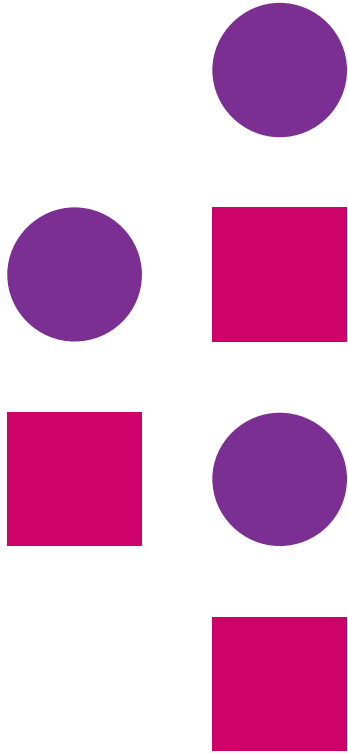
WSA | Forward looking IT finishing school

Responsive Design

Cascading Style Sheets (CSS3)

Table of Content

- Responsive Design



Responsive Design

(Cascading Style Sheets)

Responsive Web Design
(Background)

- Initially, web pages were targeted to render on computer screens
- Therefore, they were designed to have fixed size
- Later, users started surfing the internet using tablets and mobile phones
- The fixed size web pages were too large to fit the display area and user experience was poor

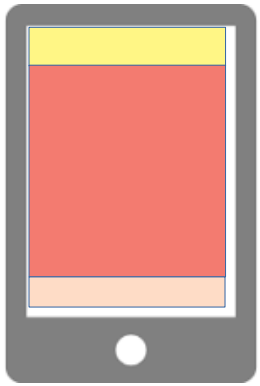
Responsive Web Design
(why?)

- Responsive web design makes the web page look good on all devices (desktop, tablets, phones)
- It enables unified user experience across different screen sizes
- You can also avoid code duplication with careful design
- Minimize testing, maintenance effort and cost

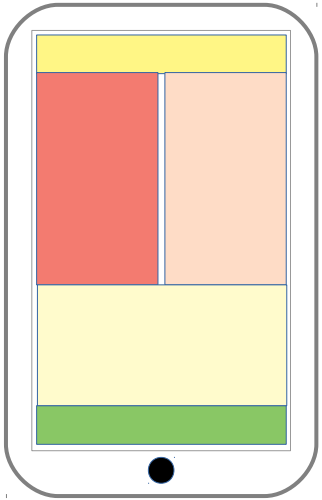
Responsive Web Design
(What?)

- Responsive Web design is about using CSS and HTML to resize, hide, shrink, enlarge or move the content to make it look good on different screen size devices
- Or in other words content responds to the size of dynamic view

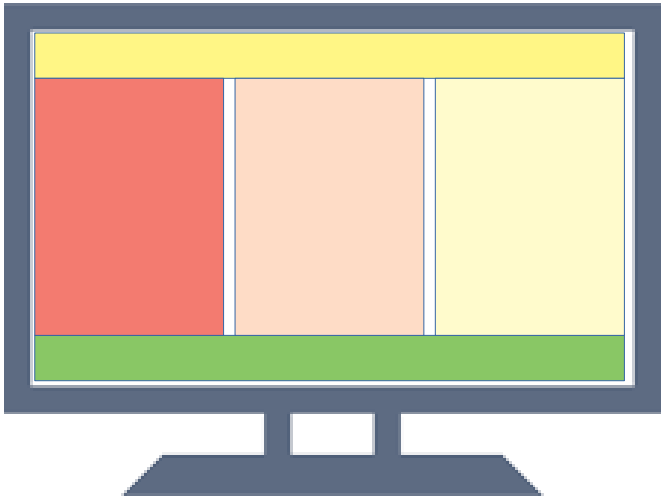
Responsive Web Design



Mobile



Tablet



Desktop

Responsive Web Design

*Source : W3C School

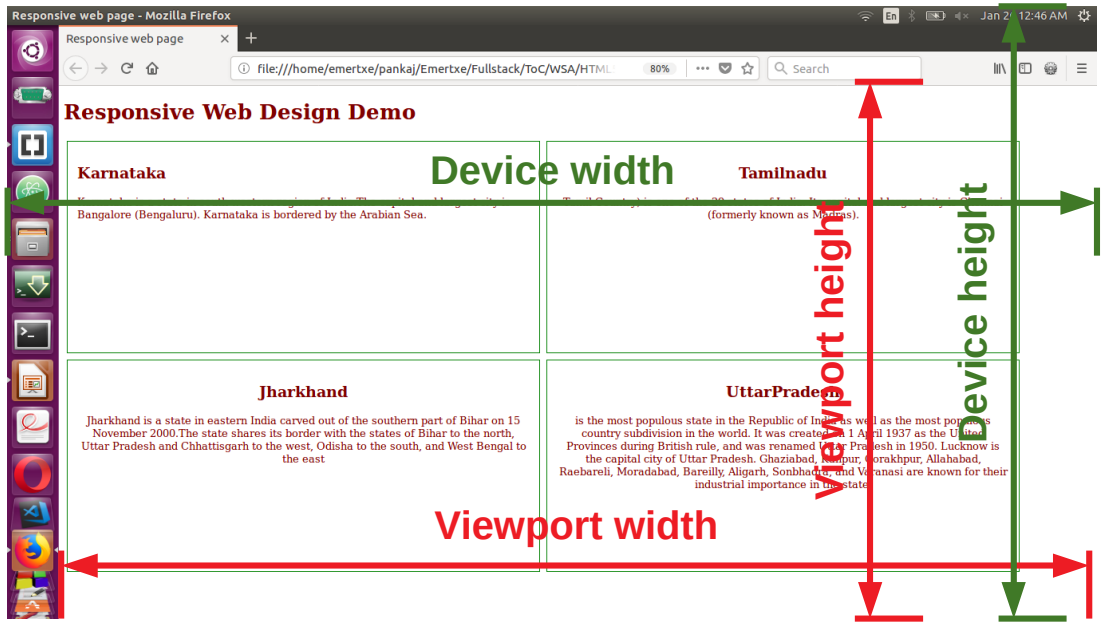
Responsive design
(Key features)

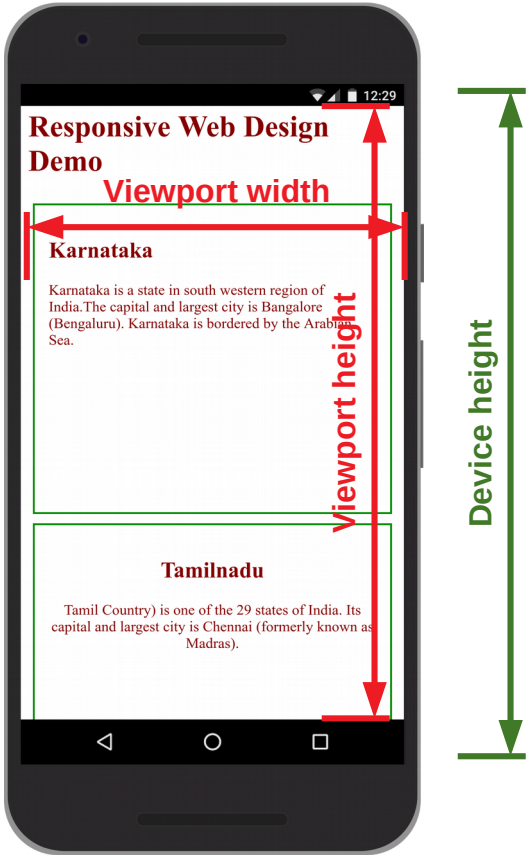
- Media queries and media query listeners
- A flexible grid-based layout that uses relative sizing
- Resizeable flexible images and media

Viewport

- Viewport on desktop is user's visible area of a web page
- It’s basically the size of browser window (excluding toolbars and scrollbars)
- The viewport on mobile phone may be different than user’s visible area
  - Example: Safari on desktop and mobile have different viewport

Viewport


Responsive web page - Mozilla Firefox
Responsive web page
file:///home/emertxe/pankaj/Emertxe/Fullstack/ToC/WSA/HTML
Search
Responsive Web Design Demo
Karnataka
Bangalore (Bengaluru). Karnataka is bordered by the Arabian Sea.
Tamilnadu
(formerly known as Madras).
Jharkhand
Jharkhand is a state in eastern India carved out of the southern part of Bihar on 15 November 2000.The state shares its border with the states of Bihar to the north, Uttar Pradesh and Chhattisgarh to the west, Odisha to the south, and West Bengal to the east
UttarPradesh
Device width
Viewport height
Device height
Viewport width


12:29
Responsive Web Design Demo
Viewport width
Karnataka
Karnataka is a state in south western region of India.The capital and largest city is Bangalore (Bengaluru). Karnataka is bordered by the Arabian Sea.
Viewport height
Tamilnadu
Tamil Country) is one of the 29 states of India. Its capital and largest city is Chennai (formerly known as Madras).
Device height

Viewport

- The user resizes the viewport by resizing the window
- If webpage is larger than the viewport, then user scrolls to see more content of the webpage
- When the viewport is resized, browser may change the document’s layout
- Example: Expand or shrink the width of the text to fit

Setting viewport

```
<meta name="viewport" content="width=device-width, initial-scale=1.0,
user-scalable=1" />
```

- Width of viewport is set to the physical width of device's screen
- Width of device screen is in CSS pixels at a scale of 100%
- The maximum-scale, minimum-scale, and user-scalable properties control how users are allowed to zoom-in or zoom-out the page

Property values

Property	Description
width	Width of the virtual viewport of the device
height	Height of the virtual viewport of the device
device-width	Physical width of the device's screen
device-height	Physical height of the device's screen
initial-scale	Initial zoom when visiting the page (1.0 meaning no zoom)
minimum-scale	Minimum amount a user can zoom the page (1.0 meaning no zoom)
maximum-scale	Maximum amount a user can zoom the page (1.0 meaning no zoom)
user-scalable	Allows the device to zoom in and out (yes | no)

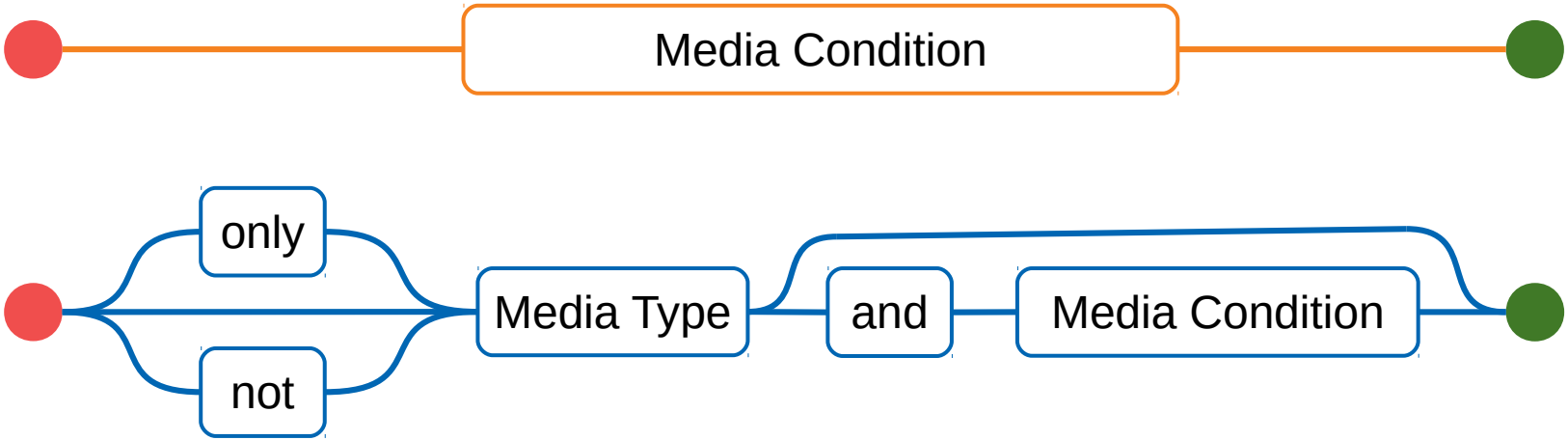
Zoom Level

- The initial-scale property controls the zoom level when the page is first loaded
- Initial zoom level is set to 1.0 which means 1 CSS pixel is equal to 1 viewport pixel
- The maximum-scale, minimum-scale, and user-scalable properties control how users are allowed to zoom-in/out the page
- When user-scalable is set to “no” it prevents the user from zooming

Media Query

- A media query is a method of testing certain aspects of the user agent or device
- It uses the @media rule to include a block of CSS properties only if a certain condition is true

Media Query



Media Query

- A media query is a logical expression which could be either true or false
- A media query is true if -
  - The media type, if specified, matches the media type of the device where the user agent is running, and the media condition is true

Media Query

Example :

```
/* Following media query will be true for devices having display screen */


@media  screen {
        body {
                background-color: red;
            };
}
```

Media Query
(operators)

Operator	Description
and	• Is logical AND operator • It Combines a media feature with a media type or other media features
not	• Is media query modifier • It negates the result of an individual media query
only	• Is media query modifier • It hides media queries from legacy user agents • The only keyword has no effect on the media query's result

Media Query
(operators)

- By default, “all” media type is used when no other type is specified
- However, if you use the “not” or “only” operators, you must explicitly specify a media type
- The “not” keyword can't be used to negate an individual feature expression, it applies to entire media query

Media Query
(mediatype)

- Media types describe the general category of a given device
- Generally, websites are commonly designed with screens in mind
- But, you may want to create styles that target special devices such as printers or audio-based screen readers

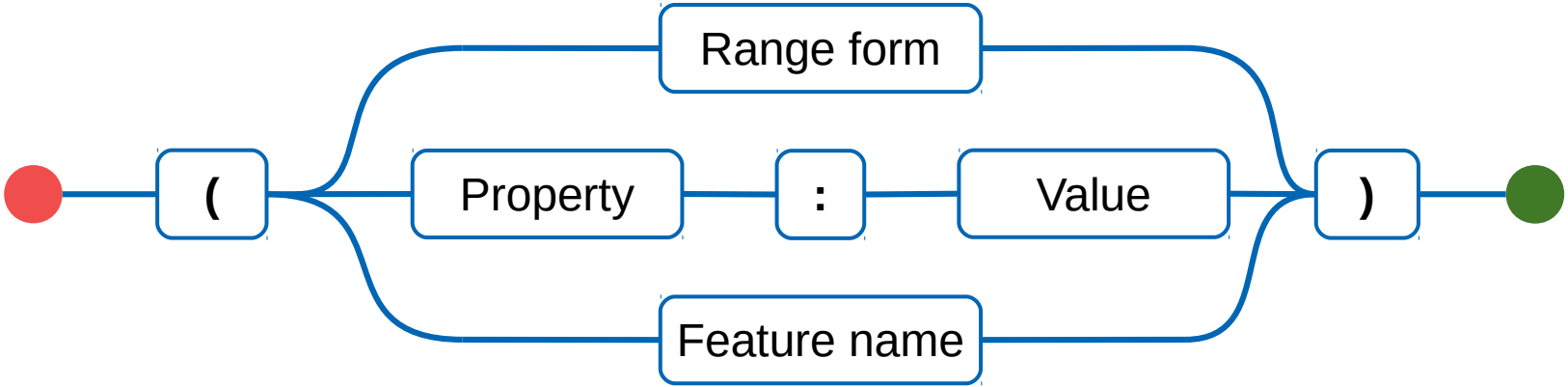
Media Type	Description
all	Used for all media type devices
print	Used for printers
screen	Used for computer screens, tablets, smart-phones etc.
speech	Used for screenreaders that "reads" the page out loud

Media Query
(mediatype)

- Following media types are deprecated
  - tty
  - tv
  - projection
  - handheld
  - braille
  - embossed
  - aural

Media Query
(media feature)

- A media feature is a fine-grained test for testing a single, specific feature of the user agent or display device



Media Query
(media feature)

- Media features describe the specific characteristics of a given user agent, output device, or environment
- For instance, you can apply specific styles to touch screen tablets, desktops that use mice, or to devices that are being used in low-light conditions
- Styles will be used as long as the feature is true
- Media features are entirely optional
- Each media feature expression must be surrounded by parentheses

Media Query
(media feature)

Example :

```
@media  (hover: hover) {
    CSS-Code;
 }
```

Media Query
(media feature)

- Many media features are range features, which means they can be prefixed with "min-" or "max-" to express "minimum condition" or "maximum condition" constraints

```
/* set background color for mobile device */
    @media only screen and (max-width: 500px) {
        body {
            background-color: lightblue;
        }
    }
```

Media Query

```
/* set background color for mobile device */
@media only screen and (max-width: 500px)
```

Evaluation of above query :

Correct : @media only (screen and (max-width: 500px))

Wrong : @media (only screen) and (max-width: 500px)

Media Query

```
/* set background color for mobile device */
 @media only screen and (max-width: 480px) and (orientation: landscape) {
        body {
            background-color: lightblue;
        }
    }
@media screen and (min-height: 680px) and (orientation: portrait) {
        body {
            background-color: red;
        }
    }
```

Media Query
(comma separated '*media query list*')

- Each query in a comma-separated '*media query list*' is treated separately from the others
- A media query list is true if any of its component media queries are true
- And, false only if all of its component media queries are false
- In other words, lists behave like logical operator OR

Media Query
(comma separated '*media query list*')

- Example :

```
/* set background color for mobile device in portrait mode */
   @media screen and (max-width: 320px) and (orientation: portrait),
              screen and (max-width: 480px) and (orientation: landscape) {
      body {
         background-color: red;
      }
   }
```

Media Query
(An empty media query list)

- Empty query list is always true

```
/* set background color for all devices */
    @media {
        body {
            background-color: red;
        }
    }
```

Breakpoint

- Breakpoints are the points at which your sites content will respond to provide the user with the best possible layout to consume the information
- Meaning how the content shall respond when viewport width changes dynamically
- Breakpoints shall be content focused (design to help users consume content)
- These breakpoints sometime called as ‘content breakpoints’ or ‘points of reassembly’

Responsive Image

- If the width property is set to 100%, the image will be responsive and scale up and down
- If the max-width property is set to 100%, the image will scale down if it has to, but never scale up to be larger than its original size

```
<img src="./images/bouquet.jpg" alt="Flower" style="max-width: 100%; height: auto" />
```

Resolution switching

- Resolution switching is nothing but selecting appropriate image as per screen resolution
- Common use cases
  - Provide a HiDPI (Retina) version of image for high-DPI display
  - Provide half HD version of image for 720p display
  - And, offer fallback image formats when a modern format is not supported by an older browser

Art Direction

- Selecting appropriate image for portrait or landscape mode

The picture element

- <picture> element is used to list down relevant images
- Picture element contains source element and image element
- The attributes of source element
  - “srcset” (required) - defines the URL of the image to show
  - “media” - accepts any valid CSS media query
  - “sizes” - defines a single width descriptor, a single media query with width descriptor, or a comma-delimited list of media queries with a width descriptor
  - “type” - defines the MIME type (image/format)

Image Selection

- Browser will use the attribute values to load the most appropriate image
- Browser will use the first <source> element with a matching hint and ignore any following <source> tags
- The <img> element is required as the last child tag of the <picture> declaration block
- The <img> element is used to provide backward compatibility for browsers that do not support the <picture> element, or if none of the <source> tags matched
- The <picture> element works similar to the <video> and <audio> elements
- The first source that fits the preferences is the one being used from given set

Image Selection

- Browser takes ‘device width’ and evaluate which media condition in the sizes list is ‘first one to be true’
- Looks at the slot size given to that media query
- Load the image referenced in the srcset list that ‘most closely matches’ the chosen slot size
- For the slot width, you may provide an absolute length (px, em) or a relative length (such as a percentage)

Image Selection

- Attributes srcset and sizes serve the purpose of image selection

Syntax :
srcset="filename-1 image-width, filename-2 image-width, filename-3 image-width"
sizes="(max-width: width) slot-width, (max-width: width) slot-width, default-slot-width"

Image Selection

- “src” attribute is used as a fallback for the browsers which do not yet support srcset implementation

```
<img src="./images/bouquet.jpg" alt="Flower"
   srcset=“bouquet-320.jpg 320w,  bouquet-480.jpg 480w,
              bouquet-800.jpg 800w”
   sizes="(max-width: 320px) 280px, (max-width: 480px) 440px,
             800px"/>
```

Image Selection

- Here “320w” is real width of image file
- (max-width : 320px) is media condition
- The last slot width has no media condition (this is the default image that is chosen when none of the media conditions are true)
- The browser ignores everything after the first matching condition, so be careful how you order the media conditions

Image Selection

```
<img src="./images/cherry-320x240.jpg"
        alt="cherry"
        srcset="./images/cherry-320x240.jpg 320w,
            ./images/cherry-480x320.jpg 480w,
            ./images/cherry-800x480.jpg 800w"
       sizes="(max-width: 320px) 240px,
           (max-width: 480px) 320px,
           (max-width: 800px) 480px, 1280px" />
```

Image Selection

- The HTML <picture> element allows you to define different images for different resolutions

```
<picture>
   <source srcset="./images/cherry-320x240.jpg 320w, ./images/cherry-480x320.jpg 480w,
                   ./images/cherry-800x480.jpg 800w"
           sizes="(max-width: 320px) 240px, (max-width: 480px) 320px,
                  (max-width: 800px) 480px, 1280px" />
   <img src="./images/cherry-1280x800.jpg" alt="cherry" />
</picture>
```

Image Selection

- Image element is must before </picture> tag, the image will not be displayed otherwise
- Image element provides a default case that will apply when none of the media conditions return true
- Image element’s default case can be used as fallback option for browsers
- Picture element is useful to load different orientation images (such as portrait image for mobile phone and landscape image for laptop

Responsive text

- Responsive text is about amount of textual detail scales relative to your screen size
- The text size can be set with a "vw" unit, which means the "viewport width".
- That way the text size will follow the size of the browser window

```
<h1 style="font-size: 5vw">The Poppy Flower</h1>
```

Class Work

- Design a three equal column layout
- Design a three unequal column layout
- Design two column blog layout

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