

Semantic-UI Part IV

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 facinating 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 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.





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Mathematics

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Supported by leading edge research at...



Department of Computing & Mathematics

BSc (Hons) in the Internet of Things



Waterford Institute of Technology
INSTITIÚD 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

The background features a stylized network of interconnected icons representing various IoT components like mobile devices, security, and infrastructure, all set against a blue gradient with white arrows indicating connectivity.

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Supported by leading edge research

TSSG
TSSG

 **ctr g**
convergent technologies research group


AUTOMOTIVE CONTROL GROUP
Software Engineering for the Connected Car

Icons

[facebook](#) [twitter](#) [linkedin](#)

```
<footer class="ui segment">
  <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>
```



```
<footer class="ui center aligned segment">
  <a href="http://www.facebook.com/witcomp"> <i class="large facebook icon"></i> </a>
  <a href="http://twitter.com/ComputingAtWIT"> <i class="large twitter icon"></i> </a>
  <a href="http://www.linkedin.com/pub/computing-at-wit"> <i class="large linkedin icon"></i> </a>
</footer>
```

Colours

<http://semantic-ui.com/usage/theming.html>

site/globals/site.variables

less

```
@primaryColor      : @pink;  
@secondaryColor    : @grey;  
@red               : #B03060;  
@orange             : #FE9A76;  
@yellow             : #FFD700;  
@olive              : #32CD32;  
@green              : #016936;  
@teal               : #008080;  
@blue               : #0E6EB8;  
@violet              : #EE82EE;  
@purple              : #B413EC;  
@pink               : #FF1493;  
@brown              : #A52A2A;  
@grey               : #A0A0A0;  
@black              : #000000;
```

Primary Button

Secondary Button

ALL COLORS

Red

Orange

Yellow

Olive

Green

Teal

Blue

Violet

Purple

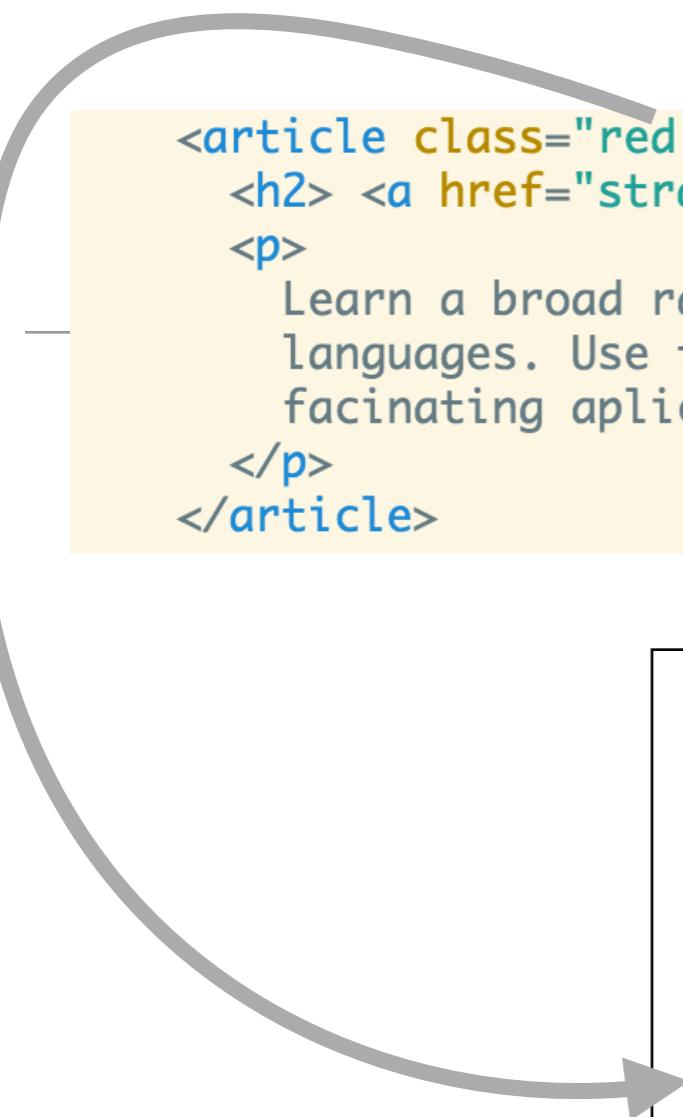
Pink

Brown

Grey

Black

```
<article class="red column">
  <h2> <a href="strands/programming.html"> Programming </a> </h2>
  <p>
    Learn a broad range of programming and problem solving skills, including exciting new p
    languages. Use these skills to build apps for mobile, cloud and device based IoT applic
    facinating applications.
  </p>
</article>
```





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```
<section class="ui three column row">

  <article class="red column">
    ...
  </article>

  <article class="orange column">
    ...
  </article>

  <article class="yellow column">
    ...
  </article>

</section>

<section class="ui three column row">

  <article class="olive column">
    ...
  </article>

  <article class="green column">
    ...
  </article>

  <article class="blue column">
    ...
  </article>

</section>
```

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Networks

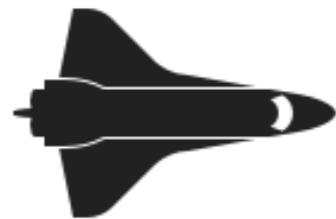
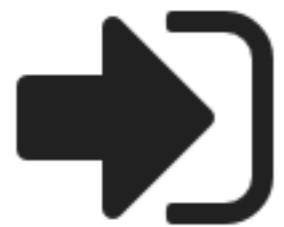
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```
<i class="huge settings icon"></i>
<i class="huge bar chart icon"></i>
<i class="huge space shuttle icon"></i>
<i class="huge cloud upload icon"></i>
<i class="huge lab icon"></i>
<i class="huge wizard icon"></i>
```

```
<article class="red column">
  <h2> Programming </h2>
  <p>
    Learn a broad range of programming and problem solving skills
  </p>
  <div class="ui two column grid">
    <div class="left aligned column">
      <i class="huge settings icon"></i>
    </div>
    <div class="right aligned column">
      <a href="strands/programming.html" class="strandlink">
        <i class="huge sign in icon"></i>
      </a>
    </div>
  </div>
</article>
```

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- Encapsulate icons in 2 column grid
 - Left align first icon
 - Right align second icon

Raised Segment

Raised



A segment may be formatted to raise above the page.

Example



Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Vestibulum tortor quam, feugiat vitae, ultricies eget, tempor sit amet, ante. Donec eu libero sit amet quam egestas semper. Aenean ultricies mi vitae est. Mauris placerat eleifend leo.

```
<div class="ui raised segment">
  <p>Pellentesque habitant morbi tristique senectus et netus et
  malesuada fames ac turpis egestas. Vestibulum tortor quam, feugiat
  vitae, ultricies eget, tempor sit amet, ante. Donec eu libero sit amet
  quam egestas semper. Aenean ultricies mi vitae est. Mauris placerat
  eleifend leo.</p>
</div>
```

Padded Segment

Padded



A segment can increase its padding

Example



```
<div class="ui padded segment">
  <p></p>
</div>
```

Stacked Segment

Stacked



A segment can be formatted to show it contains multiple pages

Example



Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Vestibulum tortor quam, feugiat vitae, ultricies eget, tempor sit amet, ante. Donec eu libero sit amet quam egestas semper. Aenean ultricies mi vitae est. Mauris placerat eleifend leo.

```
<div class="ui stacked segment">
  <p>Pellentesque habitant morbi tristique senectus et netus et malesuada
fames ac turpis egestas. Vestibulum tortor quam, feugiat vitae, ultricies
eget, tempor sit amet, ante. Donec eu libero sit amet quam egestas semper.
Aenean ultricies mi vitae est. Mauris placerat eleifend leo.</p>
</div>
```

<section class="ui three column padded stacked grid segment">

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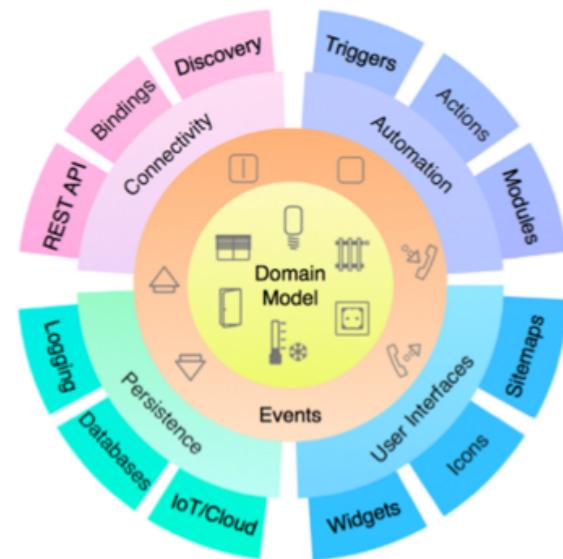
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Programming



The IoT requires a new breed of software skills, with an emphasis on flexible, reactive, and highly networked applications and services. This software runs on a diverse range of systems, is frequently connected to cloud services, and may be capable of leveraging large data sets to deliver inferences and decision support in an informed manner. The software is designed and implemented using agile techniques, with an emphasis on test driven development and quality user experiences..

Year 1

Semester 1

Semester 2

Semester 3

Year 2

Semester 4

Year

Semester 5

Programming Fundamentals I

Programming Fundamentals II

Web Development I

Web Development II

Programming Learning Path

The Data Science strand will begin with the fundamentals of relational databases used to store structured transactional data and descriptive analysis required to predict future events and to identify relationships in data. In the third year the students will learn how to manage unstructured data (such as text, images, and video) using big data technologies like Hadoop and Spark. They will also learn how to use machine learning algorithms to analyze large datasets and extract insights. The fourth year will focus on building real-world data science projects, such as recommendation engines, fraud detection systems, and predictive maintenance systems. The fifth year will involve research projects and internships in the industry.

- Images set to default size
- Text not positioned correctly

```

<article>
  <h1> Programming </h1>
  <p>
    
    The IoT requires a new breed of software skills, with an emphasis on flexible, reactive, and highly networked applications and services. This software runs on a diverse range of systems, is frequently connected to cloud services, and may be capable of leveraging large data sets to deliver inferences and decision support in an informed manner. The software is designed and implemented using agile techniques, with an emphasis on test driven development and quality user experiences..
  </p>
</article>

<figure>
  
  
</figure>

<article>
  <h2> Programming Learning Path </h2>
  <p>
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  </p>
</article>

```

Strand Pages

- Make the segment a ‘grid’
- Rework each strand page to row/column structure
- + use ‘ui image’ for consistent image sizing

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

Mathematics

The Mathematics Strand underpins most of the other strands: its purpose is to provide a rigorous foundation for many of the more applied concepts met in the other Strands. As such it is offered early in the course. Discrete Mathematics represents a breadth first rather than depth first treatment of concepts such as logic (cf. Algorithms), sets (cf. Data Structures), enumeration (cf. Statistics), relations (cf. Databases) and graphs (cf. Algorithms and Networking). Its purpose is to ensure that all students have a basic mathematical literacy in such topics. In such a one semester course, the treatment will necessarily be at an introductory level, but the concepts will be covered in greater depth later in the course, mainly in modules on other Strands.

Year 1

Semester 1 Semester 2 Semester 3 Semester 4

Discrete Mathematics Applied Calculus Mathematical Methods Statistics & Probability

Mathematics Learning Path

Applied Calculus ensures that students understand features of the real world such as rates of change (which are critical to many sensing systems) and can manipulate relationships between quantities that vary on a continuous scale. It also covers much of the engineering mathematics needed to understand the devices themselves, needed for the Devices and Systems Strand, and shows how numerical methods reconcile the finite, discrete world of digital computers and networks with the continuous world in which the IoT devices and networks are deployed. Mathematical Methods (in Semester 3) builds on the Applied Calculus module in Semester 2, and shows how the rate of change concept is extended to multivariate functions and its subsequent applications. However, the major focus of this module is on the concepts and methods of linear algebra, and the various applications in other modules during the programme (e.g., state-space modeling, computer vision and machine learning).

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programming.html



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Year 1		Year 2		Year 3		Year 4	
Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8
Programming Fundamentals I	Programming Fundamentals II	Algorithms	Data Structures	Application Development		Distributed Systems I	Distributed Systems II
Web Development I	Web Development II						

Learning Paths

The Data Science strand will begin with the fundamentals of relational databases used to store structured transactional business data. This data holds the basis for reporting and descriptive analysis required to predict future events and to identify relationships in data. In the third year the students will extend their knowledge to NoSQL (especially for managing unstructured data) databases and data warehouses (supporting consistent views of a domain, and as a springboard for statistics and machine learning analyses). In the IoT context the importance of dealing with large volumes of data in terms of storage and analytics is great. The skills they learn will allow them to design and implement the appropriate data solution with a complete understanding and knowledge of the available options. The students will learn about the trade-offs in terms of consistency, availability and partitioning. In the fourth year students will learn and implement the skills of data mining covering classification, prediction and clustering, applied to data that had been managed using methods and technologies they have learned about in previous years.

ui grid

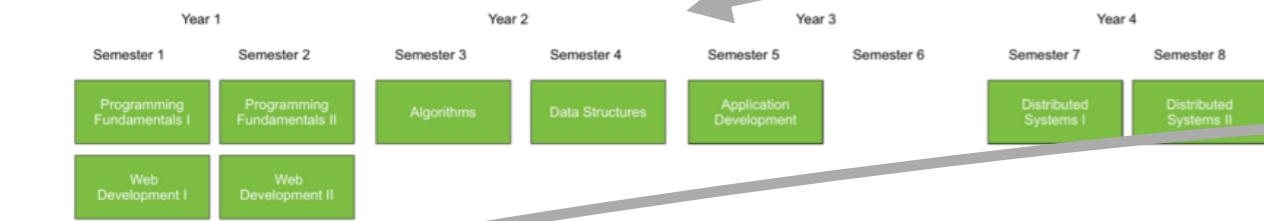
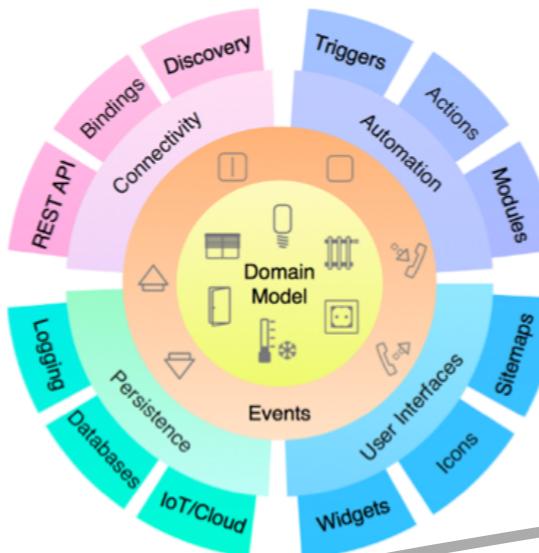
- Each grid is 16 units
- “eight wide” consumes half the available width
- ‘sixteen wide’ consumes full available width

```
<article class="eight wide column">
  <h1> Programming </h1>
  <p>
    The IoT requires a new breed of software skills, with an emphasis on f...
  </p>
</article>

<aside class="eight wide column">
  
  
  
  
  <h2> Learning Paths </h2>
  <p>
    The Data Science strand will begin with the fundamentals of relational...
  </p>
</section>
```

Programming

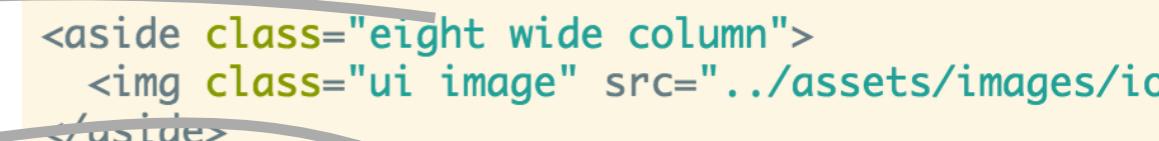
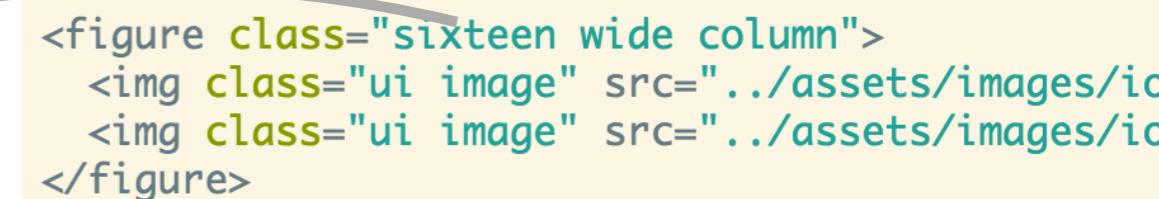
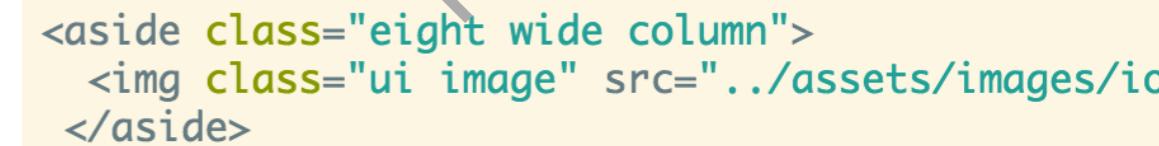
The IoT requires a new breed of software skills, with an emphasis on flexible, reactive, and highly networked applications and services. This software runs on a diverse range of systems, is frequently connected to cloud services, and may be capable of leveraging large data sets to deliver inferences and decision support in an informed manner. The software is designed and implemented using agile techniques, with an emphasis on test driven development and quality user experiences..



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</article>
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  </p>
</section>
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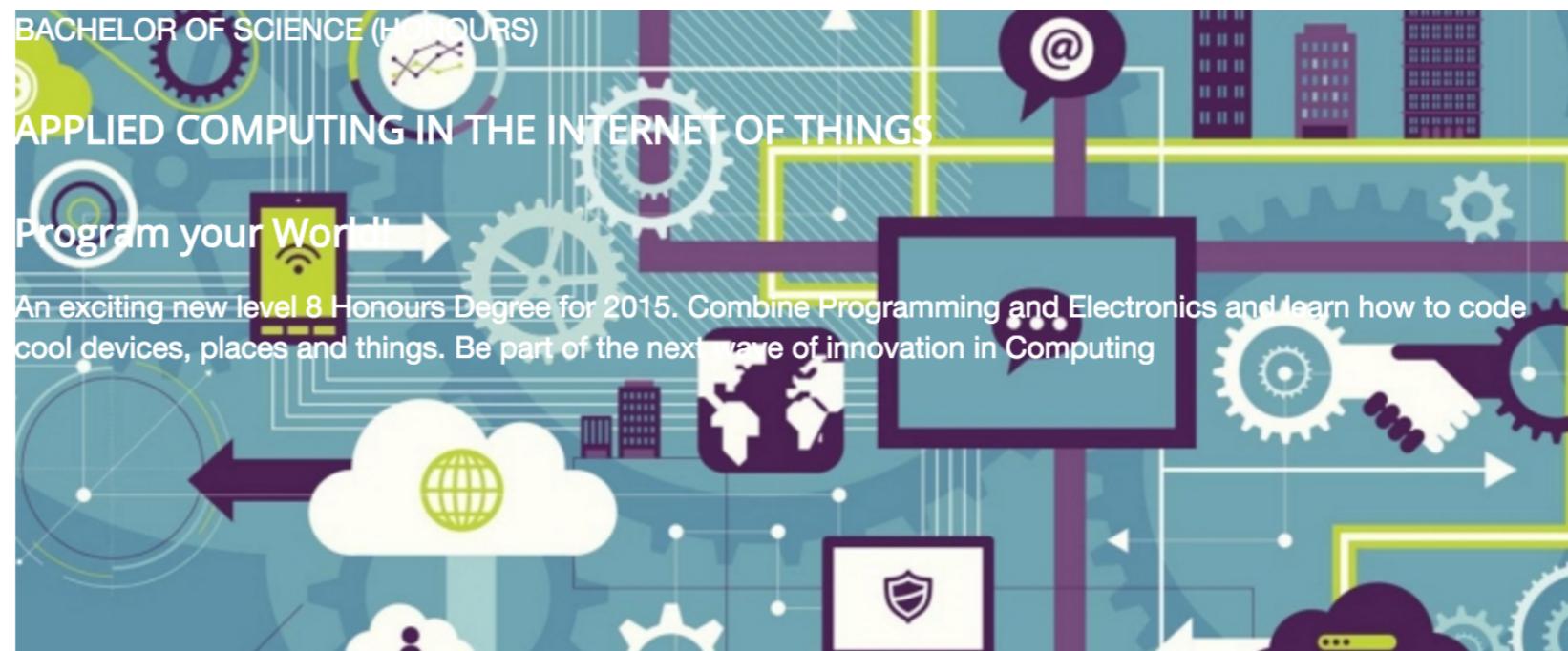
- We could have used ‘ui row’ as well, but just using cols will also suffice

Department of Computing & Mathematics



Waterford Institute of Technology
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BSc (Hons) the Internet of Things



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Banner
Segment
-current

background image

```
.banner {  
background: url("/assets/images/banner.jpg") top center;  
background-position: top center;  
color: white;  
height:300px;  
}
```

```
<!DOCTYPE html>  
<html lang="en">  
<head>  
  <meta charset="UTF-8">  
  <link rel="stylesheet" type="text/css" href="http://fonts.googleapis.com/  
  <link rel="stylesheet" href="assets/css/semantic.css">  
  <link type="text/css" rel="stylesheet" href="style.css" media="screen"/>  
  <title>BSc in the Internet of Things</title>  
</head>  
<body>  
<section class="ui container">  
  
  current page  
  content  
  
</section>  
</body>  
</html>
```

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```
<article class="banner">  
<div>  
  <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  
      to code cool devices, places and things. Be part of the next wave of  
  </p>  
</div>  
</article>
```

Department of Computing & Mathematics



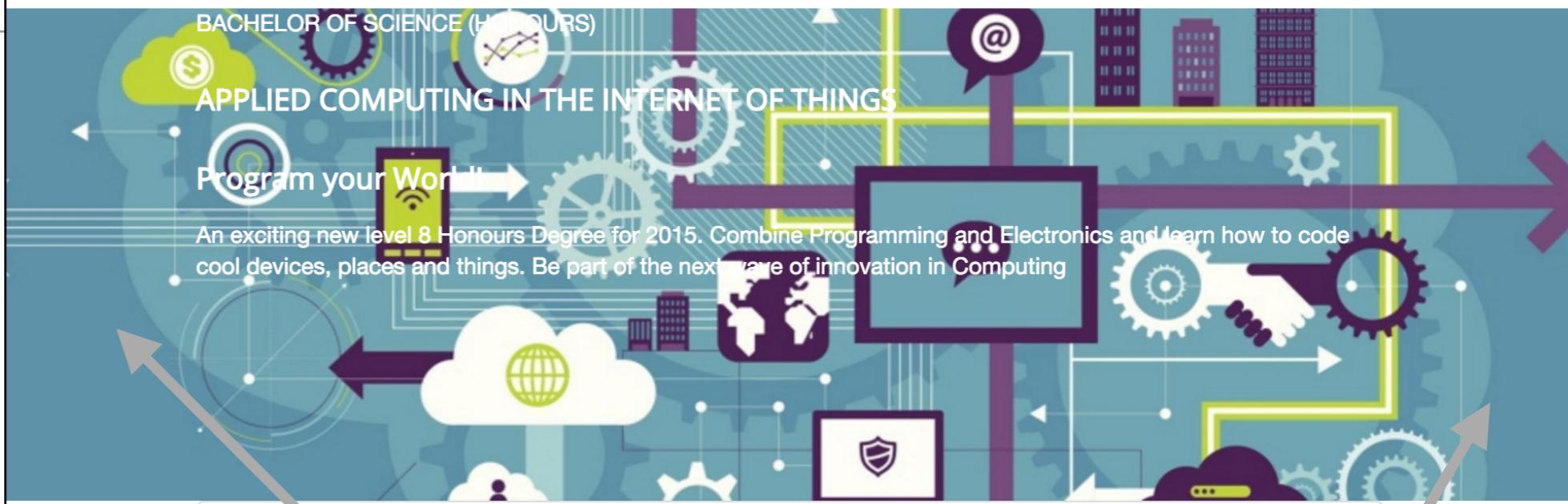
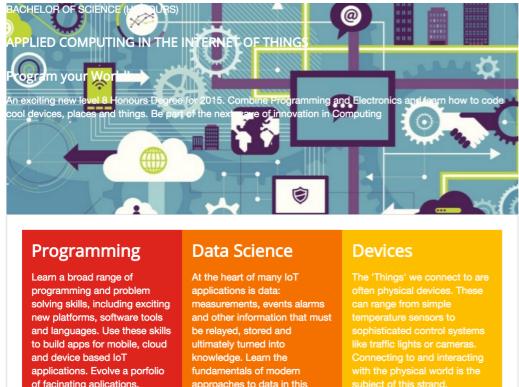
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BSc (Hons) the Internet of Things

Department of Computing & Mathematics



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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

```
<body>
  <section class="ui container">
    ...header
  </section>
  <section class="banner">
    <section class="ui container">
      <section class="ui grid">
        <article class="ui seven wide column raised blue segment">
          ... existing banner section...
        </article>
      </section>
    </section>
    <section class="ui container">
      curriculum
      sponsors
      footer sections.
    </section>
  </body>
```

- Stretch the background image to the edges

Department of Computing & Mathematics



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Learn the fundamental concepts of programming and

Data Science

At the forefront of many IoT applications is

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The IoT is built upon connected devices that

```
<section class="ui grid">
  <article class="ui seven wide column raised blue segment">
    <div>
      <p>
        BACHELOR OF SCIENCE (HONOURS)
      </p>

      <h3>
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      </h3>

      <h3>
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      </p>
    </div>
  </article>
</section>
```

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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

Data Science

Devices

Computing & Mathematics



Waterford Institute of Technology
www.wit.ie/witbachelors-in-ict-area

BSc (Hons) the
Internet of
Things

Programming

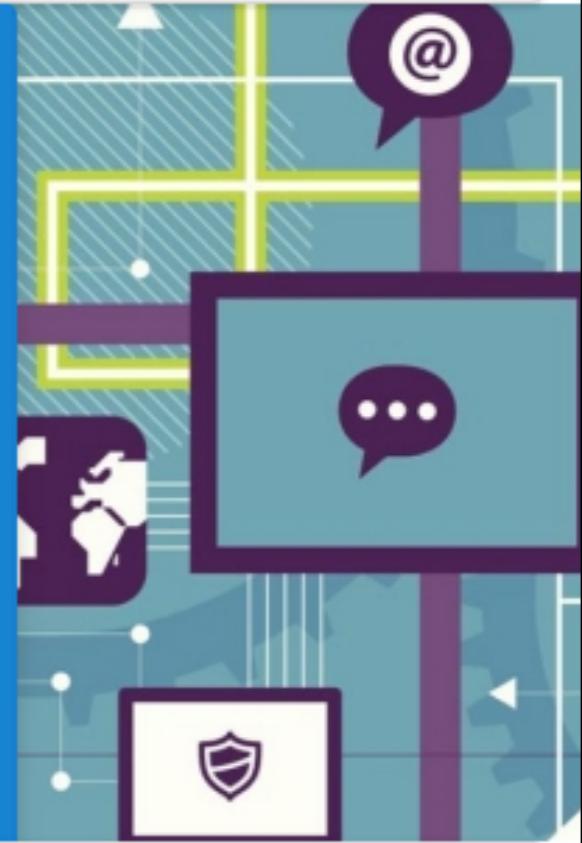
The IoT requires a new breed of software skills, with an emphasis on flexible, reactive, and highly networked applications and services. This software runs on a diverse range of systems, is frequently connected to cloud services, and may be capable of leveraging large data sets to deliver inferences and decision support in



BACHELOR OF
SCIENCE
(HONOURS)

APPLIED COMPUTING IN THE INTERNET OF THINGS

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World!



Program

Learn a broad range of programming and problem solving skills, including exciting new platforms,

Data Science

At the heart of many IoT applications is data: measurement events, alarms and other information that must

Devices

The 'Things' we connect to are often physical devices. These can range from simple temperature sensors to

Unresponsive Layouts



Programming

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Year 1		Year 2		Year 3		Year 4								
Semester 1	Programming Fundamentals I	Semester 2	Programming Fundamentals II	Semester 3	Algorithms	Semester 4	Data Structures	Semester 5	Application Development	Semester 6	Semester 7	Semester 8	Distributed Systems I	Distributed Systems II
Web Development I		Web Development II												

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.



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.



Responsive Layouts

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 computers, mobiles and full workstations.



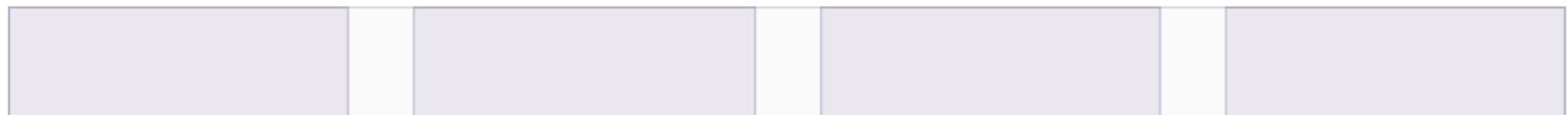
Grids

A grid is a structure with a [long history](#) used to align negative space in designs.

Using a grid makes content appear to flow more naturally on your page.



Toggle Animation



Columns

Grids divide horizontal space into indivisible units called "columns". All columns in a grid must specify their width as proportion of the total available row width.

All grid systems chooses an arbitrary column count to allow per row. Semantic's default theme [uses 16 columns](#).



Responsive Grids

Introduction

Grids

Columns

Rows

Gutters

Negative Margins

Page Grids

Columns

Rows

Varying Grids

Responsive Grids

Containers

Stackable

Reverse Order

Doubling

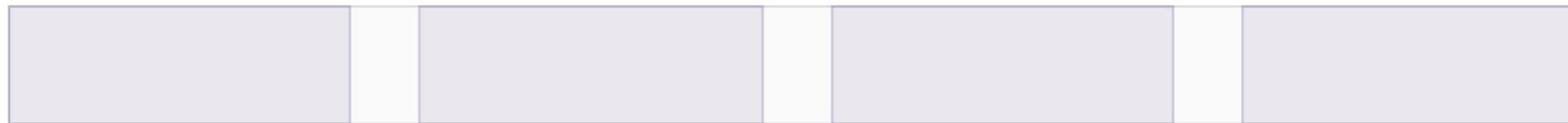
Manual Tweaks

Stackable



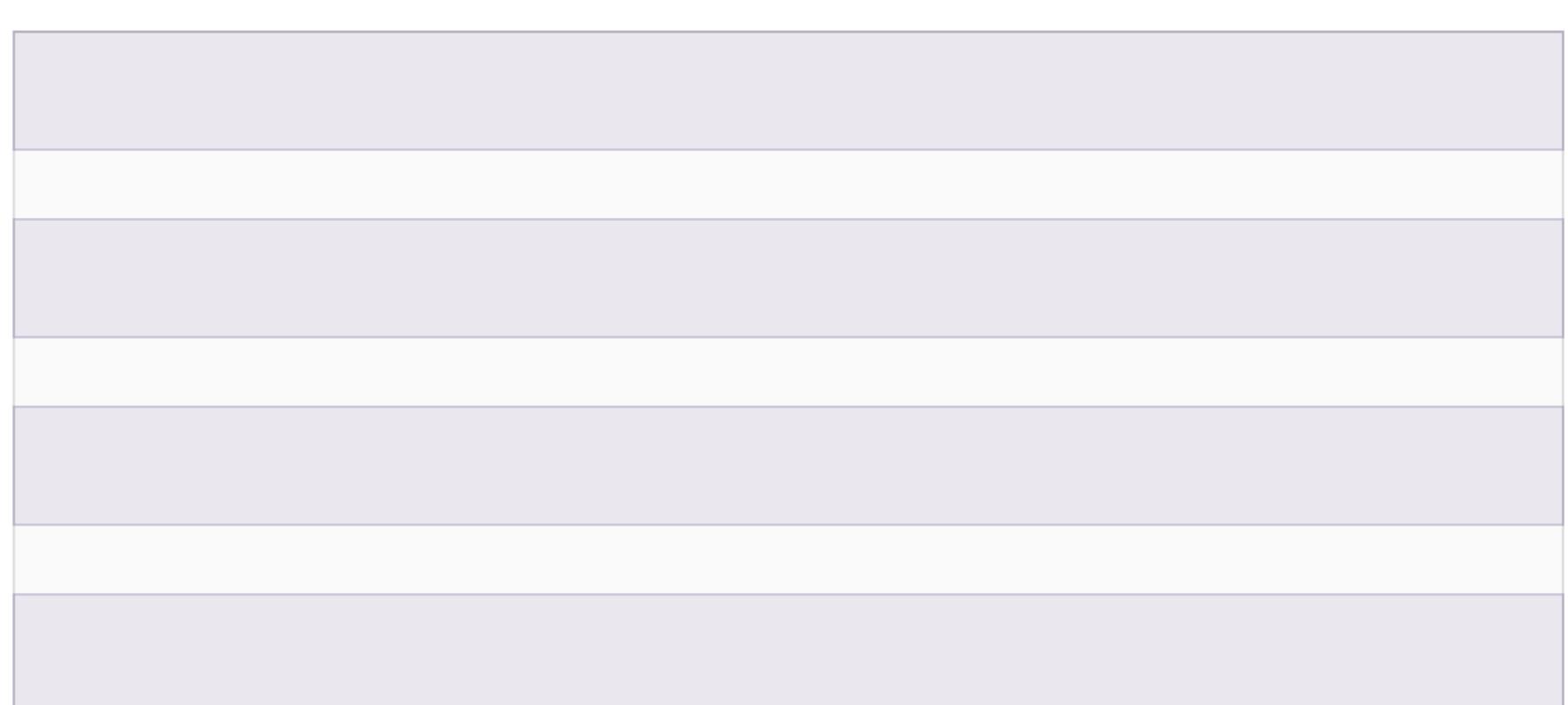
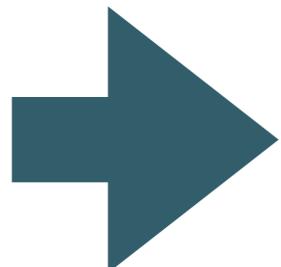
A **stackable grid** will automatically stack rows to a single columns on mobile devices

Example



```
<div class="ui stackable four column grid">
  <div class="column"></div>
  <div class="column"></div>
  <div class="column"></div>
  <div class="column"></div>
</div>
```

- Grid elements
‘stackable’ if
the browser
width to narrow

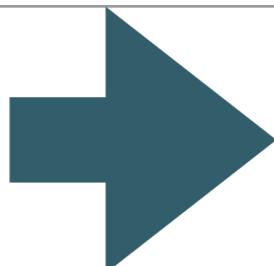


Computing & Mathematics



Waterford Institute of Technology
Scoilteach Teangeolaíochta Phort Láirge

BSc (Hons) the
Internet of
Things



Department of Computing & Mathematics

BSc (Hons) the Internet of Things



Waterford Institute *of* Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

```
<header class="ui two column center aligned middle aligned stacked stackable grid segment">
  <div class="column">
    <h2 class="ui header"> Department of Computing & Mathematics </h2>
    <h3 class="ui header"> BSc (Hons) the Internet of Things </h3>
  </div>
  <div class="column">
    <p>
      
    </p>
  </div>
</header>
```

- Distinguish between ‘stackable’ and ‘stacked’?

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Stackable

```
<section class="ui three column padded stacked stackable grid segment">

  <article class="red column">
    <h2> Programming </h2>
    <p>
      Learn a broad range of programming and problem solving skills, including software tools and languages. Use these skills to build apps for mobile IoT applications. Evolve a portfolio of fascinating applications.
    </p>
    <div class="ui two column grid">
      <div class="left aligned column">
        <i class="huge settings icon"></i>
      </div>
      <div class="right aligned column">
        <a href="strands/programming.html">
          <i class="huge sign in icon"></i>
        </a>
      </div>
    </div>
  </article>
</section>
```

- ‘stackable grid’ class makes all columns in the grid stack up as browser narrows

Stackable Strand Pages



```
<section class="ui three column padded stacked stackable grid segment">
```

- All strand pages now responsive

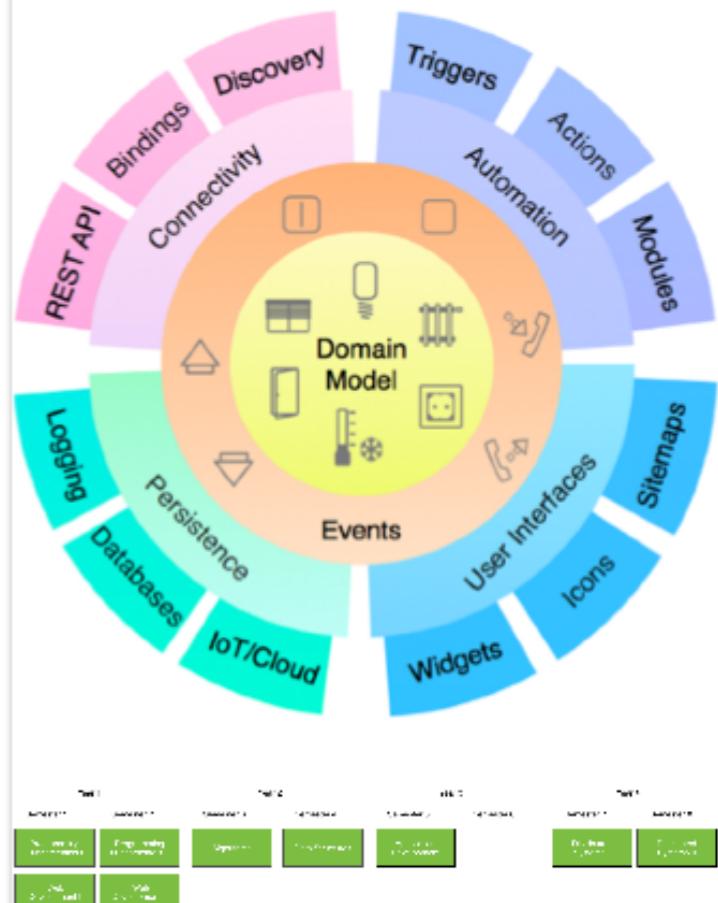
Devices

The IoT professional must be comfortable when dealing with the many kinds of devices and systems that are the means for the Internet to interact with the environment. Such an awareness of the devices and systems made to perform what attributes may be ch



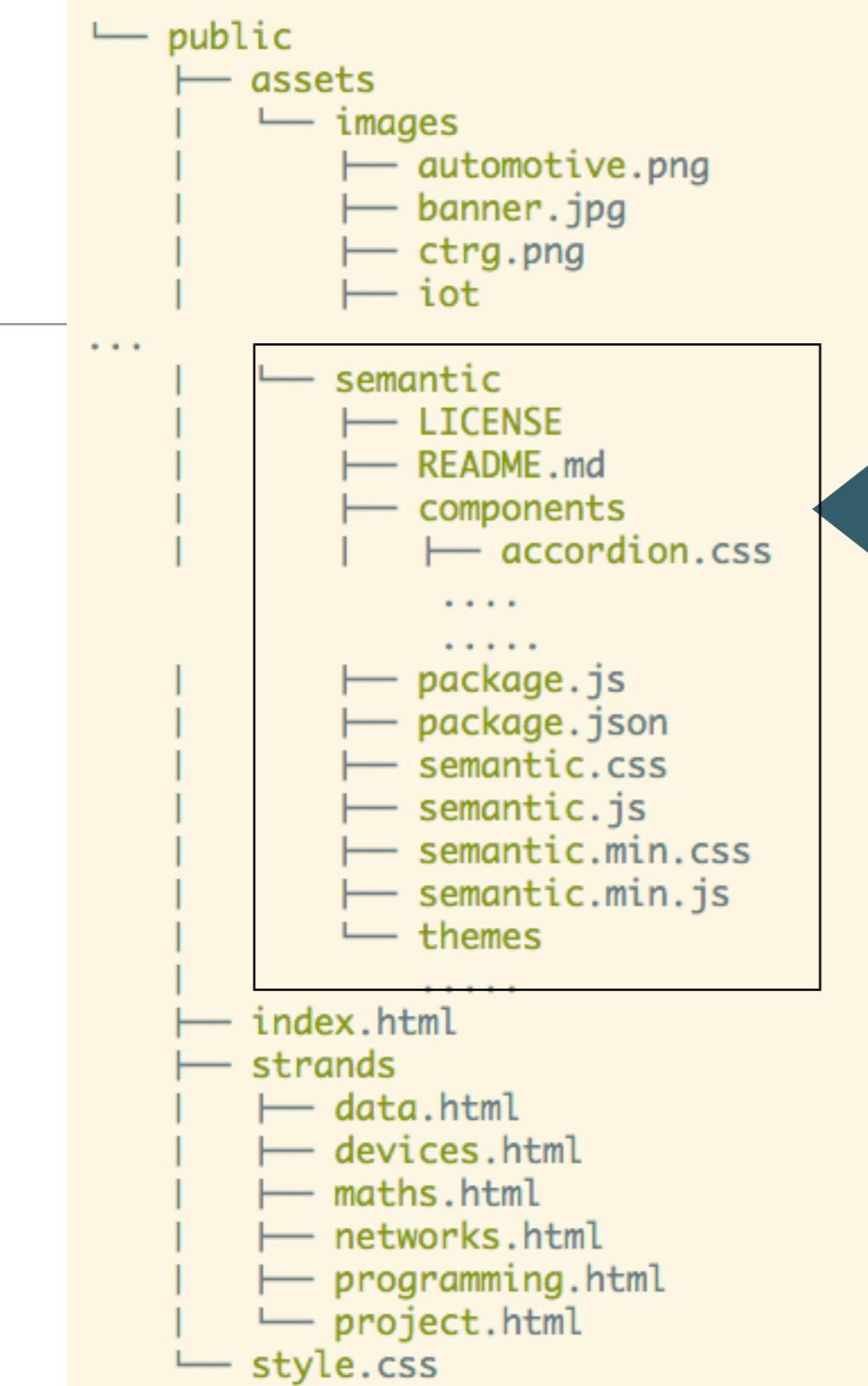
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```
if (empty($vars)) {
    $vars['classes'][] = 'ui';
}
// Since the title and the shortcut link are positioned next to each other in most cases, position them relative to each other by removing the title_prefix and title_suffix if add or remove shortcut or div using the title_prefix and title_suffix wrapper
if ($title_prefix || $title_suffix) {
    $vars['title_prefix'] = array(
        'title' => $title,
        'prefix' => $title_prefix,
        'suffix' => $title_suffix
    );
}
```

Semantic-UI Libraries



- This is the library:
- semantic.css
- + a set of icons and other assets
- The project is not heavily dependent on these files

- semantic.css is linked from all pages:

```
<link rel="stylesheet" href="/assets/css/semantic.css">
```

Alternative Mechanisms for Linking Semantic.css

- Replace

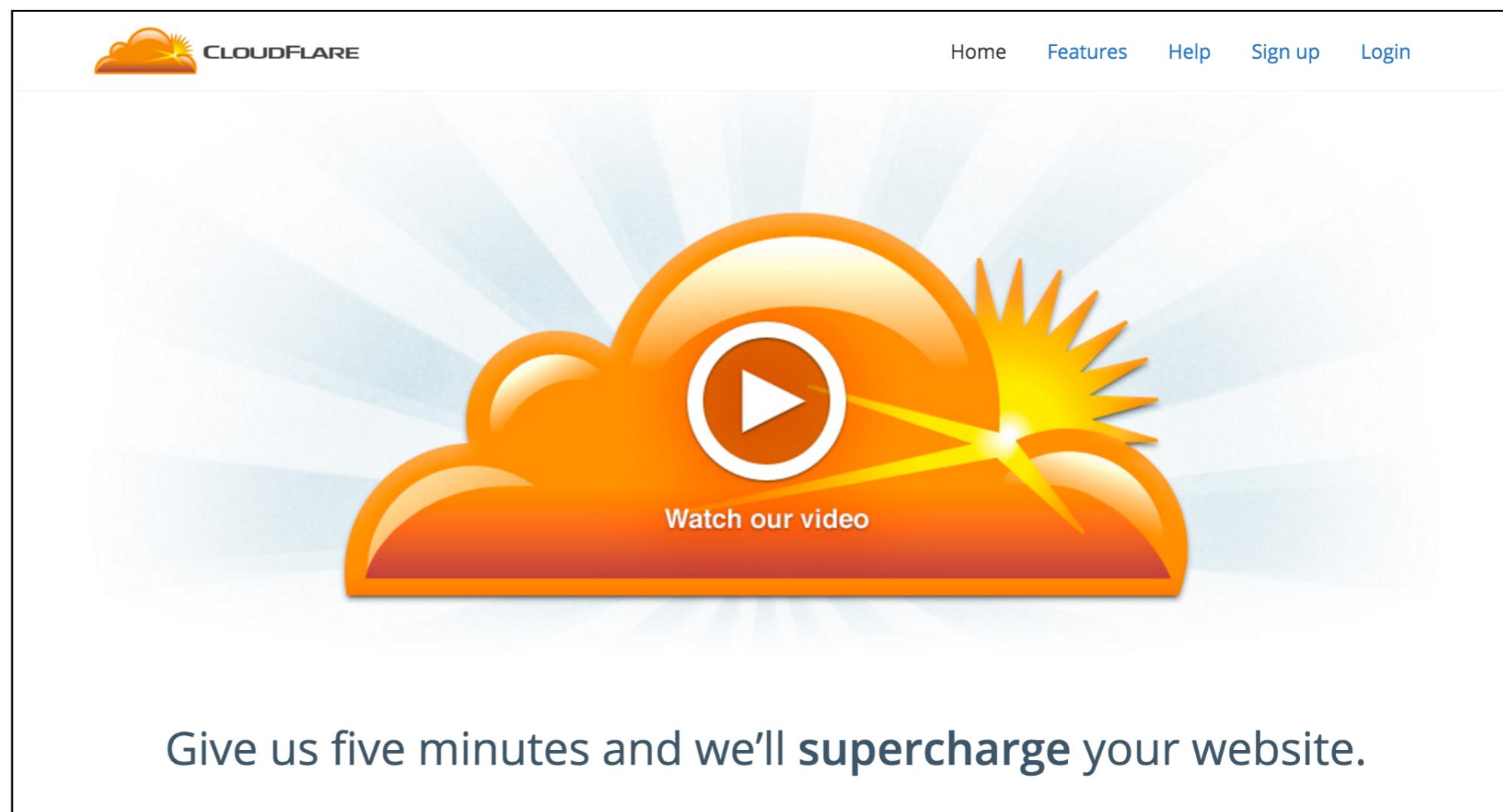
```
<link rel="stylesheet" href="/assets/css/semantic.css">
```

-
- With

```
<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/semantic-ui/2.1.6/semantic.min.css" type="text/css">
<script type="text/javascript" src="http://cdnjs.cloudflare.com/ajax/libs/jquery/2.0.3/jquery.min.js"></script>
<script type="text/javascript" src="https://cdnjs.cloudflare.com/ajax/libs/semantic-ui/2.1.6/semantic.min.js"></script>
```

- Cloud flare is a Content Delivery Network (CDN)

- It hosts many common libraries and assets in the cloud, simplifying access



class =“ui container”

class =“ui segment”

class =“ui header”

class =“ui image”

class =“ui grid”

class =“ui row”

class =“ui column”

class =“ui table”

class =“ui icon”

Summary of Classes (encountered so far)

Variations: grid

stackable, {number} column (*16 for full row*)

Variations: segment

raised, stacked, padded, left/center/right aligned,
top/middle/bottom aligned, {colour}

Variations: table

striped, single line, celled, collapsing

Variations: sizes of image & icon

mini, tiny, small, medium, large, big, huge, massive