Presentation by

Barkha Javed

Module leader

CSS - Responsive Web Design (RWD)

UFCFES-30-1

Overall Learning Map

Client Side

| 2. Presentation/ Layout

CSS | 1.Contents/ Structure

HTML | 5. Dynamic controls/ Interactivity

JavaScript |

4. Python Flask

Server Side

mysql.connector

4. Backend/Server side Programming

Python Flask

3. Persistent Storage/ Database

MySQL/MariaDB
(MongoDB – PyMongo)

Advanced topics: e.g., APIs, Security
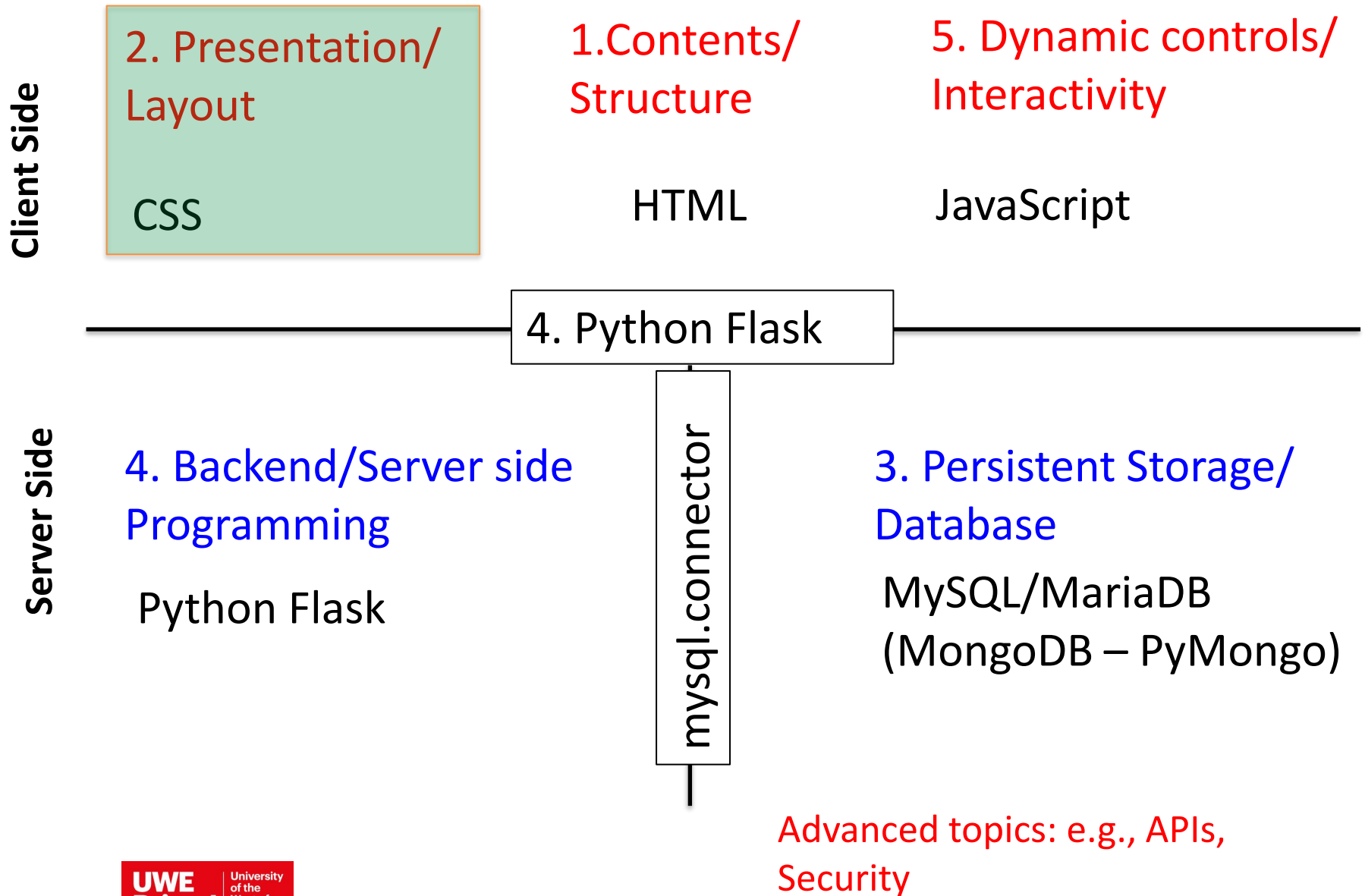
What we covered so far...

HTML

CSS3 in detail

What we'll cover today…

How to build our web pages look good on different devices/screen sizes?

- Media queries

- Breakpoints

Books and Other material

- *Responsive Web Design with HTML5 and CSS3, Ben Frain, PACT Publishing, Birmingham.*

- W3School
  - http://www.w3schools.com/css/css_rwd_intro.asp
- Others:
  - http://learn.shayhowe.com/advanced-html-css/responsive-web-design/

Ack: Examples adapted from w3schools

Traditional Fixed-width design does not work any more!

# Traditional Fixed-width design does not work any more!
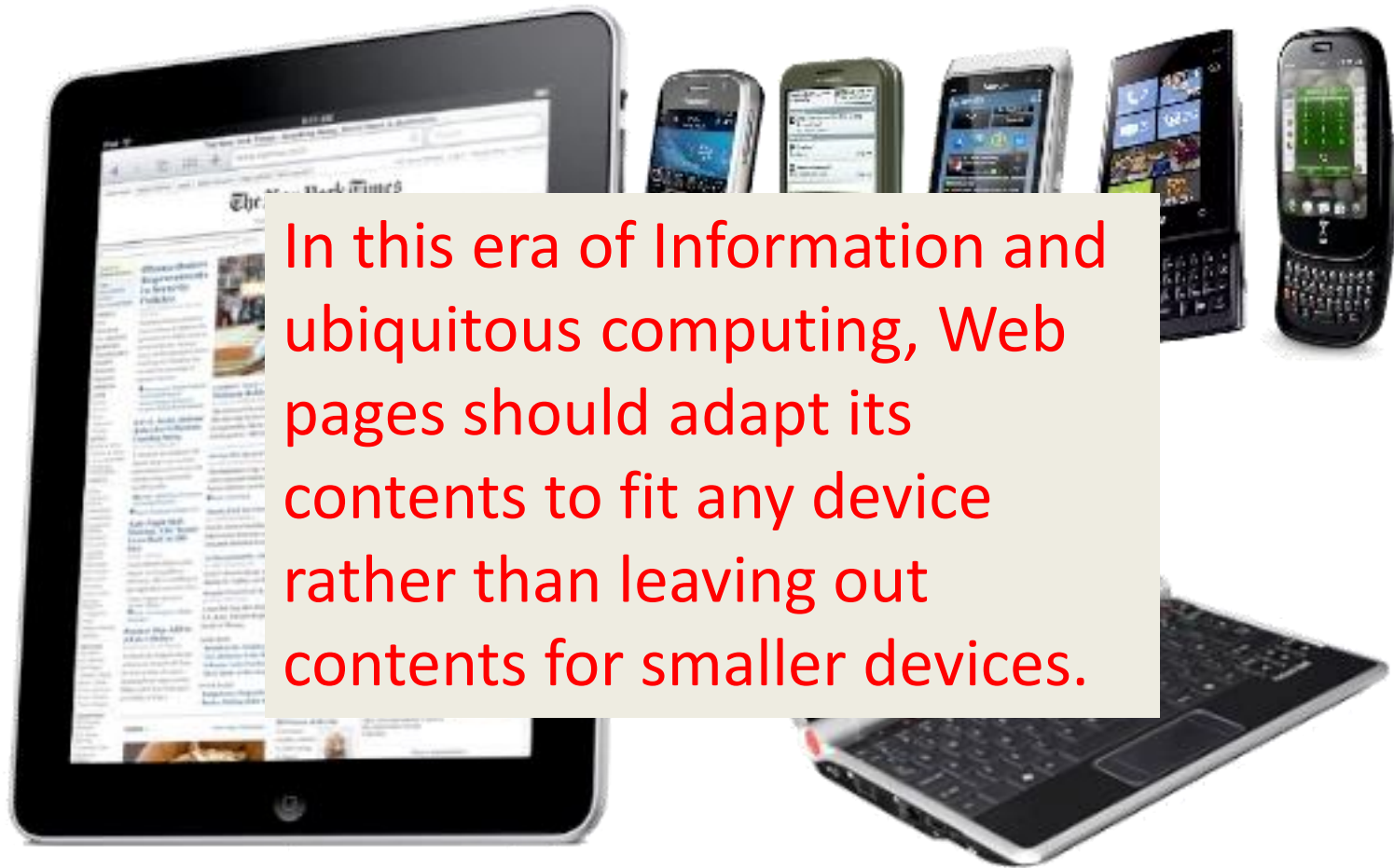
In this era of Information and ubiquitous computing, Web pages should adapt its contents to fit any device rather than leaving out contents for smaller devices.

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Responsive Web Design (RWD)

- **Viewport:** User's visible area of a web page; varies for each device with different screen sizes

- Web browsers auto shrink web contents into small size that fits into device screen but difficult to read without zooming and scrolling!

- RWD is a way of using HTML and CSS to change the webpage layout when it renders on different screen sizes

- It is not a program or JavaScript. It is for better user experience & outreach

- Existing websites can also adopt responsive design
  - *Fixed to Fluid layouts formula: target ÷ context = result*
  - Example: A *rectangle* (Target) of width 300px in a *viewport* of width 900px (Context) can be changed to 300/900 * 100 = 30% width size (Result) for RWD

- **Self study:** W3School - http://www.w3schools.com/css/css_rwd_intro.asp
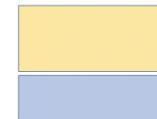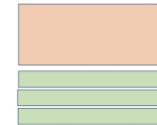
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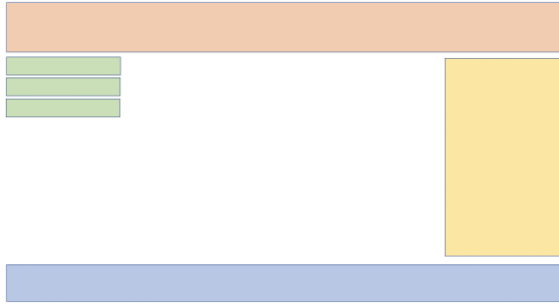
RWD is about using HTML and CSS to *resize, hide, shrink, enlarge, or move the content* *to make it look good on any screen*

Desktop
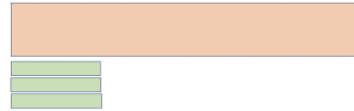
Tablet

Phone

RWD - HTML5 and CSS3

- RWD has three main elements:
  - Flexible layout --> Grid view
    - Capable of dynamically resizing to any width
  - Media Queries
    - Capable to specify different styles for browser/device circumstances
    - Viewport - Meta tags
  - Flexible media e.g. scalable Images, Videos

RWD Grid View
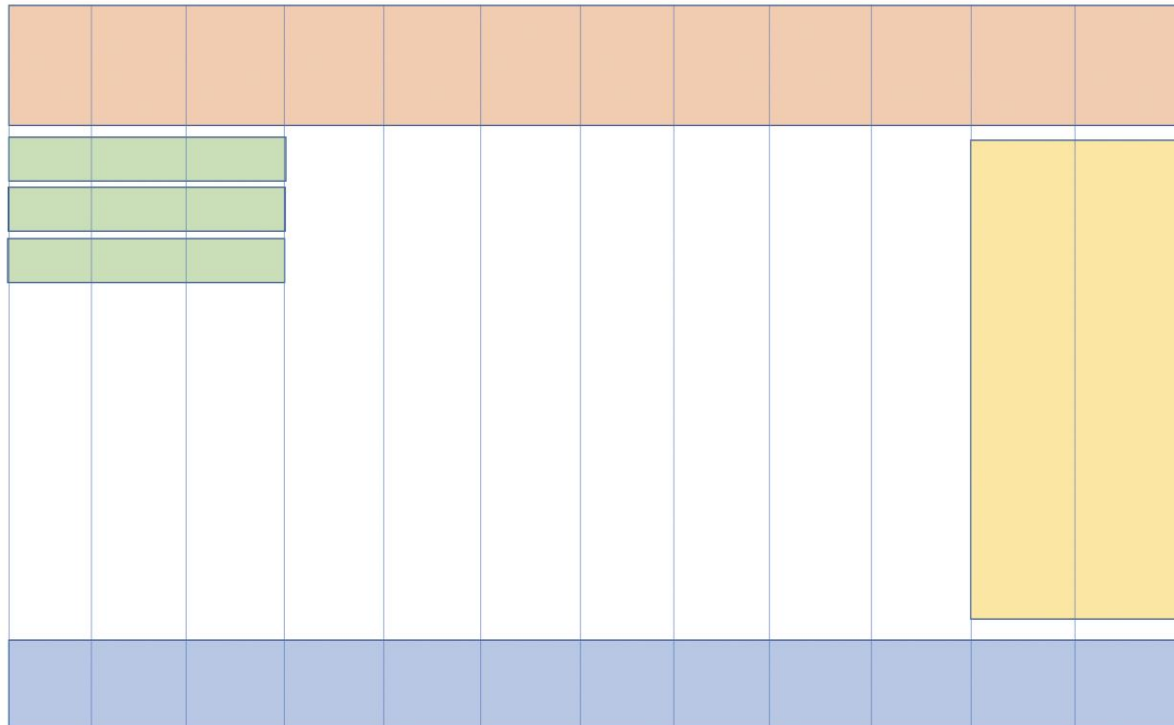
- Divide web page into columns (and rows), this will make it easy to place elements on page
- A responsive grid view has 12 columns and has total width of 100%

RWD Grid View

- Divide web page into columns (and rows), this will make it easy to place elements on page
- A responsive grid view has 12 columns and has total width of 100%

Can you find out what will be the % width of one column?

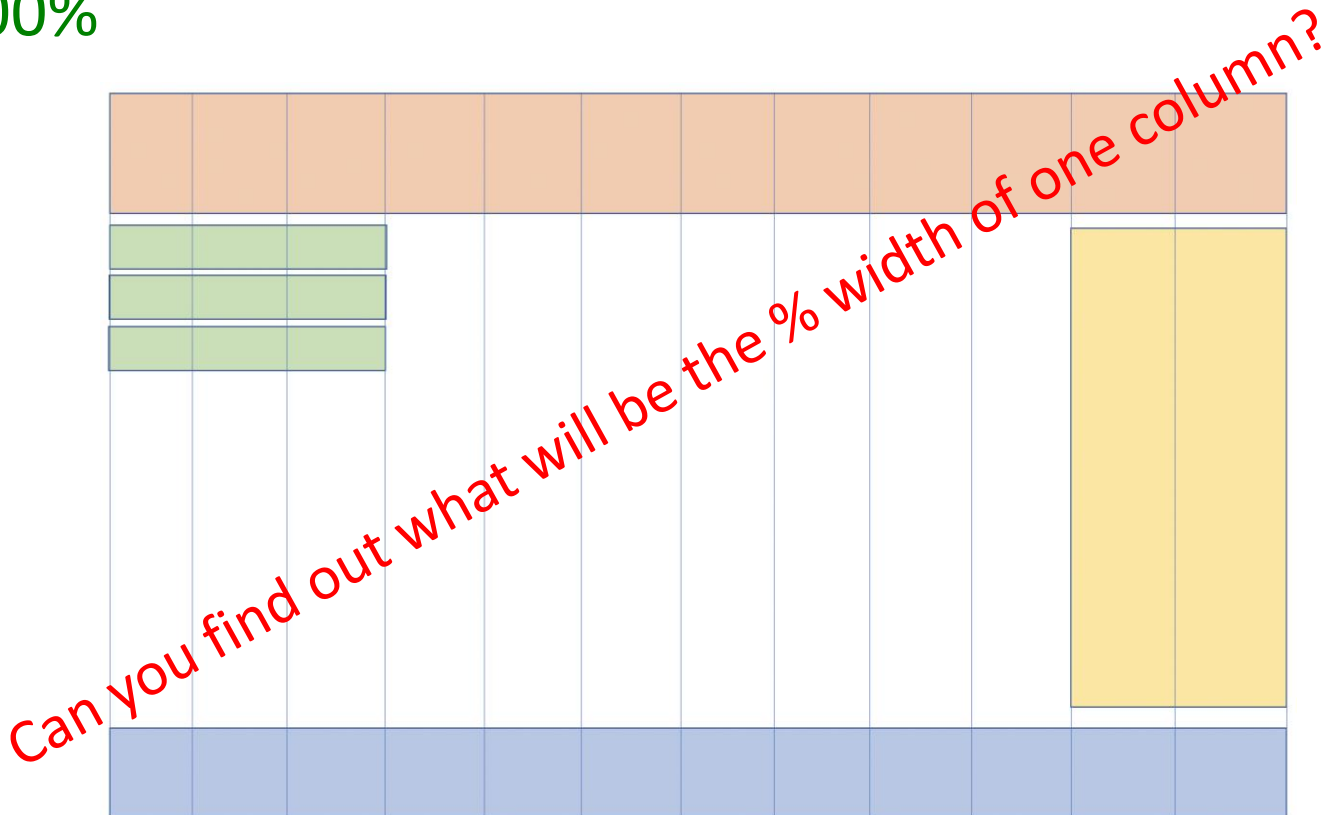# RWD Grid View

- Divides web page into columns (and rows) that makes it easy to place elements on page
- A responsive grid view has 12 columns and has total width of 100%
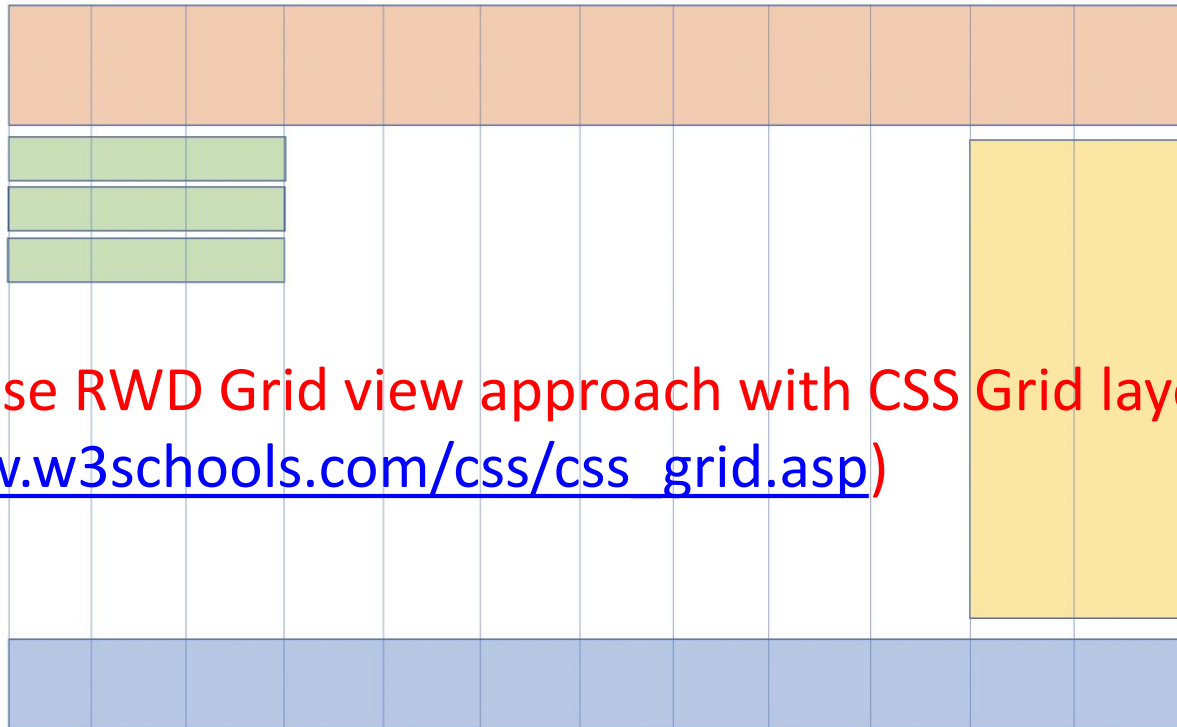
Do not confuse RWD Grid view approach with CSS Grid layout module (https://www.w3schools.com/css/css_grid.asp)

RWD Grid View

- Remember box-sizing property?

- For each HTML element, box-sizing property is set to border-box that ensures that padding and border are included in total height and width of the elements. This can be done by using * universal style:

```
* {
    box-sizing: border-box;
}
```

RWD Grid View

- For each HTML element, box-sizing property is set to border-box that ensures that padding and border are included in total height and width of the elements. This can be done:

```
* {
    box-sizing: border-box;
}
```

Bristol

- The Port
- The City
- The Heritage
- The Food

The City

Bristol is one of the largest cities in United Kingdom. It has population over 450 thousands residents. It is green capital of europe in 2015 and many smart initiatives are being taken.

```html
<!DOCTYPE html>
<html>
<head>
<style>
* {
    box-sizing: border-box;
}
.header {
    border: 1px solid blue;
    padding: 15px;
    width: 900px;
}
.menu {
    width: 300px;
    float: left;
    padding: 15px;
    border: 1px solid green;
}
.main {
    width: 600px;
    float: left;
    padding: 15px;
    border: 1px solid red;
}
</style>
</head>
```

```html
<body>
<div class="header">
    <h1>Bristol</h1>
</div>
<div class="menu">
    <ul>
    <li>The Port</li>
    <li>The City</li>
    <li>The Heritage</li>
    <li>The Food</li>
    </ul>
</div>
<div class="main">
    <h1>The City</h1>
    <p>Bristol is one of the largest cities in United
    Kingdom. It has population over 450 thousands
    residents. It is green capital of Europe in 2015 and
    many smart initiatives are being taken.</p>
</div>
</body>
</html>
```

Without RWD

Bristol

- The Port
- The City
- The Heritage
- The Food

The City

Bristol is one of the largest cities in United Kingdom. It has population over 450 thousands residents. It is green capital of europe in 2015 and many smart initiatives are being taken.

Bristol

- The Port
- The City
- The Heritage and Culture
- The Food

The City

Bristol is one of the largest cities in United Kingdom. It has population over 450 thousands residents. It is green capital of Europe in 2015 and many smart initiatives are being taken.

```html
<!DOCTYPE html>
<html>
<head>
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<style>
* {
    box-sizing: border-box;
}
.header {
    border: 1px solid blue;
    padding: 15px;
}
.menu {
    width: 30%;
    float: left;
    padding: 15px;
    border: 1px solid green;
}
.main {
    width: 70%;
    float: left;
    padding: 15px;
    border: 1px solid red;
}
</style>
</head>
<body>
<div class="header">
        <h1>Bristol</h1>
</div>
<div class="menu">
        <ul>
        <li>The Port</li>
        <li>The City</li>
        <li>The Heritage</li>
        <li>The Food</li>
        </ul>
</div>
<div class="main">
        <h1>The City</h1>
        <p>Bristol is one of the largest cities in United
        Kingdom. It has population over 450 thousands
        residents. It is green capital of Europe in 2015 and
        many smart initiatives are being taken.</p>
</div>
</body>
</html>
```

Grid View

...g property is set to border-box that ensures that ... in total height and width of the elements. This can

Viewport (<meta>)

- User's visible area of a web page; varies for each device with different screen sizes

- In the absence of RWD, web browsers scale down whole web page to fit screens of different sizes

- In HTML 5 <meta> is used to control viewport

- <meta name="viewport" content="width=device-width, initial-scale=1.0">
  - disables the initial scale
  - Uses device width as viewport width
  - Inside <Head> tag
  - width=device-width sets width of page to follow screen size
  - initial-scale=1.0 sets initial zoom level when page is loaded by the browser

RWD Grid settings

- Previous example had two columns 30% and 70% widths. But if you need 12 columns of equal size then this mean you need 100/12=8.33% width for each column.

- If each element takes two columns then the width for each element will be 100/6 = 16.66%
  - <div width='16.66%'>

- If each element takes three columns then what should be the width?
  - <div width='?'>

- If each element takes four columns then what should be the width?
  - <div width='?'>

RWD Grid Settings

- Make a class in CSS for each of 12 columns e.g. "class=col-*"

.col-1 {width: 8.33%;}
.col-2 {width: 16.66%;}
.col-3 {width: 25%;}
.col-4 {width: 33.33%;}
.col-5 {width: 41.66%;}
.col-6 {width: 50%;}
.col-7 {width: 58.33%;}
.col-8 {width: 66.66%;}
.col-9 {width: 75%;}
.col-10 {width: 83.33%;}
.col-11 {width: 91.66%;}
.col-12 {width: 100%;}

```
<style>
* { box-sizing: border-box;  }
.header {  border: 1px solid blue; padding: 15px; }
.row:after {
    content: "";
    clear: both;
    display: block;
}
[class*="col-"] {
    float: left;
    padding: 15px;
    border: 1px solid green;
}
.col-1 {width: 8.33%;}
.col-2 {width: 16.66%;}
.col-3 {width: 25%;}
.col-4 {width: 33.33%;}
.col-5 {width: 41.66%;}
.col-6 {width: 50%;}
.col-7 {width: 58.33%;}
.col-8 {width: 66.66%;}
.col-9 {width: 75%;}
.col-10 {width: 83.33%;}
.col-11 {width: 91.66%;}
.col-12 {width: 100%;}
</style>
```

To prevent placing any other element in row if the columns do not exist

All columns are floating left and have padding 15px

```
<div class="header">
    <h1>Bristol</h1>
</div>
<div class="row">
    <div class="col-3">
        <ul>
        <li>The Port</li>
        <li>The City</li>
        <li>The Heritage</li>
        <li>The Food</li>
        </ul>
    </div>
    <div class="col-9">
        <h1>The City</h1>
        <p>Bristol is one of the largest cities in
United          Kingdom. It has population over 450
thousands      residents. It is green capital of europe
in                  2015 and   many smart initiatives are
being                        taken.</p>
    </div>
</div>
</body>
```

Each row should be wrapped in a <div> and number of cols should always add up to 12

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Bristol

- The Port
- The City
- The Heritage
- The Food

The City

Bristol is one of the largest cities in United Kingdom. It has population over 450 thousands residents. It is green capital of europe in 2015 and many smart initiatives are being taken.

Media Queries

```
Syntax:
@media not|only mediatype and (mediafeature and|or|not mediafeature) {
  CSS-Code;
}
```

MQ provide the ability to specify different styles for individual browser and/or device circumstances e.g. the width of the viewport or media type, device orientation, etc.

```
<style>
body {
  background-color:lightgreen;
}


@media only screen and (max-width: 800px) {
  body {
    background-color:lightblue;
  }
}
</style>
```

When the screen (browser window) gets smaller than 800px, background colour changes to light blue.
Example 2:
min-width:480px --- change the background colour if the viewport is 480 pixel wide or wider

Media types: all, screen, print, speech - Check media types – many have been deprecated.
Media Features: height, width, min-width, max-width, color, hover, orientation, resolution, etc.

https://www.w3schools.com/cssref/css3_pr_mediaquery.asp

An Example

```
<!DOCTYPE html>
<html>
<head>
<style>
body {
    background-color: lightgreen;
}

@media screen and (max-width: 300px) {
    body {
        background-color: lightblue;
    }
}
</style>
</head>
<body>

<p>Resize the browserwindow. When the width of this
document is less than 300 pixels, the background-color is
"lightblue", otherwise it is "lightgreen".</p>

</body>
</html>
```

Result:

Resize the browserwindow. When the width of this document is less than 300 pixels, the background-color is "lightblue", otherwise it is "lightgreen".

Result:

Resize the browserwindow. When the width of this document is less than 300 pixels, the background-color is "lightblue", otherwise it is "lightgreen".

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Source: https://www.w3schools.com/css/css_rwd_mediaqueries.asp

Media Query – Media Rule

- It is CSS3 technique that uses the @media rule to include a block of CSS properties only if a certain condition is true.

- **No limit** on number of media queries

- ```
  @media not|only mediatype and (media feature) {
      CSS-Code;
  }
  ```

- Browser **compatibility** issue: IE7 and IE8 don't understand media queries

- http://www.w3schools.com/cssref/css3_pr_mediaquery.asp

Mobile-first or Desk-top first?

- **Design Decision:** Desktop-first or Mobile-first?

- Desktop-first approach
  - Define default page style first aimed at desktop or laptop screens
  - Move to mobile version using media queries

- Mobile-first approach
  - Define mobile page style first and move to desktop version
  - Rather than changing style, change design for big screens
  - Faster rendering on mobile phones

  Instead of changing styles when the width gets *smaller* than 768px, we should change the design when the width gets *larger* than 768px. This will make our design Mobile First.

- Find out pros and cons of both approaches !!
  http://www.w3schools.com/css/css_rwd_mediaqueries.asp

Media Query – Desktop First

```css
/* For Desktop: */
.col-1 {width: 8.33%;}
.col-2 {width: 16.66%;}
.col-3 {width: 25%;}
.col-4 {width: 33.33%;}
.col-5 {width: 41.66%;}
.col-6 {width: 50%;}
.col-7 {width: 58.33%;}
.col-8 {width: 66.66%;}
.col-9 {width: 75%;}
.col-10 {width: 83.33%;}
.col-11 {width: 91.66%;}
.col-12 {width: 100%;}
```

```css
@media only screen and (max-width: 768px)
/* For mobile phones: */
[class*="col-"] {
    width: 100%;
}
```

https://www.w3schools.com/css/css_rwd_mediaqueries.asp

Media Query – Mobile First

```css
/* For mobile phones: */
[class*="col-"] {
    width: 100%;
}

@media only screen and (min-width:
600px) {
    /* For tablets: */
    .col-m-1 {width: 8.33%;}
    .col-m-2 {width: 16.66%;}
    .col-m-3 {width: 25%;}
    .col-m-4 {width: 33.33%;}
    .col-m-5 {width: 41.66%;}
    .col-m-6 {width: 50%;}
    .col-m-7 {width: 58.33%;}
    .col-m-8 {width: 66.66%;}
    .col-m-9 {width: 75%;}
    .col-m-10 {width: 83.33%;}
    .col-m-11 {width: 91.66%;}
    .col-m-12 {width: 100%;}
}
```

```css
@media only screen and (min-width:
768px) {
    /* For desktop: */
    .col-1 {width: 8.33%;}
    .col-2 {width: 16.66%;}
    .col-3 {width: 25%;}
    .col-4 {width: 33.33%;}
    .col-5 {width: 41.66%;}
    .col-6 {width: 50%;}
    .col-7 {width: 58.33%;}
    .col-8 {width: 66.66%;}
    .col-9 {width: 75%;}
    .col-10 {width: 83.33%;}
    .col-11 {width: 91.66%;}
    .col-12 {width: 100%;}
}
```

https://www.w3schools.com/css/css_rwd_mediaqueries.asp

Typical Screen Sizes

- W3Schoool recommendations
- /* Extra small devices (phones, 600px and down) */
@media only screen and (max-width: 600px) {...}

  /* Small devices (portrait tablets and large phones, 600px and up) */
@media only screen and (min-width: 600px) {...}

  /* Medium devices (landscape tablets, 768px and up) */
@media only screen and (min-width: 768px) {...}

  /* Large devices (laptops/desktops, 992px and up) */
@media only screen and (min-width: 992px) {...}

  /* Extra large devices (large laptops and desktops, 1200px and up) */
@media only screen and (min-width: 1200px) {...}

Source: https://www.w3schools.com/css/css_rwd_mediaqueries.asp

Media Query - Breakpoints

- **Remember layout problem in Bristol example!**

- **Breakpoints** can be added where certain parts of the design will behave differently on each side of the breakpoint

- For example: Breakpoint at 768px i.e. any smaller window will have 100% width for each column (elements will be stacked)

- You can add multiple breakpoints to support different viewport sizes

- See example on next page – adapted from - http://www.w3schools.com/css/tryit.asp?filename=tryresponsive_styles

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Bristol

- The Port
- The City
- The Heritage
- The Food

The City

Bristol is one of the largest cities in United Kingdom. It has population over 450 thousands residents. It is green capital of Europe in 2015 and many smart initiatives are being taken.

Where?

Bristol is in South west of England.

Education?

It has two big universities.

Transport

It has good transport infrastructure

This page is a demonstration of RWD and breakpoints

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The Heritage

The Food

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Bristol

max-width:768px
100% width for each element

Breakpoint at 768px

> max-width:768px (desktop view)
col-3 (25%) for menu; col-6 (50%) for text/content;
col-3 (25%)for aside

Bristol

The Port

The City

The Heritage

The Food

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This page is a demonstration of RWD and breakpoints

```css
<style>
* { box-sizing: border-box; }
.row:after {
    content: "";
    clear: both;
    display: block;}
[class*="col-"] {
    float: left;
    padding: 15px;
}
html {    font-family: "Lucida Sans", sans-serif; }
.header {
    background-color: #898989;
    color: #ffffff;
    padding: 15px;
}
.menu ul {
    list-style-type: none;
    margin: 0;
    padding: 0;
}
.menu li {
    padding: 8px;
    margin-bottom: 7px;
    background-color :#657535;
    color: #ffffff;
    box-shadow: 0 1px 3px rgba(0,0,0,0.12), 0 1px 2px rgba(0,0,0,0.24);
}

.menu li:hover {
    background-color: #00f0ff;
}
.aside {
    background-color: #657535;
    padding: 15px;
    color: #ffffff;
    text-align: center;
    font-size: 14px;
    box-shadow: 0 1px 3px rgba(0,0,0,0.12), 0 1px 2px rgba(0,0,0,0.24);
}

.footer {
    background-color: #898989;
    color: #ffffff;
    text-align: center;
    font-size: 12px;
    padding: 15px;
}
```

```css
/* For desktop: */
.col-1 {width: 8.33%;}
.col-2 {width: 16.66%;}
.col-3 {width: 25%;}
.col-4 {width: 33.33%;}
.col-5 {width: 41.66%;}
.col-6 {width: 50%;}
.col-7 {width: 58.33%;}
.col-8 {width: 66.66%;}
.col-9 {width: 75%;}
.col-10 {width: 83.33%;}
.col-11 {width: 91.66%;}
.col-12 {width: 100%;}

@media only screen and (max-width: 768px) {
    /* For mobile phones: */
    [class*="col-"] {
        width: 100%;
    }
}
</style>
```

Is this desktop-first or mobile-first approach?

```html
<div class="header">
     <h1>Bristol</h1>
</div>

<div class="row">

     <div class="col-3 menu">
          <ul>
          <li>The Port</li>
          <li>The City</li>
          <li>The Heritage</li>
          <li>The Food</li>
          </ul>
     </div>

     <div class="col-6">
          <h1>The City</h1>
          <p>Bristol is one of the largest cities in
United Kingdom. It has population over 450
thousands residents. It is green capital of Europe
in 2015 and many smart initiatives are being
taken.</p>
     </div>

     <div class="col-3">
          <div class="aside">
               <h2>Where?</h2>
               <p>Bristol is in South west of
               England.</p>
               <h2>Education?</h2>
               <p>It has two big universities.</p>
               <h2>Transport</h2>
               <p>It has good transport
               infrastructure</p>
          </div>
     </div>

</div>

<div class="footer">
<p>This page is a demonstration of RWD and
breakpoints</p>
</div>
```

How can we change or re-design previous example to adapt layout for multiple screen sizes?

Multiple Breakpoints

Bristol

The Port

The City

The Heritage

The Food

The City

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It has two big universities.

Transport

It has good transport infrastructure

This page is a demonstration of RWD and breakpoints

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The City

The Heritage

The Food

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It has two big universities.

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This page is a demonstration of RWD and breakpoints

Multiple breakpoints for different screen sizes

```css
/* For mobile phones: */
[class*="col-"] {
    width: 100%;
}
@media only screen and (min-width: 600px) {
    /* For tablets: */
    .col-m-12 {width: 8.33%;}
    .col-m-2 {width: 16.66%;}
    .col-m-3 {width: 25%;}
    .col-m-4 {width: 33.33%;}
    .col-m-5 {width: 41.66%;}
    .col-m-6 {width: 50%;}
    .col-m-7 {width: 58.33%;}
    .col-m-8 {width: 66.66%;}
    .col-m-9 {width: 75%;}
    .col-m-10 {width: 83.33%;}
    .col-m-11 {width: 91.66%;}
    .col-m-12 {width: 100%;}
}
```

```css
@media only screen and (min-width: 768px) {
    /* For desktop: */
    .col-1 {width: 8.33%;}
    .col-2 {width: 16.66%;}
    .col-3 {width: 25%;}
    .col-4 {width: 33.33%;}
    .col-5 {width: 41.66%;}
    .col-6 {width: 50%;}
    .col-7 {width: 58.33%;}
    .col-8 {width: 66.66%;}
    .col-9 {width: 75%;}
    .col-10 {width: 83.33%;}
    .col-11 {width: 91.66%;}
    .col-12 {width: 100%;}
}
```

Multiple breakpoints for different screen sizes

```
/* For mobile phones: */
[class*="col-"] {
    width: 100%;
}
@media only screen and (min-width: 600px) {   @media only screen and (min-width: 768px) {
    /* For tablets: */                             /* For desktop: */
    .col-m-12 {width: 8.33%;}                      .col-1 {width: 8.33%;}
    .col-m-2 {width: 16.66%;}                      .col-2 {width: 16.66%;}
    .col-m-3 {width: 25%;}                         .col-3 {width: 25%;}
```

Isn't this same? Why did we define two identical classes?

```
    .col-m-5 {width: 41.66%;}                      .col-5 {width: 41.66%;}
    .col-m-6 {width: 50%;}                         .col-6 {width: 50%;}
    .col-m-7 {width: 58.33%;}                      .col-7 {width: 58.33%;}
    .col-m-8 {width: 66.66%;}                      .col-8 {width: 66.66%;}
    .col-m-9 {width: 75%;}                         .col-9 {width: 75%;}
    .col-m-10 {width: 83.33%;}                     .col-10 {width: 83.33%;}
    .col-m-11 {width: 91.66%;}                     .col-11 {width: 91.66%;}
    .col-m-12 {width: 100%;}                       .col-12 {width: 100%;}
}                                              }
```

Multiple Breakpoints

max-width:600px
100% width for each element

min-width:600px (tablet view)
col-3 (25%) for menu; col-9 (75%) for text/content;
col-12 (100%)for aside

min-width:768px (desktop view)
col-3 (25%) for menu; col-6 (50%) for text/content; col-3 (25%)for aside

Bristol

The Port

The City

The Heritage

The Food

The City

Bristol is one of the largest cities in United Kingdom. It has population over 450 thousands residents. It is green capital of Europe in 2015 and many smart initiatives are being taken.

Where?

Bristol is in South west of England.

Education?

It has two big universities.

Transport

It has good transport infrastructure

This page is a demonstration of RWD and breakpoints

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Multiple breakpoints for different screen sizes

It gives opportunity in HTML to decide what will happen to columns at each breakpoint

```html
<div class="row">
  <div class="col-3 col-m-3 menu">
    <ul>
    <li>The Port</li>
    <li>The City</li>
    <li>The Heritage</li>
    <li>The Food</li>
    </ul>
  </div>

  <div class="col-6 col-m-9">
    <h1>The City</h1>
    <p>Bristol is one of the largest cities in
United      Kingdom. It has population over 450
    thousands residents. It is green capital of
    Europe in 2015 and many smart
    initiatives are being taken.</p>
  </div>
```

```html
<div class="col-3 col-m-12">
    <div class="aside">
      <h2>Where?</h2>
      <p>Bristol is in South west of
England.</p>
      <h2>Education?</h2>
      <p>It has two big universities.</p>
      <h2>Transport</h2>
      <p>It has good transport
infrastructure</p>
    </div>
</div>

</div>

<div class="footer">
    <p>This page is a demonstration of RWD and
breakpoints</p>
</div>
```

Spot difference: For desktop 3, 6, 3 and for Tablet 3, 9, 12

Media queries for Page Orientation

- Portrait or Landscape
- Specific rules can be applied when browser width is wider than its height

```
@media only screen and (orientation: landscape) {
   body {
      background-color: lightblue;
   }
}
```

```
<!DOCTYPE html>
<html>
<head>
<meta name="viewport" content="width=device-width, initial-
scale=1.0">
<style>
body {
    background-color: lightyellow;
}

@media only screen and (orientation: landscape) {
    body {
        background-color: red;
        color: white;
    }
}
</style>
</head>
<body>
<p>This is an example of changing web page orientation from portrait
to landscape i.e. reducing height of the browser by resizing it </p>
</body>
</html>
```

This is an example of changing web page orientation from portrait to landscape i.e. reducing height of the browser by resizing it

This is an example of changing web page orientation from portrait to landscape i.e. reducing height of the browser by resizing it

Hiding an element / Variable Font size

- **Can you tell what following media queries will do?**

```css
@media only screen and (max-width: 600px) {
  div.hideelementexample {
    display: none;
  }
}
```

- **Varible Font Size**

```css
@media only screen and (min-width: 601px) {
  div.bigfontexample {
    font-size: 80px;
  }
}
```

```css
@media only screen and (max-width: 600px) {
  div.smallfontexample {
    font-size: 30px;
  }
}
```

Source: https://www.w3schools.com/css/css_rwd_mediaqueries.asp

Flexible Media e.g. Images

- How to handle images when switching from fixed-width to responsive layout?

- Image size with **specific width and height won't scale automatically** and probably will not fit in the containers on reduced size viewport

- Simple solution is:

img {width: auto; max-width: 100%; height: auto;}

Handle background images with media queries

Images

- For responsive images set **width** property of img classifier to 100%

- width property allows scaling up even more than original size of the image

- max-width property set to 100% will allow scaling down but never scaling to be larger than image actual size

```
<style>
img {
    width: 100%;
    height: auto;
}
</style>
```

<img src="any.jpg" width="460" height="345">

Remember background-size with %age, contain and cover properties we studied in previous lecture?

Example Source: http://www.w3schools.com/css/css_rwd_images.asp

Large and small images

- **Tip:** Use media queries to load small images on small devices rather than scaling it down!

```
<style>
/* For width smaller than 400px: */
body {
    background-repeat: no-repeat;
    background-image: url('small.jpg');
}


/* For width 400px and larger: */
@media only screen and (min-width: 400px) {
    body {
        background-image: url('large.jpg');
    }
}
</style>
```

Also can use min-device-width instead of min-width that checks device width rather than browser width and then image size won't change

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RWD Videos

- Responsive video player (scale up and down) by setting width property to 100%

- max-width can be used with video classifier (scale down but no scale up larger than original size)

```
<style>
video {
    width: 100%;
    height: auto;
}
</style>
```

```
<video width="400" controls>
  <source src="abc.mp4" type="video/mp4">
  <source src="bbc.ogg" type="video/ogg">
  Your browser does not support HTML5 video.
</video>
```

RWD Frameworks

- W3.css - CSS

- Bootstrap – CSS, HTML and jQuery

More: http://www.w3schools.com/css/css_rwd_frameworks.asp

Summary

- Basic CSS for presentation purposes
- CSS3 with variety of new features e.g. transitions, animations, background images, etc
- RWD is necessary for modern web development
  - Flexi design: Media Queries, Flexi-media, etc.

- Next Topic: Introduction to Databases