    ├── strands
    |   ├── data.html
    |   ├── devices.html
    |   ├── maths.html
    |   ├── networks.html
    |   ├── programming.html
    |   └── project.html
    └── style.css
```

- Visit:
  - http://localhost:9000/
- WET (non templated) version of site



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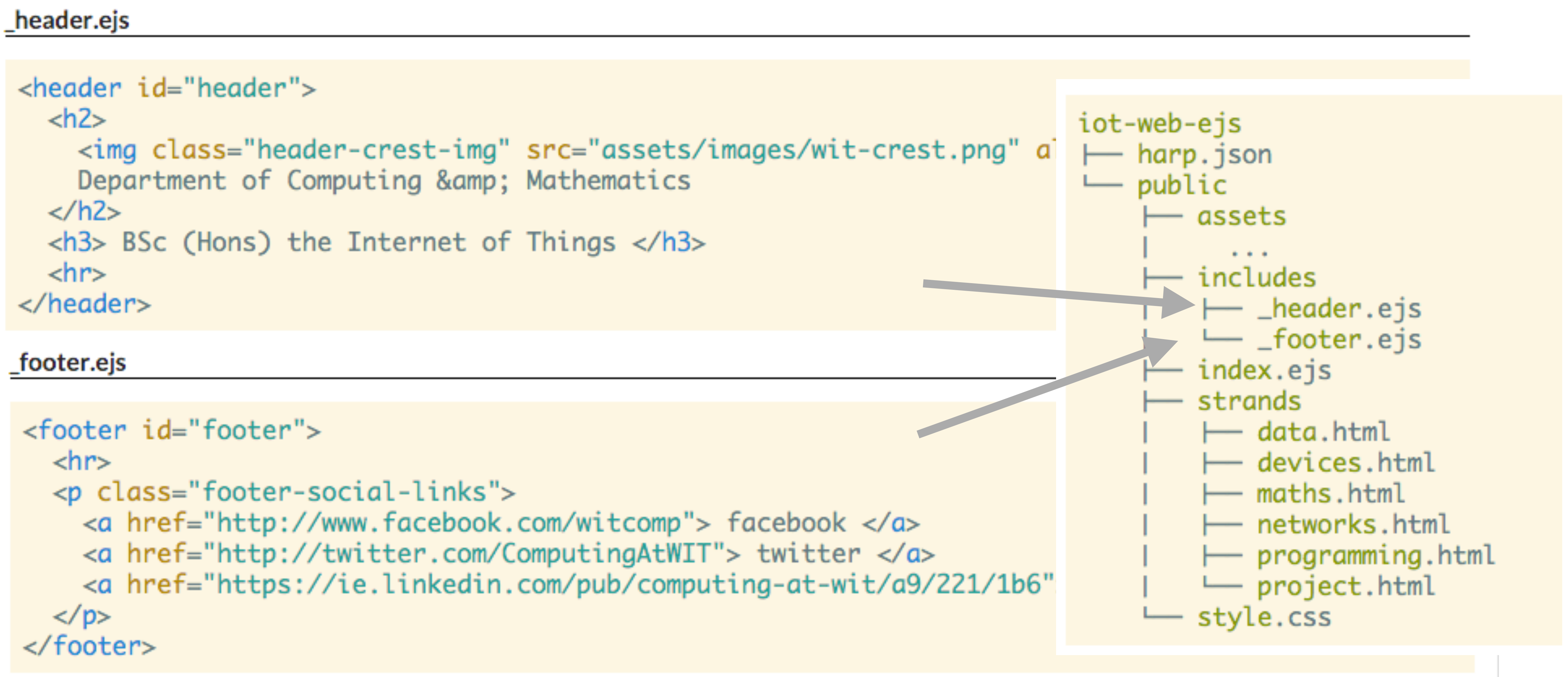
TSSG
ctrg convergent technologies research group
AUTOMOTIVE CONTROL GROUP Software Engineering for the Connected Car

facebook twitter linkedin

Step 02 - Header & Footer templates


_header.ejs

```
<header id="header">
  <h2>
    <img class="header-crest-img" src="assets/images/wit-crest.png" a
    Department of Computing &amp; Mathematics
  </h2>
  <h3> BSc (Hons) the Internet of Things </h3>
  <hr>
</header>
```

_footer.ejs

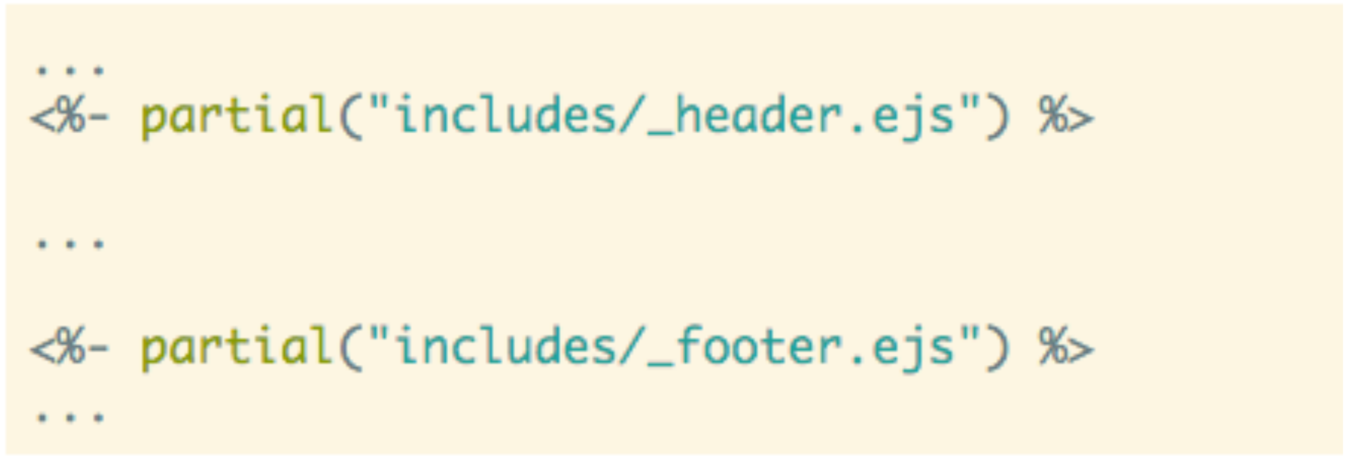
```
<footer id="footer">
  <hr>
  <p class="footer-social-links">
    <a href="http://www.facebook.com/witcomp"> facebook </a>
    <a href="http://twitter.com/ComputingAtWIT"> twitter </a>
    <a href="https://ie.linkedin.com/pub/computing-at-wit/a9/221/1b6"
  </p>
</footer>
```

```
iot-web-ejs
├── harp.json
└── public
    ├── assets
    |     ...
    ├── includes
    |   ├── _header.ejs
    |   └── _footer.ejs
    ├── index.ejs
    ├── strands
    |   ├── data.html
    |   ├── devices.html
    |   ├── maths.html
    |   ├── networks.html
    |   ├── programming.html
    |   └── project.html
    └── style.css
```

- New folder in project called ‘includes’
- … containing reusable templates ‘_header.ejs’ & ‘_footer.ejs’
- These are exactly the same content as in all our other pages

Step 02: index.html

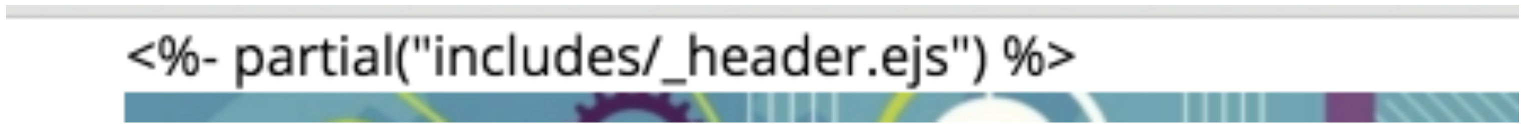
- Replace the <header> and <footer> elements with :



```
...
<%- partial("includes/_header.ejs") %>

...

<%- partial("includes/_footer.ejs") %>
...
```

- These will be 'included' in the page when it is rendered via harp.

- However, if the page loaded directly from disk page will not be rendered correctly:



<%- partial("includes/_header.ejs") %>

Step 03: Resource Paths

_header.ejs

```
<header id="header">
  <h2>
    <img class="header-crest-img" src="assets/images/wit-crest.png" alt="WIT Crest">
    Department of Computing &amp; Mathematics
  </h2>
  <h3> BSc (Hons) the Internet of Things </h3>
  <hr>
</header>
```

- The ‘src’ link in the image is relative - it assumes the ‘assets’ path is in the current folder

- This may not always be the case

- Change this to an ‘absolute’ path:

```
  <img class="header-crest-img" src="/assets/images/wit-crest.png" alt="WIT Crest">
```

- This will enable the template to be included in any file, regardless of where the file is in the site structure

Step 03: Relative vs Absolute

_header.ejs

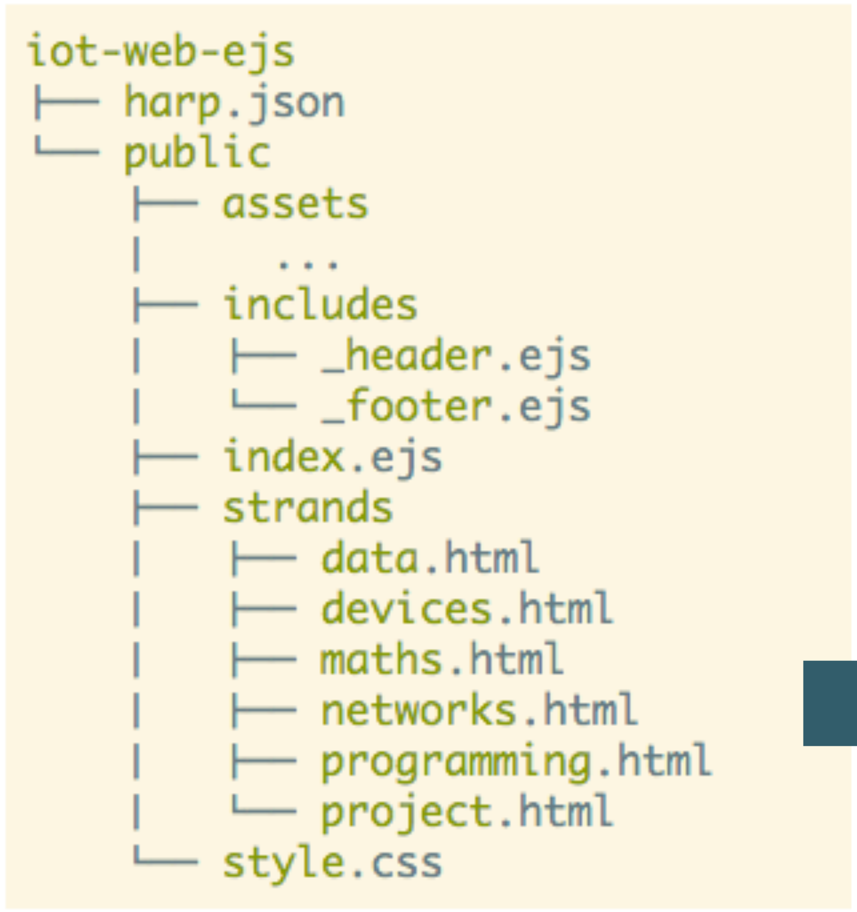
```
<header id="header">
  <h2>
    <img class="header-crest-img" src="assets/images/wit-crest.png" alt="WIT Crest">
    Department of Computing &amp; Mathematics
  </h2>
  <h3> BSc (Hons) the Internet of Things </h3>
  <hr>
</header>
```

- Harp server will make sure correct image server on:
  - http://localhost:9000/

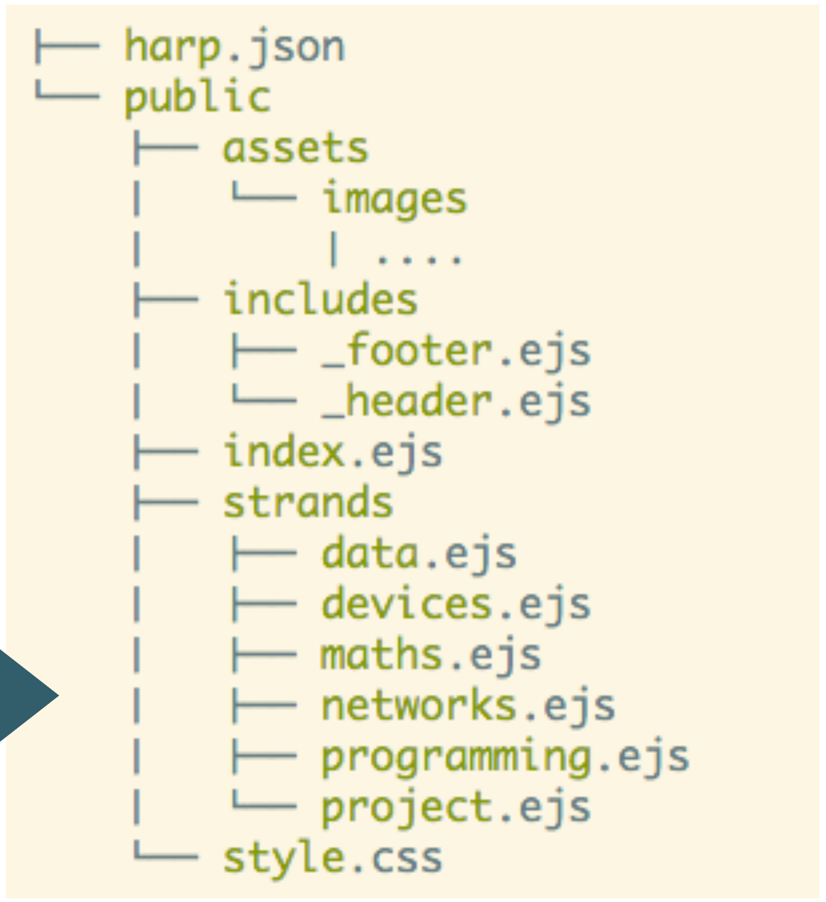
```
C:\My Documents> G:
G:\> node\init
G:\> cd iot-web-ejs
G:\iot-web-ejs> harp server
Your server is listening at http://localhost:9000/
Press Ctl+C to stop the server
```

```
    <img class="header-crest-img" src="/assets/images/wit-crest.png" alt="WIT Crest">
```

Step 04: Rename Files



```
iot-web-ejs
├── harp.json
└── public
    ├── assets
    |      ...
    ├── includes
    |   ├── _header.ejs
    |   └── _footer.ejs
    ├── index.ejs
    ├── strands
    |   ├── data.html
    |   ├── devices.html
    |   ├── maths.html
    |   ├── networks.html
    |   ├── programming.html
    |   └── project.html
    └── style.css
```



```
├── harp.json
└── public
    ├── assets
    |   └── images
    |       | ....
    ├── includes
    |   ├── _footer.ejs
    |   └── _header.ejs
    ├── index.ejs
    ├── strands
    |   ├── data.ejs
    |   ├── devices.ejs
    |   ├── maths.ejs
    |   ├── networks.ejs
    |   ├── programming.ejs
    |   └── project.ejs
    └── style.css
```

- Rename all ".html" files to ".ejs"
- This instructs harp to process these files, incorporating template features as necessary

Step 04:

- Delete <header> & <footer> form all pages

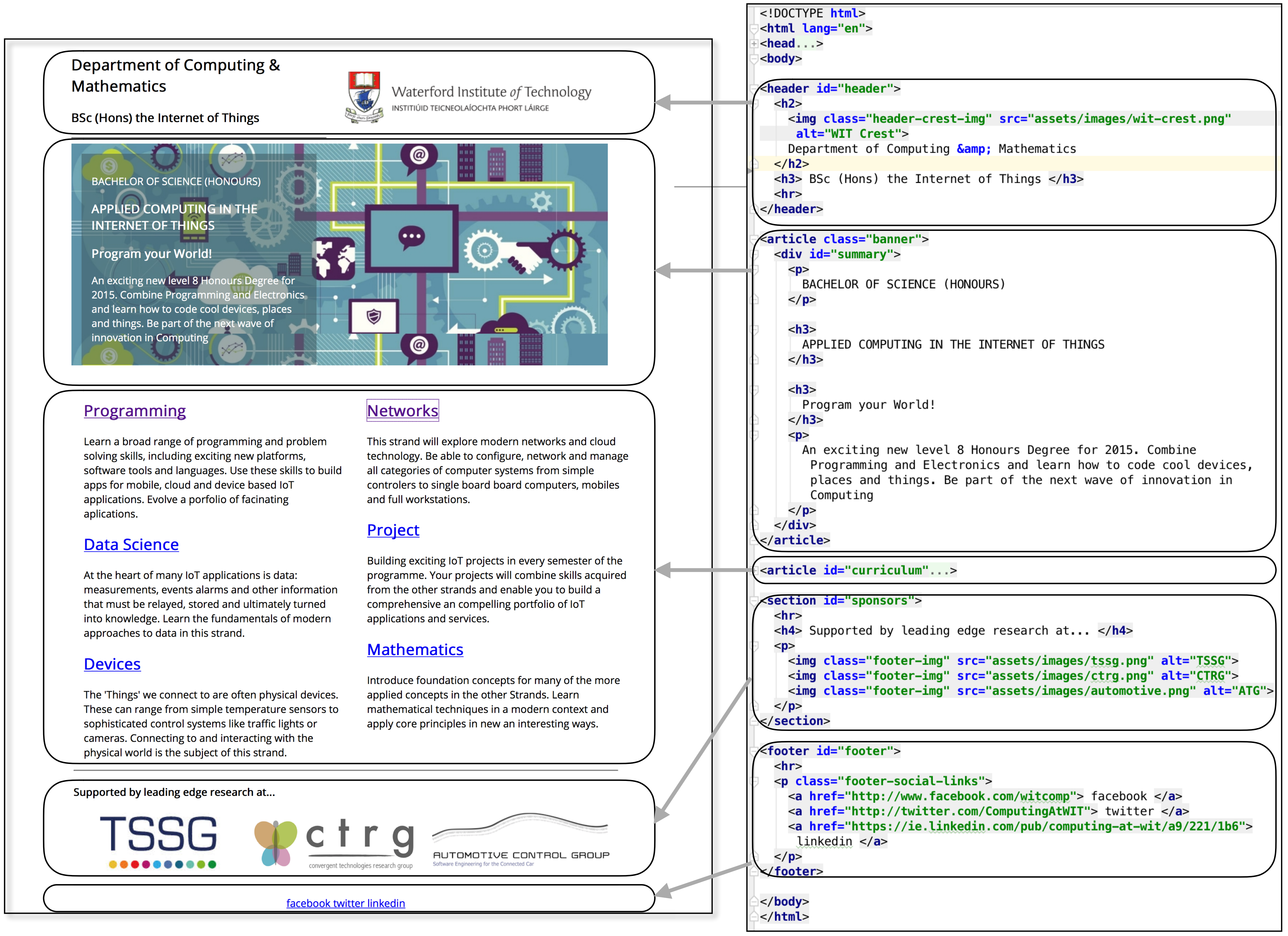
- Replace with

```
<%- partial("../includes/_header.ejs") %>
```

```
<%- partial("../includes/_footer.ejs") %>
```

- DRY first steps…

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <link rel="stylesheet" type="text/css" href="http://fonts.googleapis.com
  <link type="text/css" rel="stylesheet" href="../style.css" media="screen
  <title> Devices </title>
</head>
<body>

<%- partial("../includes/_header.ejs") %>

<article>
  <h1> Devices </h1>
  <p>
    <img class="strand-right-img" src="../assets/images/iot/devices/device
    The IoT professional must be comfortable when dealing with the many ki
  </p>
</article>

<figure>
  <img class="strand-timeline-img" src="../assets/images/iot/timeline.png"
  <img class="strand-modules-treble-img" src="../assets/images/iot/devices
</figure>

<article>
  <h2> Devices Learning Path </h2>
  <p>
    <img class="strand-left-img" src="../assets/images/iot/devices/devices
    As a student on this programme, you will start to build this competenc
  </p>
</article>

<%- partial("../includes/_footer.ejs") %>

</body>
</html>
```



Department of Computing & Mathematics

Waterford Institute *of* Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

BSc (Hons) the Internet of Things

BACHELOR OF SCIENCE (HONOURS)

APPLIED COMPUTING IN THE INTERNET OF THINGS

Program your World!

An exciting new level 8 Honours Degree for 2015. Combine Programming and Electronics and learn how to code cool devices, places and things. Be part of the next wave of innovation in Computing

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 porfolio of facinating aplications.

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.

Networks

This strand will explore modern networks and cloud technology. Be able to configure, network and manage all categories of computer systems from simple controlers to single board board computers, mobiles 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 an compelling portfolio of IoT applications and services.

Mathematics

Introduce foundation concepts for many of the more applied concepts in the other Strands. Learn mathematical techniques in a modern context and apply core principles in new an interesting ways.

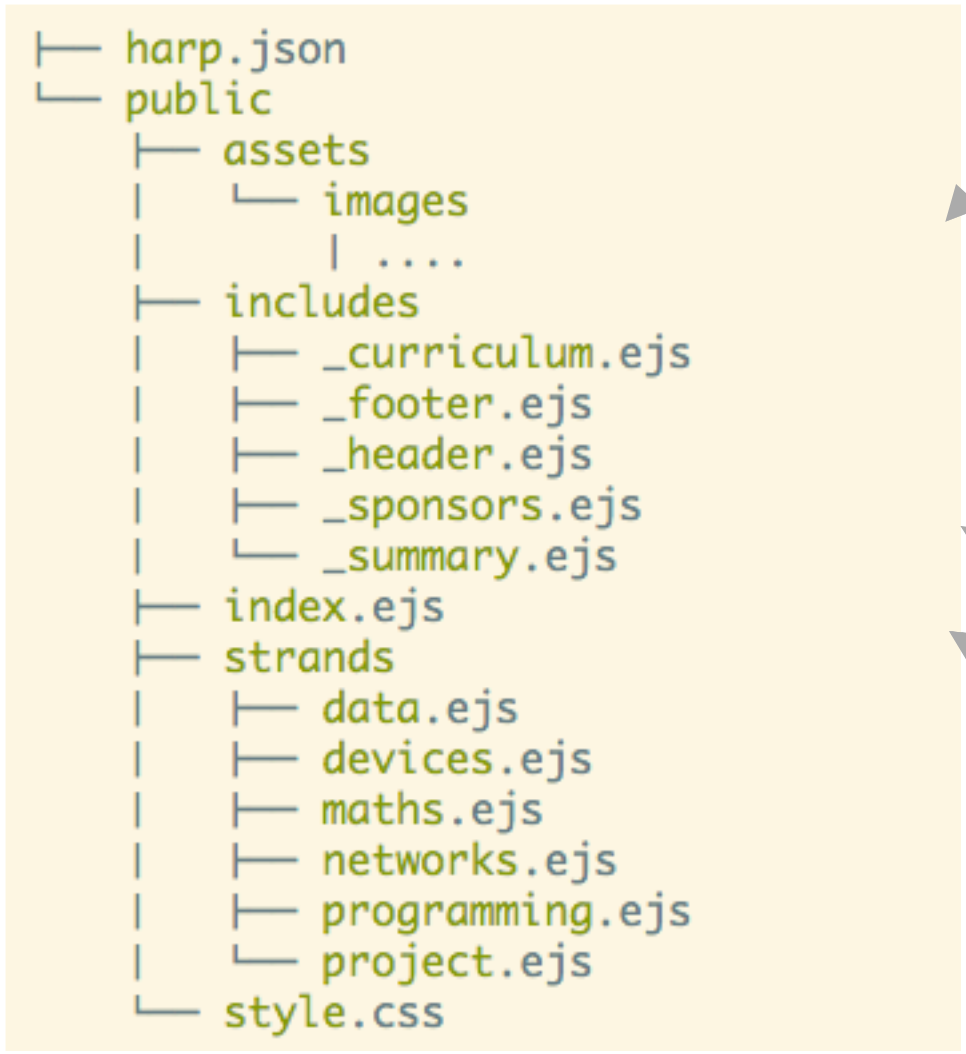
Supported by leading edge research at...

TSSG
ctrg
convergent technologies research group
AUTOMOTIVE CONTROL GROUP
Software Engineering for the Connected Car

facebook twitter linkedin

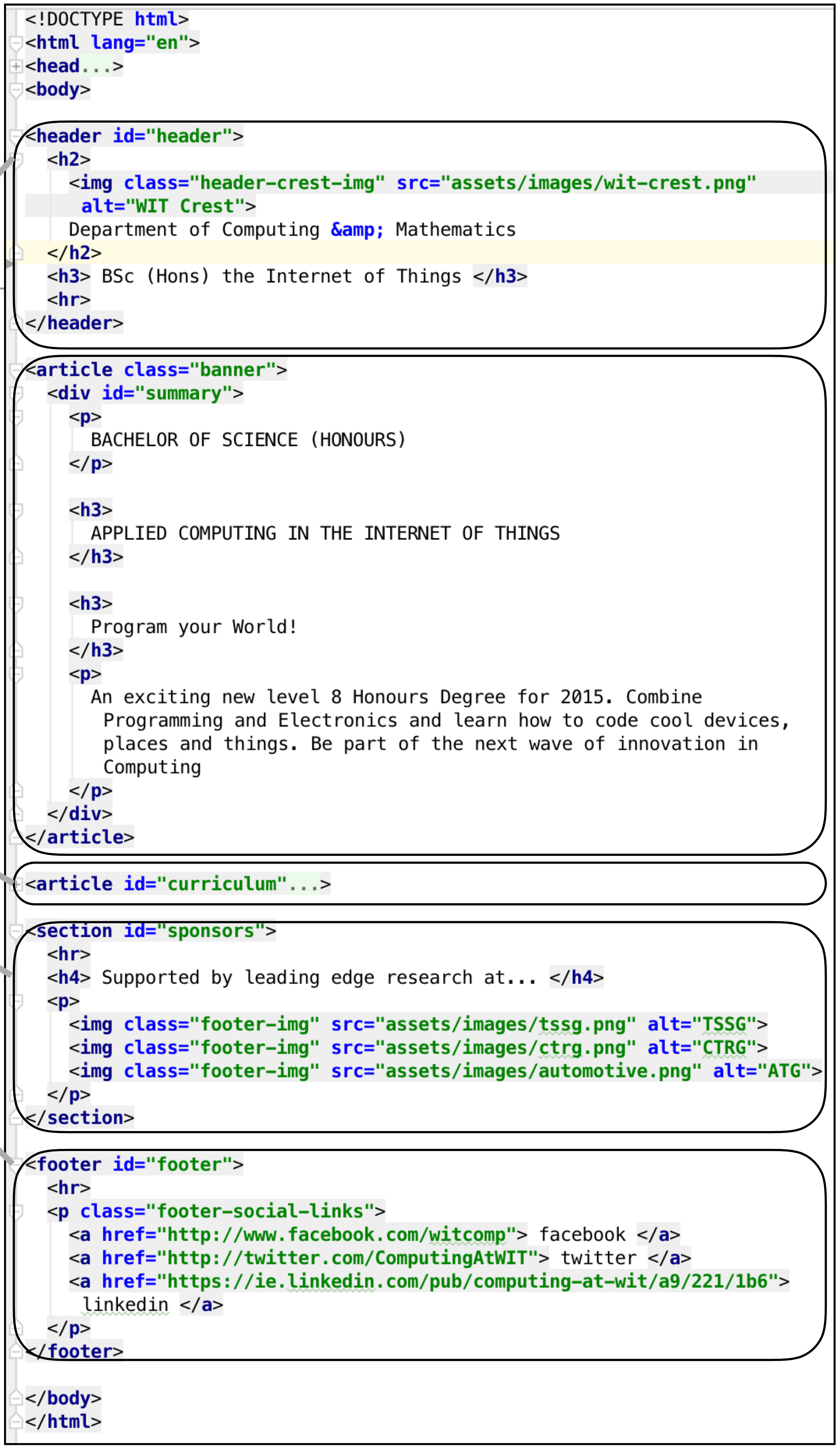
```
<!DOCTYPE html>
<html lang="en">
<head...>
<body>

<header id="header">
  <h2>
    <img class="header-crest-img" src="assets/images/wit-crest.png"
     alt="WIT Crest">
    Department of Computing &amp; Mathematics
  </h2>
  <h3> BSc (Hons) the Internet of Things </h3>
  <hr>
</header>

<article class="banner">
  <div id="summary">
    <p>
      BACHELOR OF SCIENCE (HONOURS)
    </p>

    <h3>
      APPLIED COMPUTING IN THE INTERNET OF THINGS
    </h3>

    <h3>
      Program your World!
    </h3>
    <p>
      An exciting new level 8 Honours Degree for 2015. Combine
       Programming and Electronics and learn how to code cool devices,
       places and things. Be part of the next wave of innovation in
       Computing
    </p>
  </div>
</article>

<article id="curriculum"...>

<section id="sponsors">
  <hr>
  <h4> Supported by leading edge research at... </h4>
  <p>
    <img class="footer-img" src="assets/images/tssg.png" alt="TSSG">
    <img class="footer-img" src="assets/images/ctrg.png" alt="CTRG">
    <img class="footer-img" src="assets/images/automotive.png" alt="ATG">
  </p>
</section>

<footer id="footer">
  <hr>
  <p class="footer-social-links">
    <a href="http://www.facebook.com/witcomp"> facebook </a>
    <a href="http://twitter.com/ComputingAtWIT"> twitter </a>
    <a href="https://ie.linkedin.com/pub/computing-at-wit/a9/221/1b6">
     linkedin </a>
  </p>
</footer>

</body>
</html>
```

Step 05:



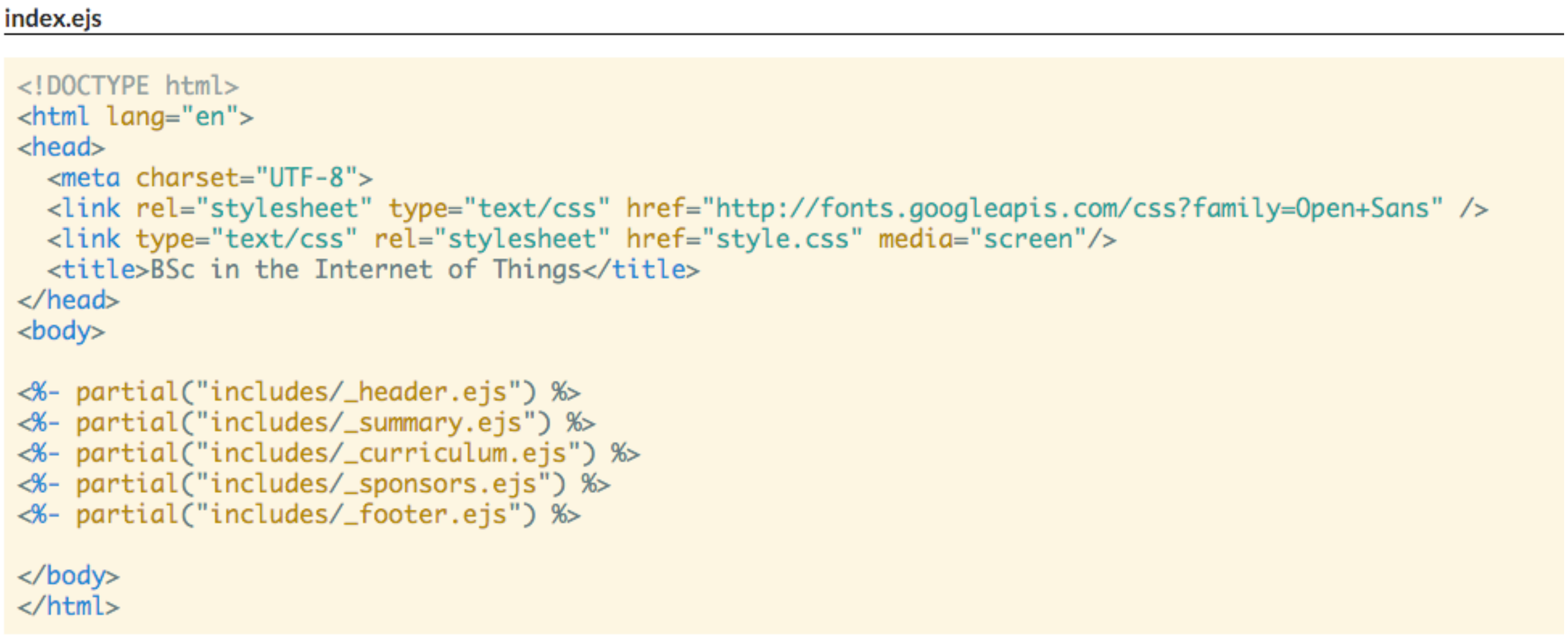
```
├── harp.json
└── public
    ├── assets
    |   └── images
    |       | ....
    ├── includes
    |   ├── _curriculum.ejs
    |   ├── _footer.ejs
    |   ├── _header.ejs
    |   ├── _sponsors.ejs
    |   └── _summary.ejs
    ├── index.ejs
    ├── strands
    |   ├── data.ejs
    |   ├── devices.ejs
    |   ├── maths.ejs
    |   ├── networks.ejs
    |   ├── programming.ejs
    |   └── project.ejs
    └── style.css
```

- ‘Factor out’ sections of the index.html pages into includes…



```html
<!DOCTYPE html>
<html lang="en">
<head...>
<body>

<header id="header">
  <h2>
    <img class="header-crest-img" src="assets/images/wit-crest.png"
     alt="WIT Crest">
    Department of Computing &amp; Mathematics
  </h2>
  <h3> BSc (Hons) the Internet of Things </h3>
  <hr>
</header>

<article class="banner">
  <div id="summary">
    <p>
      BACHELOR OF SCIENCE (HONOURS)
    </p>

    <h3>
      APPLIED COMPUTING IN THE INTERNET OF THINGS
    </h3>

    <h3>
      Program your World!
    </h3>
    <p>
      An exciting new level 8 Honours Degree for 2015. Combine
       Programming and Electronics and learn how to code cool devices,
       places and things. Be part of the next wave of innovation in
       Computing
    </p>
  </div>
</article>

<article id="curriculum"...>

<section id="sponsors">
  <hr>
  <h4> Supported by leading edge research at... </h4>
  <p>
    <img class="footer-img" src="assets/images/tssg.png" alt="TSSG">
    <img class="footer-img" src="assets/images/ctrg.png" alt="CTRG">
    <img class="footer-img" src="assets/images/automotive.png" alt="ATG">
  </p>
</section>

<footer id="footer">
  <hr>
  <p class="footer-social-links">
    <a href="http://www.facebook.com/witcomp"> facebook </a>
    <a href="http://twitter.com/ComputingAtWIT"> twitter </a>
    <a href="https://ie.linkedin.com/pub/computing-at-wit/a9/221/1b6">
     linkedin </a>
  </p>
</footer>

</body>
</html>
```

Step 05: index.html

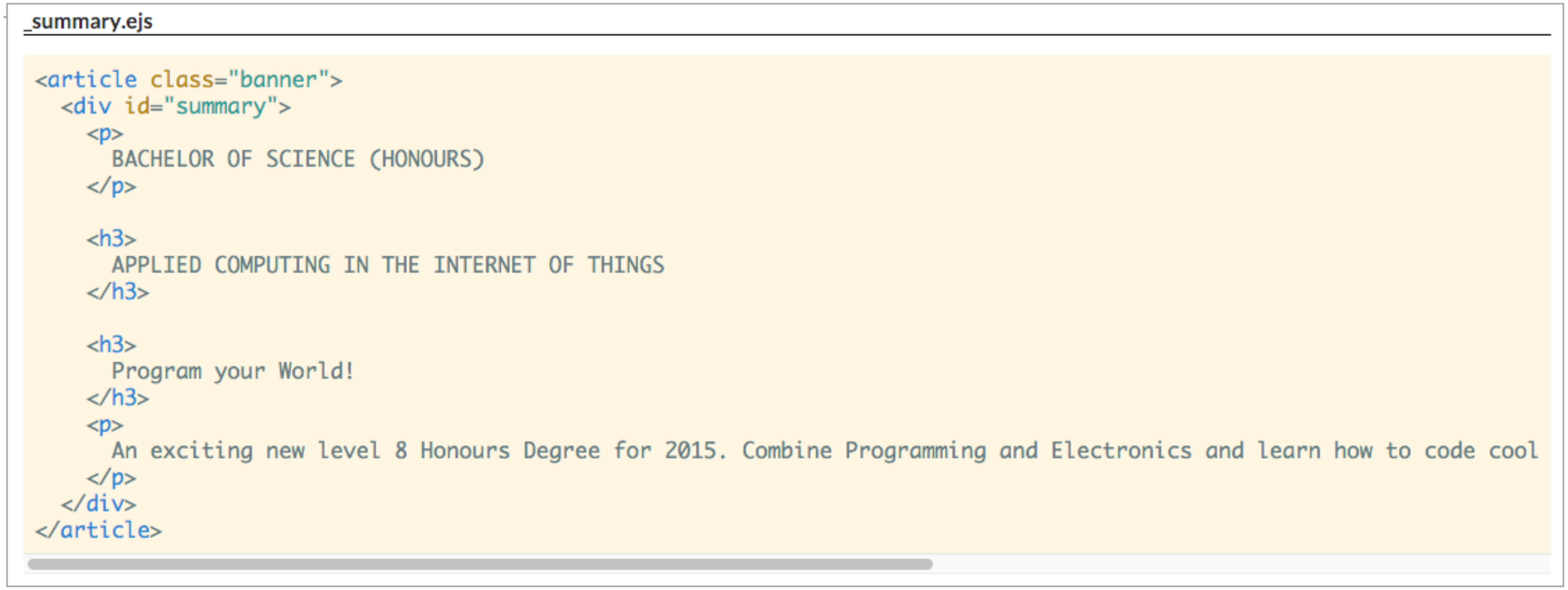


index.ejs

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <link rel="stylesheet" type="text/css" href="http://fonts.googleapis.com/css?family=Open+Sans" />
  <link type="text/css" rel="stylesheet" href="style.css" media="screen"/>
  <title>BSc in the Internet of Things</title>
</head>
<body>

<%- partial("includes/_header.ejs") %>
<%- partial("includes/_summary.ejs") %>
<%- partial("includes/_curriculum.ejs") %>
<%- partial("includes/_sponsors.ejs") %>
<%- partial("includes/_footer.ejs") %>

</body>
</html>
```

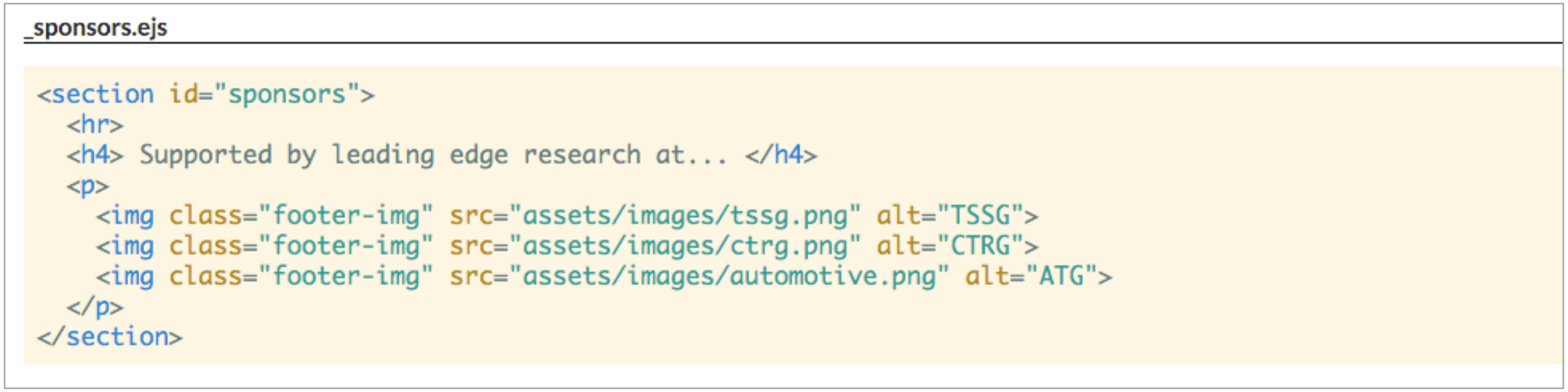
- Simplified significantly
- All of the design implemented in the includes

Step 05: summary & sponsors



_summary.ejs

```
<article class="banner">
  <div id="summary">
    <p>
      BACHELOR OF SCIENCE (HONOURS)
    </p>

    <h3>
      APPLIED COMPUTING IN THE INTERNET OF THINGS
    </h3>

    <h3>
      Program your World!
    </h3>
    <p>
      An exciting new level 8 Honours Degree for 2015. Combine Programming and Electronics and learn how to code cool
    </p>
  </div>
</article>
```



_sponsors.ejs

```
<section id="sponsors">
  <hr>
  <h4> Supported by leading edge research at... </h4>
  <p>
    <img class="footer-img" src="assets/images/tssg.png" alt="TSSG">
    <img class="footer-img" src="assets/images/ctrg.png" alt="CTRG">
    <img class="footer-img" src="assets/images/automotive.png" alt="ATG">
  </p>
</section>
```

Step 05: curriculum

_curriculum.ejs

```
<article id="curriculum">
  <hr>
  <section id="col1">
    <h2><a href="strands/programming.html"> Programming </a></h2>
    <p>
      Learn a broad range of programming and problem solving skills, including exciting new platforms, software tools
    </p>

    <h2><a href="strands/data.html"> Data Science </a></h2>
    <p>
      At the heart of many IoT applications is data: measurements, events alarms and other information that must be re
    </p>
    <h2><a href="strands/devices.html"> Devices </a></h2>
    <p>
      The 'Things' we connect to are often physical devices. These can range from simple temperature sensors to sophis
    </p>
  </section>
  <section id="col2">
    <h2><a href="strands/networks.html"> Networks </a></h2>
    <p>
      This strand will explore modern networks and cloud technology. Be able to configure, network and manage all cate
    </p>
    <h2><a href="strands/project.html"> Project </a></h2>
    <p>
      Building exciting IoT projects in every semester of the programme. Your projects will combine skills acquired fr
    </p>

    <h2><a href="strands/maths.html"> Mathematics </a></h2>
    <p>
      Introduce foundation concepts for many of the more applied concepts in the other Strands. Learn mathematical tec
    </p>
  </section>
</article>
```

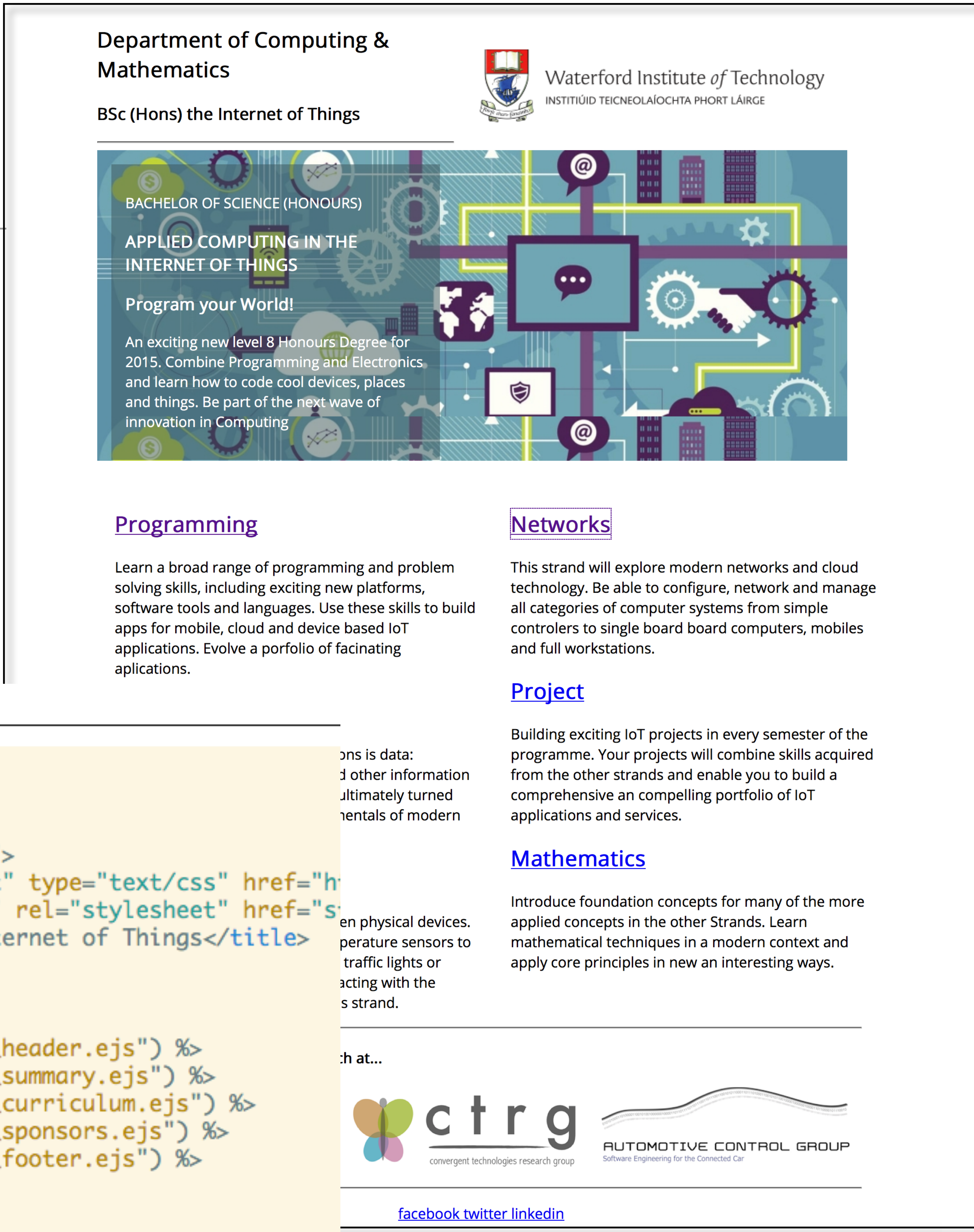
Step

```
├── harp.json
└── public
    ├── assets
    |   └── images
    |       | ....
    ├── includes
    |   ├── _curriculum.ejs
    |   ├── _footer.ejs
    |   ├── _header.ejs
    |   ├── _sponsors.ejs
    |   └── _summary.ejs
    ├── index.ejs
    ├── strands
    |   ├── data.ejs
    |   ├── devices.ejs
    |   ├── maths.ejs
    |   ├── networks.ej
    |   ├── programming
    |   └── project.ejs
    └── style.css
```

- harp will now compose the page from 5 templates

index.ejs

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <link rel="stylesheet" type="text/css" href="h
  <link type="text/css" rel="stylesheet" href="s
  <title>BSc in the Internet of Things</title>
</head>
<body>

<%- partial("includes/_header.ejs") %>
<%- partial("includes/_summary.ejs") %>
<%- partial("includes/_curriculum.ejs") %>
<%- partial("includes/_sponsors.ejs") %>
<%- partial("includes/_footer.ejs") %>

</body>
</html>
```



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ons is data:
d other information
ultimately turned
nentals of modern

en physical devices.
perature sensors to
traffic lights or
acting with the
s strand.

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

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Introduce foundation concepts for many of the more applied concepts in the other Strands. Learn mathematical techniques in a modern context and apply core principles in new an interesting ways.

ch at...

ctrg
convergent technologies research group

AUTOMOTIVE CONTROL GROUP
Software Engineering for the Connected Car

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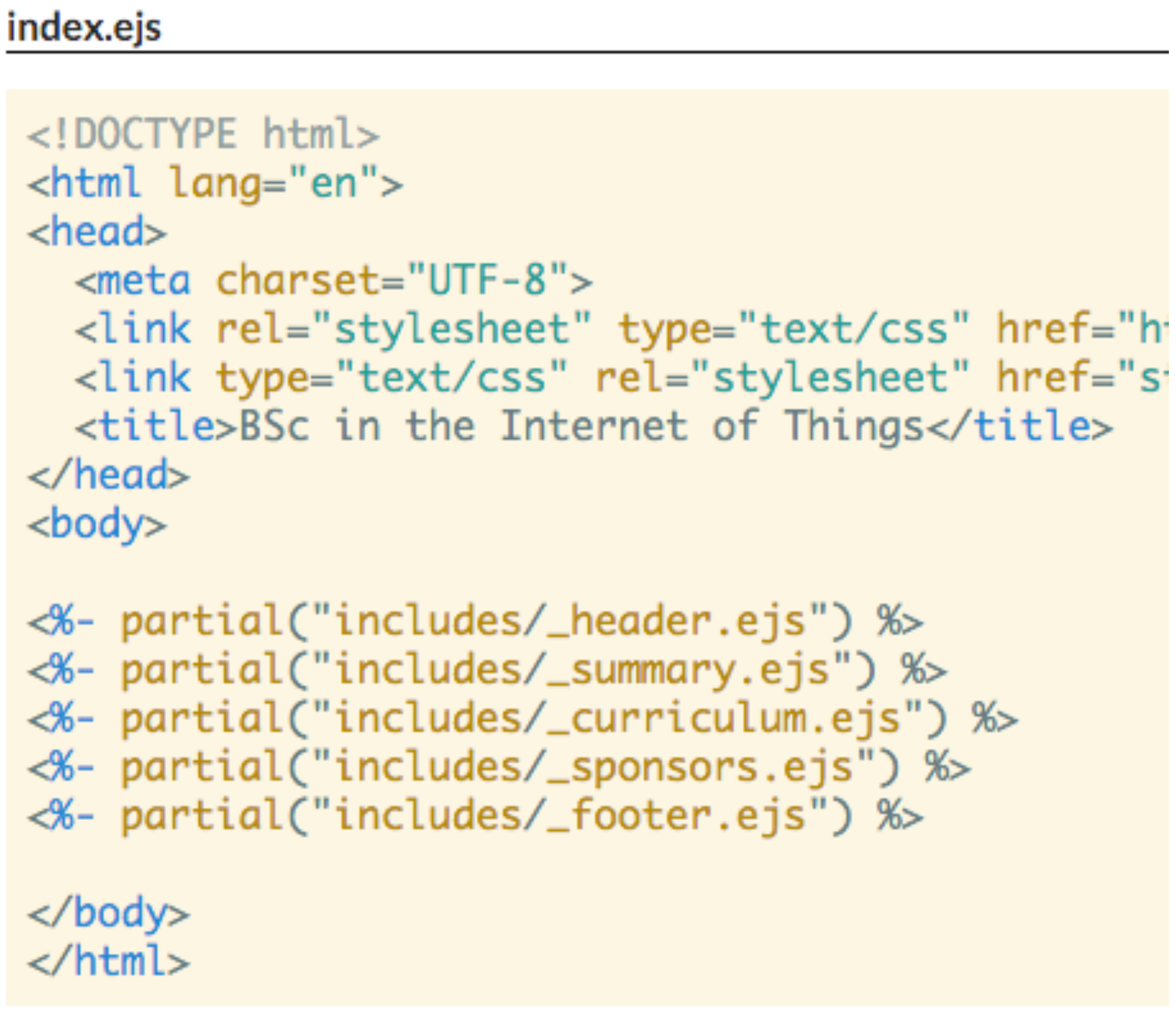
Step 06: Partials

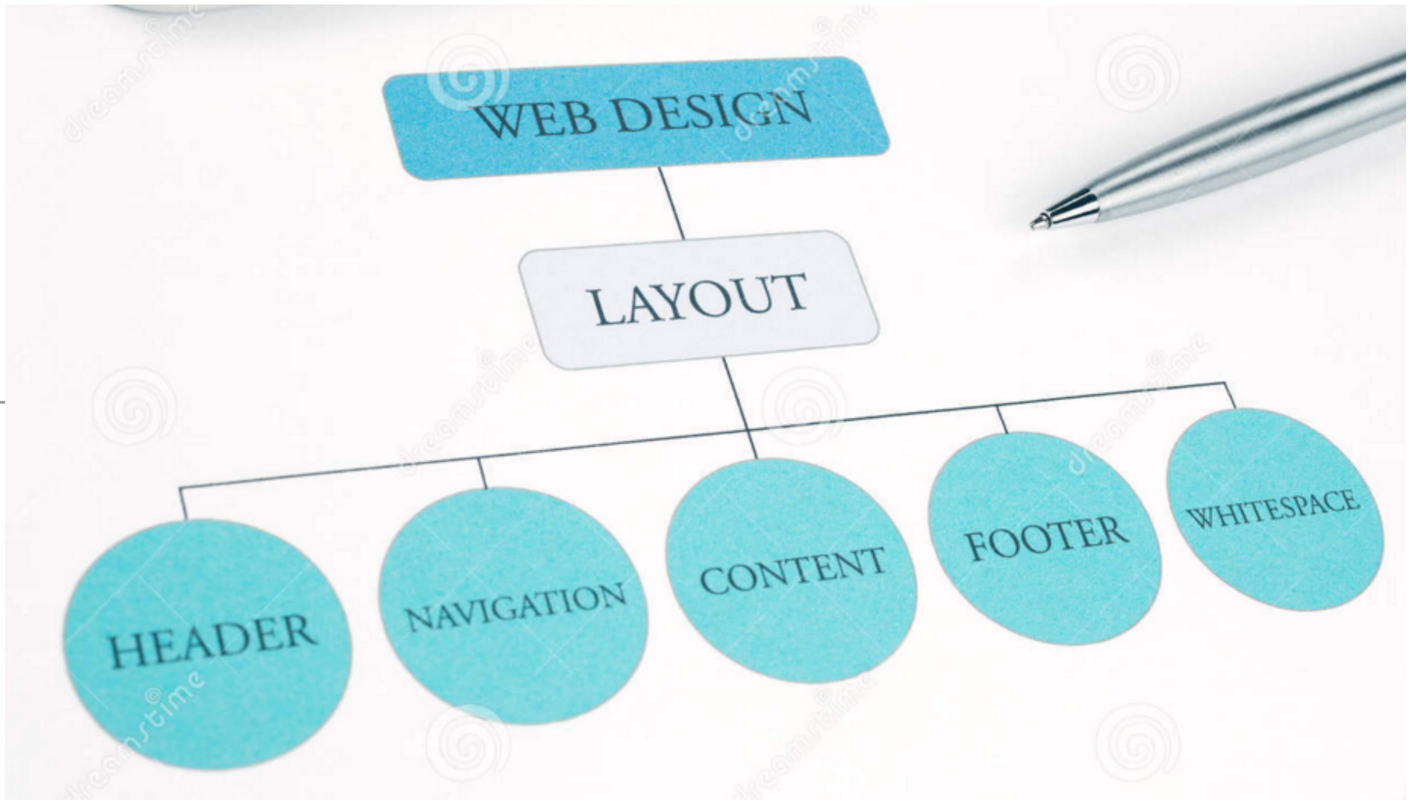
- Many Pages can share the same general structure.
- Using partial can help in making the site DRY
- We can include different sections to the same general structure
- Each section is called a *Partial*



index.ejs

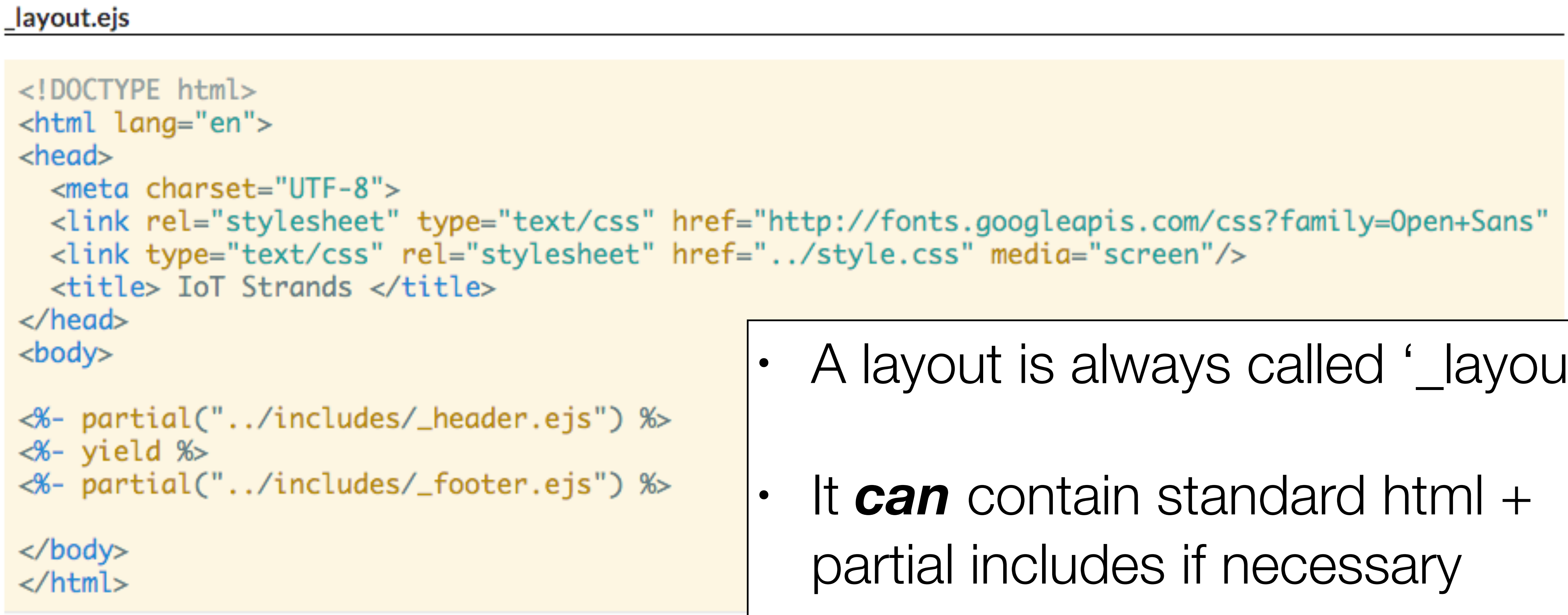
```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <link rel="stylesheet" type="text/css" href="h
  <link type="text/css" rel="stylesheet" href="s
  <title>BSc in the Internet of Things</title>
</head>
<body>

<%- partial("includes/_header.ejs") %>
<%- partial("includes/_summary.ejs") %>
<%- partial("includes/_curriculum.ejs") %>
<%- partial("includes/_sponsors.ejs") %>
<%- partial("includes/_footer.ejs") %>

</body>
</html>
```

Step 06: Layouts



- Layouts are another powerful mechanisms for adopting a DRY approach
- With Layouts, we can define the structure of the overall page…
- … and each page that uses the layout substituting into a specific part of the page

Step 06: Layouts

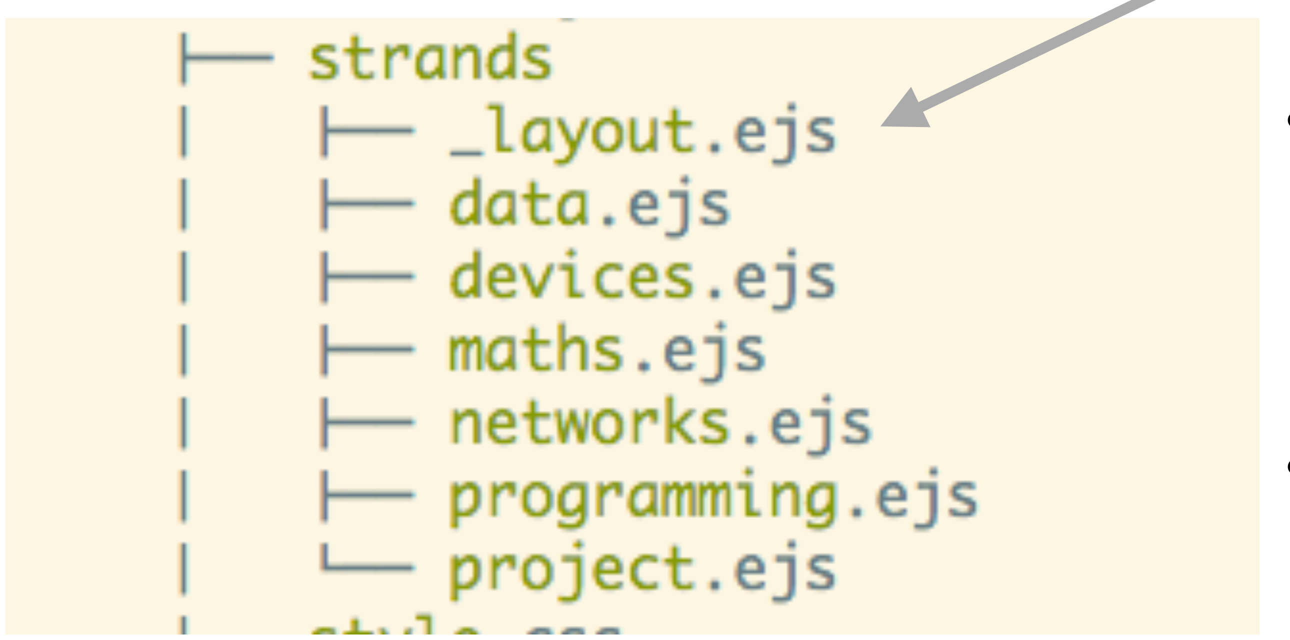


_layout.ejs

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <link rel="stylesheet" type="text/css" href="http://fonts.googleapis.com/css?family=Open+Sans"
  <link type="text/css" rel="stylesheet" href="../style.css" media="screen"/>
  <title> IoT Strands </title>
</head>
<body>

<%- partial("../includes/_header.ejs") %>
<%- yield %>
<%- partial("../includes/_footer.ejs") %>

</body>
</html>
```

- A layout is always called '_layout.ejs'
- It ***can*** contain standard html + partial includes if necessary
- It ***must*** contain a **<% yield %>** statement
- This yield is replaced by the contents of another template…

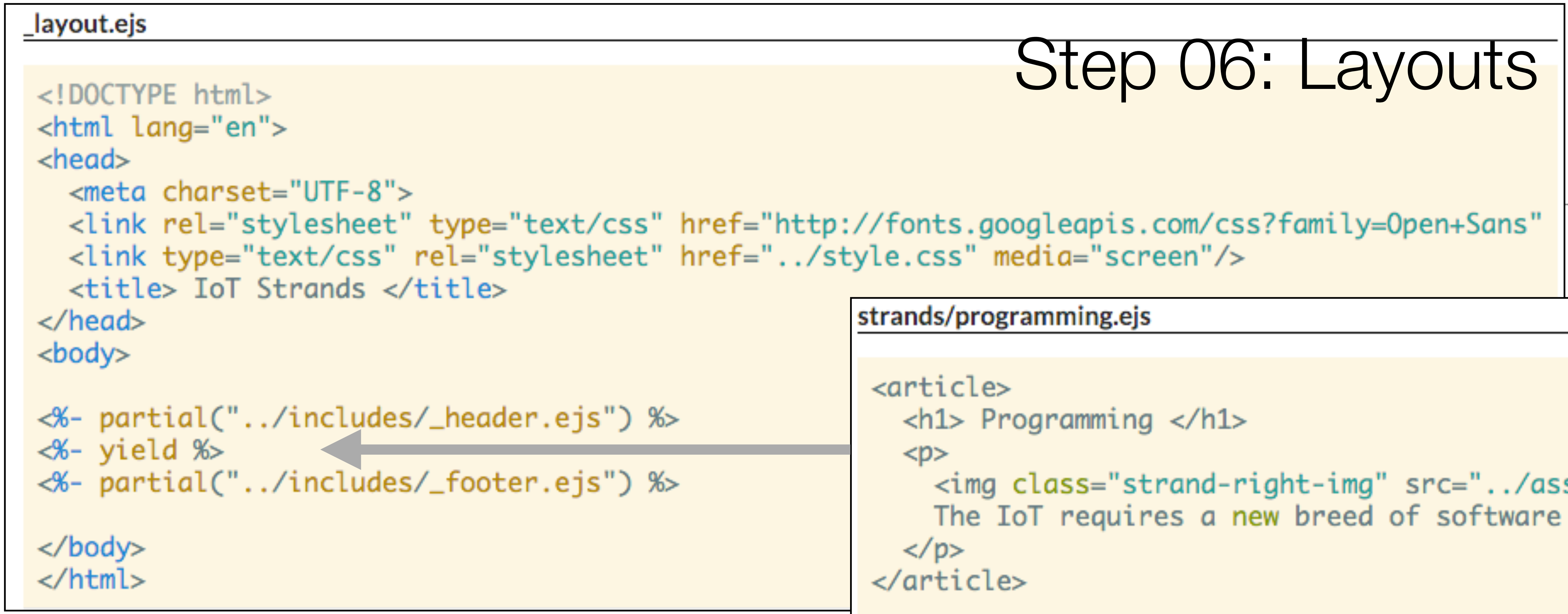
Step 06: Layouts



```
├── strands
|   ├── _layout.ejs
|   ├── data.ejs
|   ├── devices.ejs
|   ├── maths.ejs
|   ├── networks.ejs
|   ├── programming.ejs
|   └── project.ejs
```

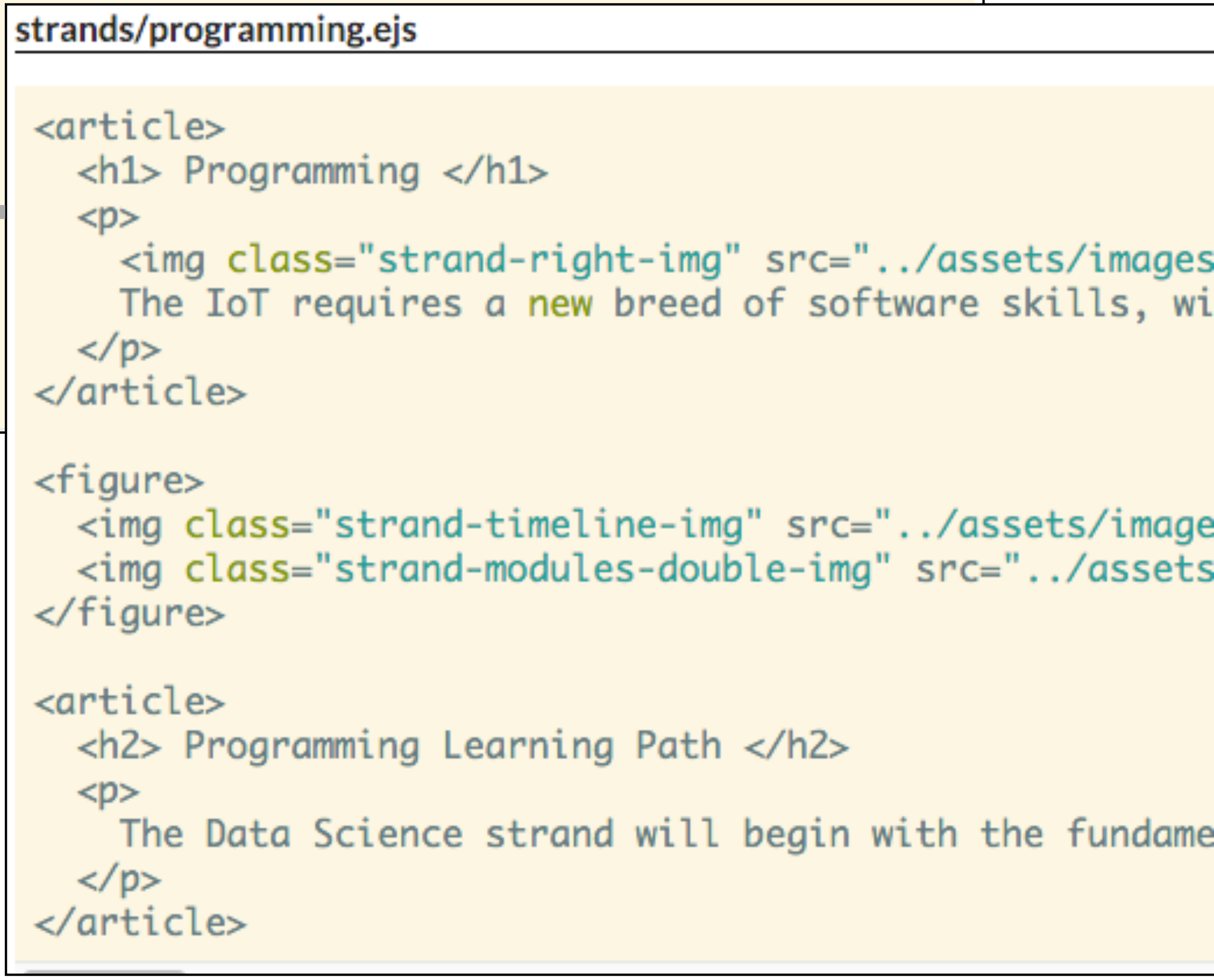
- If a folder contains a file called '_layout.ejs':
  - Each page is assumed to based on this layout
  - The template engine will build each page from the _layout + the individual page concerned

Step 06: Layouts



_layout.ejs

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <link rel="stylesheet" type="text/css" href="http://fonts.googleapis.com/css?family=Open+Sans"
  <link type="text/css" rel="stylesheet" href="../style.css" media="screen"/>
  <title> IoT Strands </title>
</head>
<body>

<%- partial("../includes/_header.ejs") %>
<%- yield %>
<%- partial("../includes/_footer.ejs") %>

</body>
</html>
```

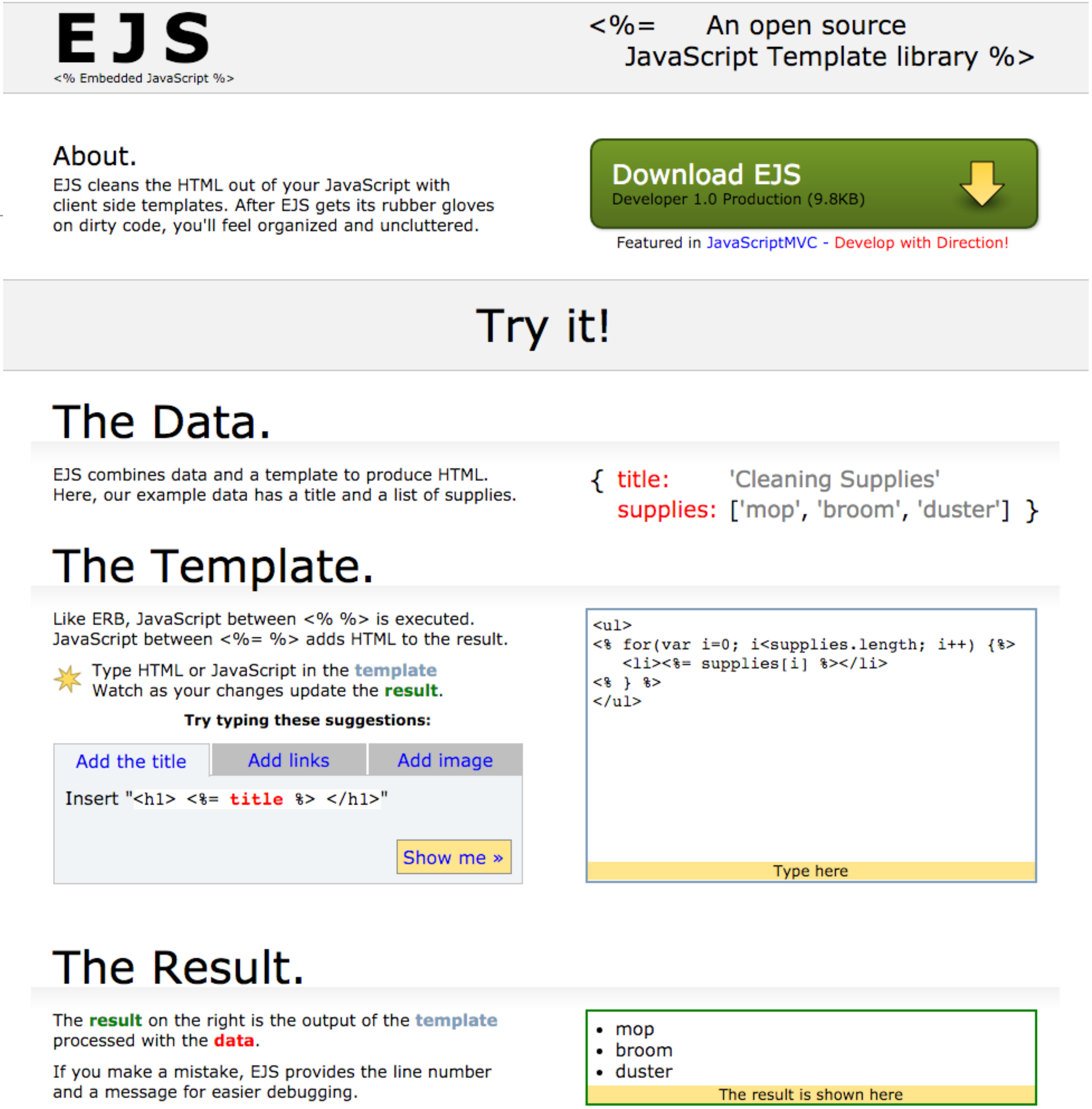


strands/programming.ejs

```
<article>
  <h1> Programming </h1>
  <p>
    <img class="strand-right-img" src="../assets/images
    The IoT requires a new breed of software skills, wi
  </p>
</article>

<figure>
  <img class="strand-timeline-img" src="../assets/image
  <img class="strand-modules-double-img" src="../assets
</figure>

<article>
  <h2> Programming Learning Path </h2>
  <p>
    The Data Science strand will begin with the fundame
  </p>
</article>
```

- For the ‘programming’ page - its contents are inserted into the layout, replacing the ‘yield’ statement.
- ‘Programming.ejs’ is a page template without head, body or other elements..
- It just contains just content to complete the layout.

Template Languages - EJS



EJS
<% Embedded JavaScript %>

<%= An open source JavaScript Template library %>

About.
EJS cleans the HTML out of your JavaScript with client side templates. After EJS gets its rubber gloves on dirty code, you'll feel organized and uncluttered.

Download EJS
Developer 1.0 Production (9.8KB)

Featured in JavaScriptMVC - Develop with Direction!

Try it!

The Data.

EJS combines data and a template to produce HTML. Here, our example data has a title and a list of supplies.

```
{ title:    'Cleaning Supplies'
  supplies: ['mop', 'broom', 'duster'] }
```

The Template.

Like ERB, JavaScript between <% %> is executed. JavaScript between <%= %> adds HTML to the result.

Type HTML or JavaScript in the **template**
Watch as your changes update the **result**.

Try typing these suggestions:

Add the title | Add links | Add image

Insert "`<h1> <%= title %> </h1>`"

Show me »

```
<ul>
<% for(var i=0; i<supplies.length; i++) {%>
   <li><%= supplies[i] %></li>
<% } %>
</ul>
```

Type here

The Result.

The **result** on the right is the output of the **template** processed with the **data**.

If you make a mistake, EJS provides the line number and a message for easier debugging.

- mop
- broom
- duster

The result is shown here

Getting Started with EJS

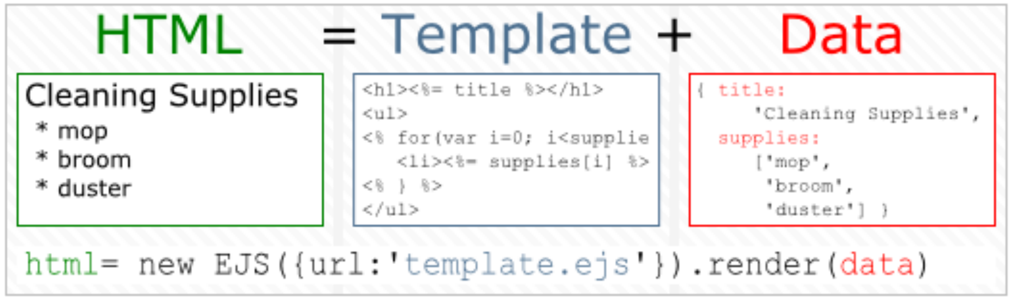
Are you ever faced with a mess of HTML string concatenations like this?

```
var html = "<h1>"+data.title+"</h1>"
html += "<ul>"
for(var i=0; i<data.supplies.length; i++) {
    html += "<li><a href='supplies/"+data.supplies[i]+"'>"
    html += data.supplies[i]+"</a></li>"
}
html += "</ul>"
```

If you're a web developer, the answer is probably yes. Beyond being ugly, the structure of your HTML is lost in the JavaScript. Adding to this layout would be difficult. How can we clean it up?

In this tutorial, we'll show you how to improve the above code that produces a list of supply links. We'll use Embedded JavaScript (EJS) to return this code to a straightforward, maintainable HTML structure.

EJS is a JavaScript templating library. It is commonly used for building html strings from JSON data. Typically, EJS works like this:



```
Cleaning Supplies
 * mop
 * broom
 * duster
```

```
<h1><%= title %></h1>
<ul>
<% for(var i=0; i<supplie
   <li><%= supplies[i] %>
<% } %>
</ul>
```

```
{ title:
    'Cleaning Supplies',
  supplies:
    ['mop',
     'broom',
     'duster'] }
```

```
html= new EJS({url:'template.ejs'}).render(data)
```

This tutorial walks you through:

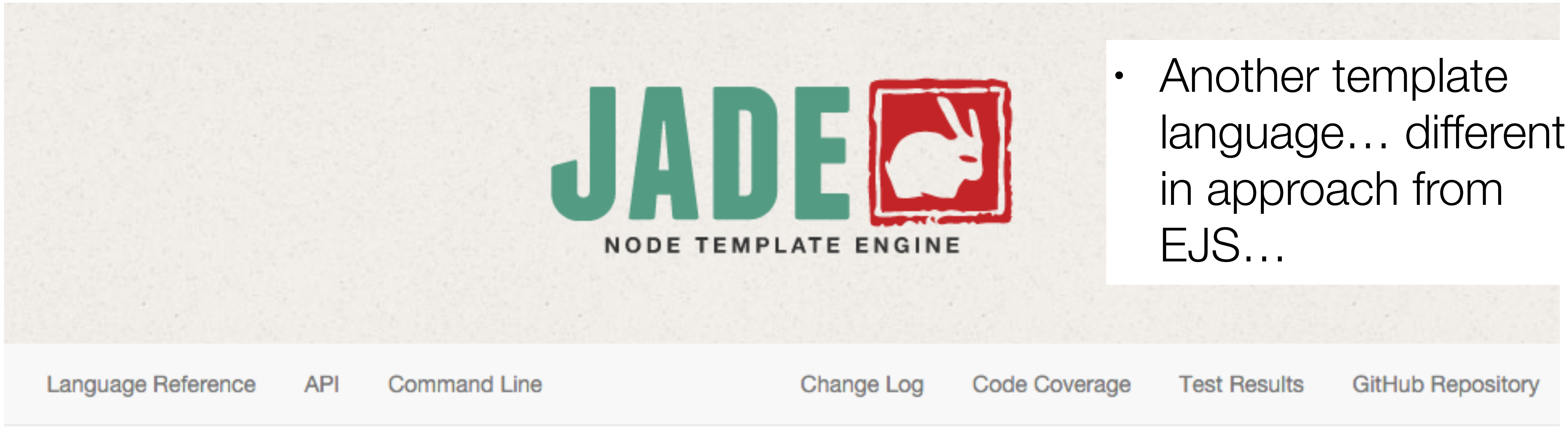
1. Including EJS
2. Creating a template
3. Using view helpers
4. Using error handling
5. When to use EJS

Include EJS

Before we put on the rubber gloves and get to the heavy scrubbing, lets get set up a bit.

Your page needs to include EJS so your JavaScript can use it. Start by downloading ejs_production.js from Google Code or the subversion repository.

Next add EJS to your HTML like this:

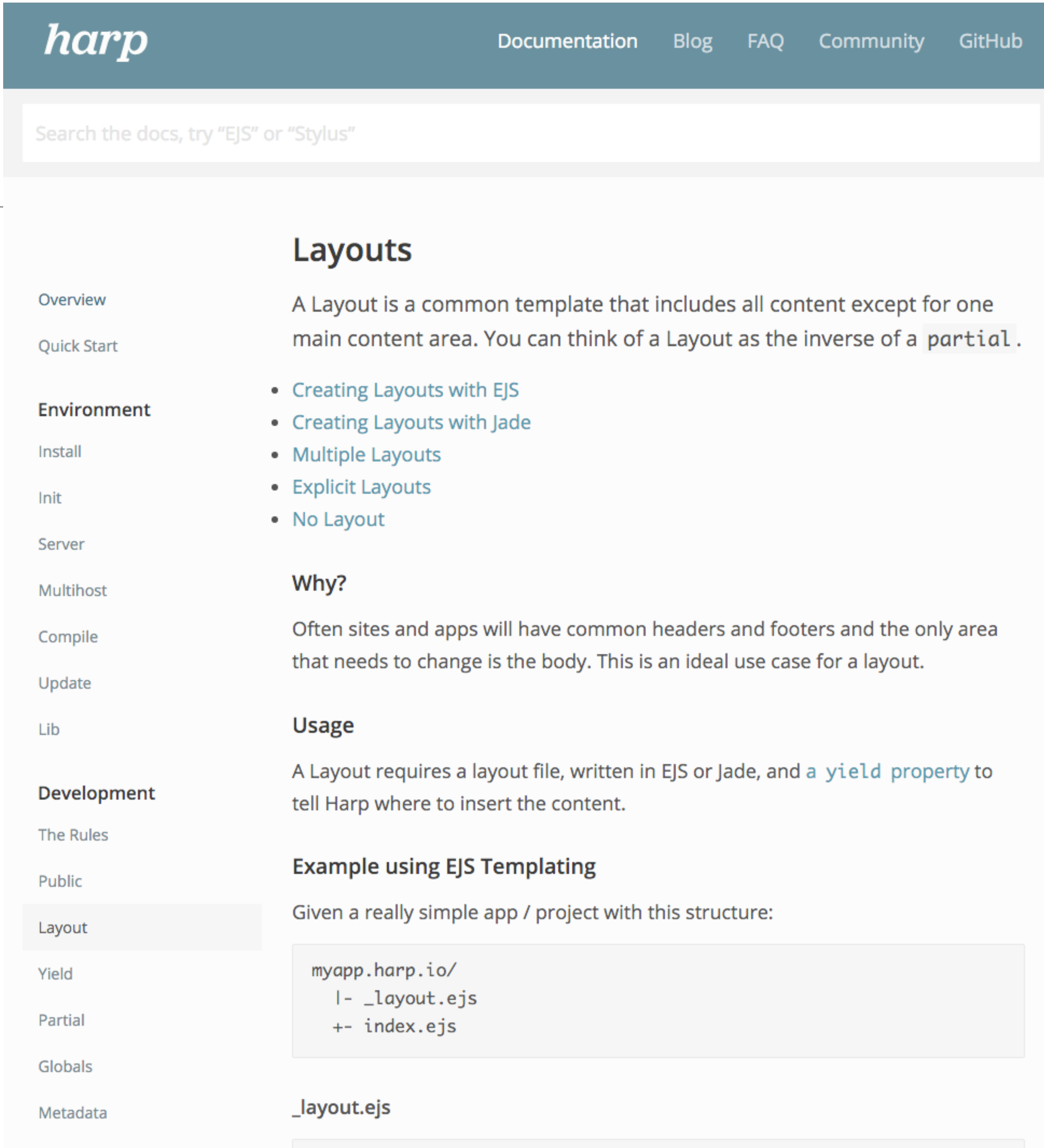


- Another template language… different in approach from EJS…

```
doctype html
html(lang="en")
  head
    title= pageTitle
    script(type='text/javascript').
      if (foo) {
         bar(1 + 5)
      }
  body
    h1 Jade - node template engine
    #container.col
      if youAreUsingJade
        p You are amazing
      else
        p Get on it!
      p.
        Jade is a terse and simple
        templating language with a
        strong focus on performance
        and powerful features.
```

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <title>Jade</title>
    <script type="text/javascript">
      if (foo) {
         bar(1 + 5)
      }
    </script>
  </head>
  <body>
    <h1>Jade - node template engine</h1>
    <div id="container" class="col">
      <p>You are amazing</p>
      <p>
        Jade is a terse and simple
        templating language with a
        strong focus on performance
        and powerful features.
      </p>
    </div>
  </body>
</html>
```

- Harp includes EJS and Jade template engines
- As long as your page is being 'served' by harp, Ejs & Jade directives will be implemented



Layouts

A Layout is a common template that includes all content except for one main content area. You can think of a Layout as the inverse of a `partial`.

- Creating Layouts with EJS
- Creating Layouts with Jade
- Multiple Layouts
- Explicit Layouts
- No Layout

Why?

Often sites and apps will have common headers and footers and the only area that needs to change is the body. This is an ideal use case for a layout.

Usage

A Layout requires a layout file, written in EJS or Jade, and a `yield` property to tell Harp where to insert the content.

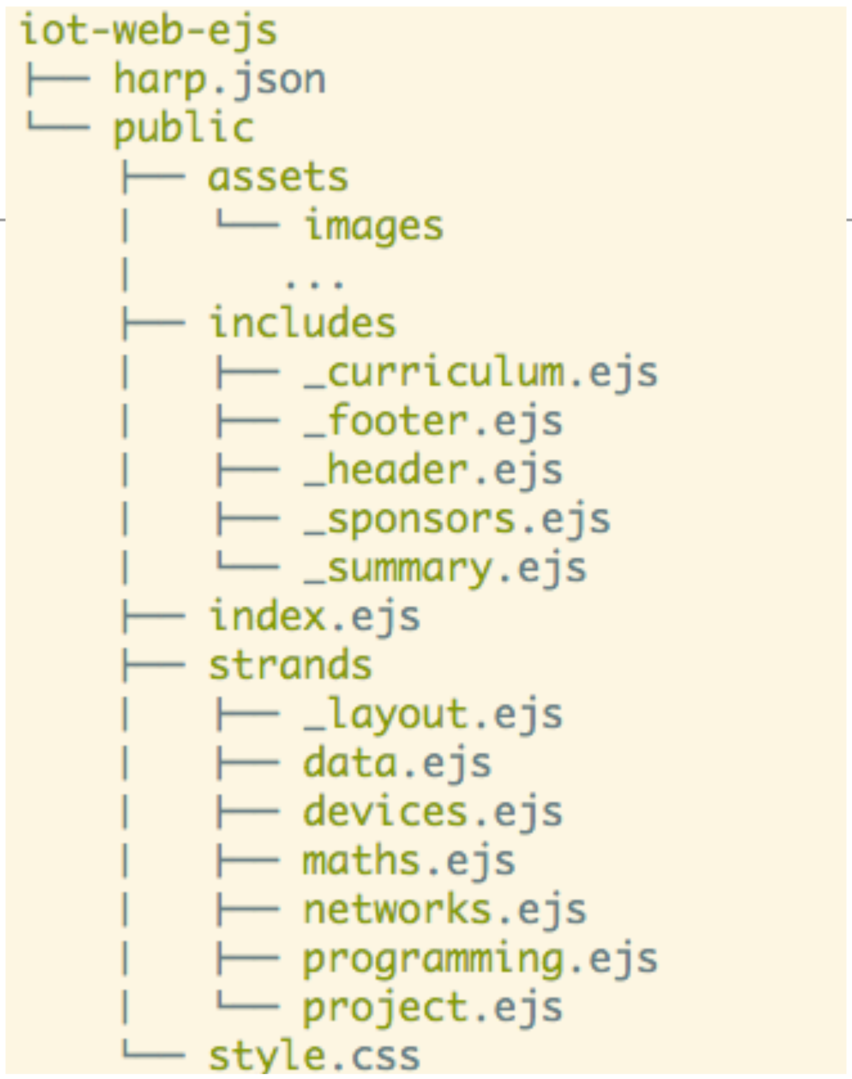
Example using EJS Templating

Given a really simple app / project with this structure:

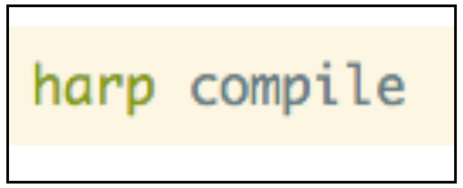
```
myapp.harp.io/
  |- _layout.ejs
  +- index.ejs
```

_layout.ejs

Compiling Pages

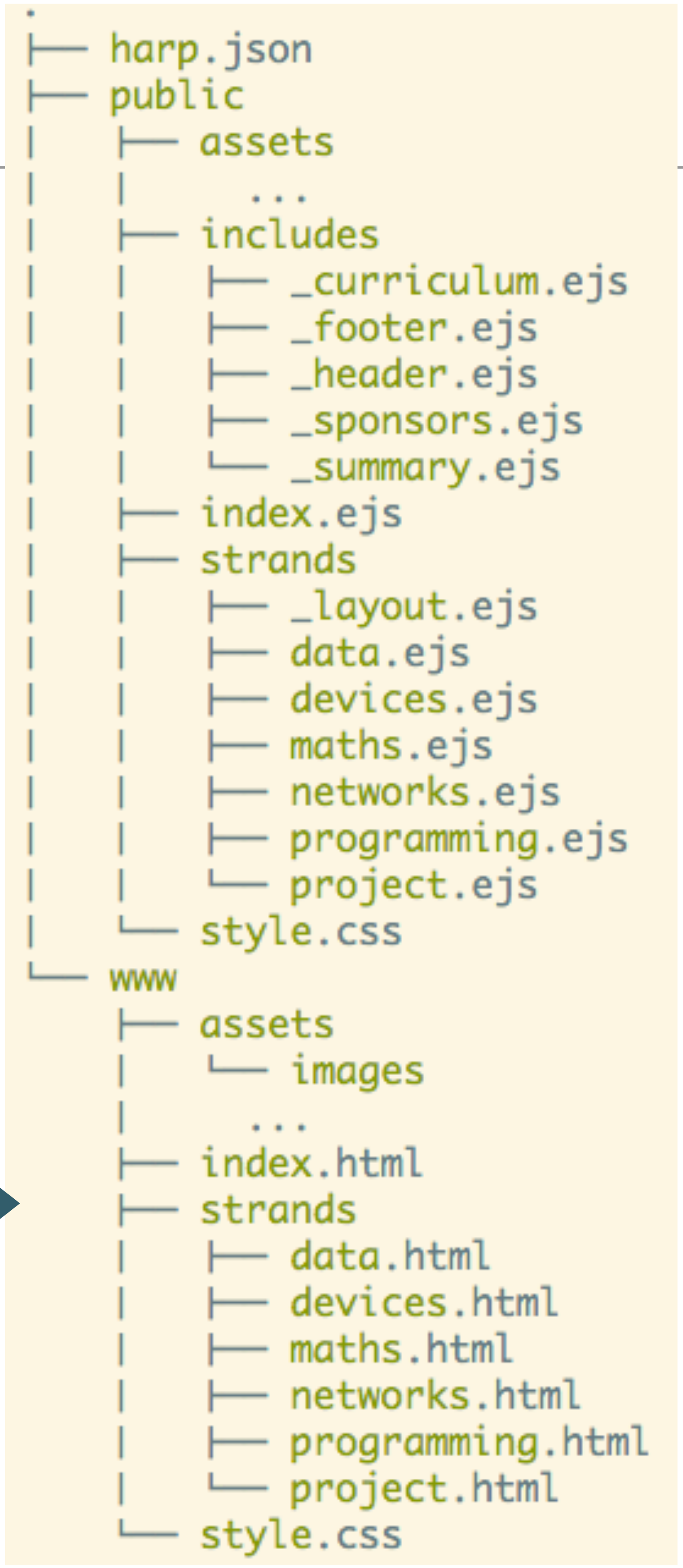


```
iot-web-ejs
├── harp.json
└── public
    ├── assets
    |   └── images
    |       ...
    ├── includes
    |   ├── _curriculum.ejs
    |   ├── _footer.ejs
    |   ├── _header.ejs
    |   ├── _sponsors.ejs
    |   └── _summary.ejs
    ├── index.ejs
    ├── strands
    |   ├── _layout.ejs
    |   ├── data.ejs
    |   ├── devices.ejs
    |   ├── maths.ejs
    |   ├── networks.ejs
    |   ├── programming.ejs
    |   └── project.ejs
    └── style.css
```



```
harp compile
```

- the harp ‘compile’ command will generate a complete copy of your site - with all directives removed and full pages replacing all fragments.



```
.
├── 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
└── www
    ├── assets
    |   └── images
    |   ...
    ├── index.html
    ├── strands
    |   ├── data.html
    |   ├── devices.html
    |   ├── maths.html
    |   ├── networks.html
    |   ├── programming.html
    |   └── project.html
    └── style.css
```