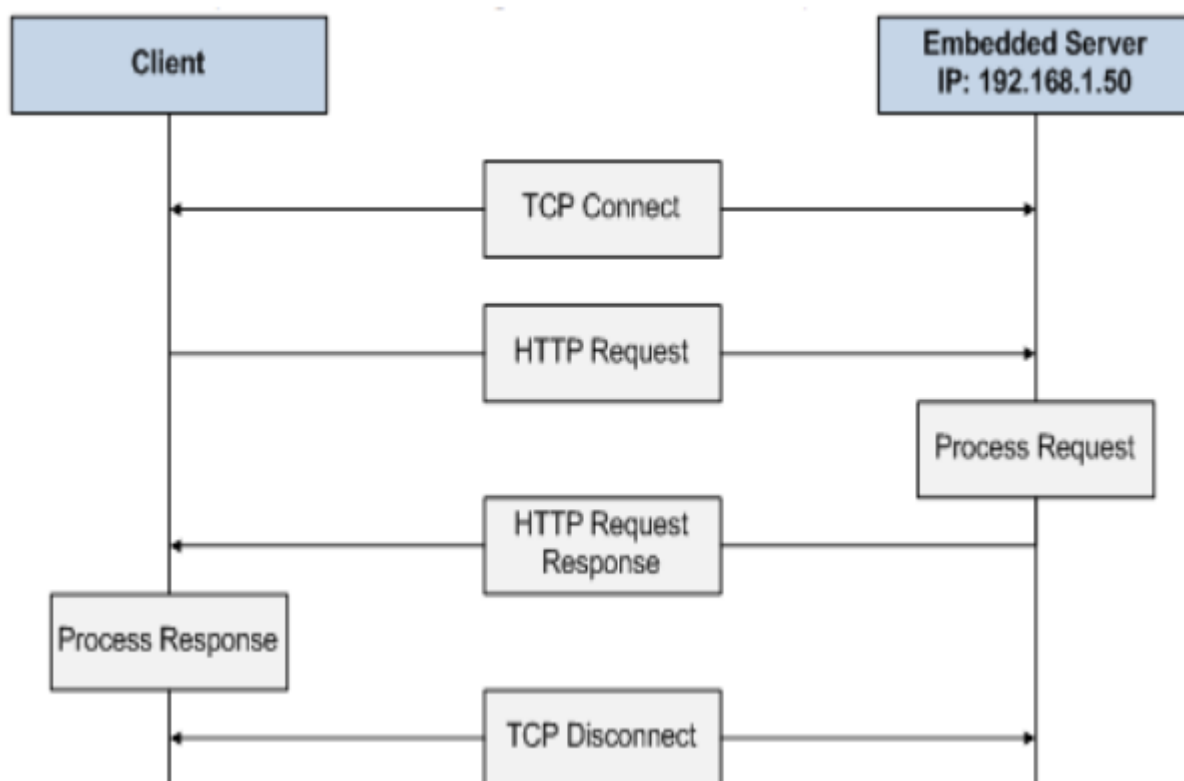# Intro

Web Servers

- Two main parts - document root (servable documents), server root (server architecture)
- Documents stored in locations set by server config file and requests are mapped to these locations

DNS

User -> DNS server -> root server (return) -> Top Level Domain sever (.com/.edu etc; return) -> Domain specific name server (return) -> returns to user OS -> starts TCP handshake

HTTP

- HTTP server is stateless
- persistent HTTP - multiple objects can be sent over single TCP connection
- non persistent HTTP - single object is sent over a TCP connection and then the connection is closed

HTTP Request

Request line followed by zero or more request headers
Request line: `<method> <uri> <req_version>`

```
GET /test.html HTTP/1.1
Accept: */*
```

```
Accept-Language: en-us
Accept-Encoding: gzip, deflate
User-Agent: Mozilla/4.0 (compatible; MSIE 4.01;
Windows 98)
Host: euro.ecom.cmu.edu
Connection: Keep-Alive
CRLF (\r\n)
```

CRLF : Carriage Return Line Feed

HTTP Response

Response line followed by zero or more request headers

Response line: `<resp_version> <status_code> <status_msg>`

```
HTTP/1.1 200 OK
Date: Thu, 22 Jul 1999 04:02:15 GMT
Server: Apache/1.3.3 Ben-SSL/1.28 (Unix)
Last-Modified: Thu, 22 Jul 1999 03:33:21 GMT
ETag: "48bb2-4f-37969101"
Accept-Ranges: bytes
Content-Length: 79
Keep-Alive: timeout=15, max=100
Connection: Keep-Alive
Content-Type: text/html
CRLF
<html>
<head><title>Test page</title></head>
<body>
<h1>Test page</h1>
</html>
```

CRLF : Carriage Return Line Feed

Basic HTML

Definition List

```
<dl >
<dt> 152 </dt>        // data title
<dd> Two-place trainer </dd>      // data definition
<dt> 172 </dt>
<dd> Smaller four-place airplane </dd>
</dl>
```

Tables (rowspan, colspan, extra td)

```
<table border = "border">
        <tr>
```

```html
            <td rowspan = "2"> Testing </td>
            <th colspan = "3"> Fruit Juice Drinks
            </th>
            </tr>
            <tr>
            <th> Apple </th>
            <th> Orange </th>
            </tr>
            <tr>
                <td rowspan = "2">1</td>
                <td>2</td>
                <td>3</td>
            </tr>
            <tr>
                <td>4</td>
                <td>5</td>
                <td>6</td>
            </tr>
            </table>
```

Testing	Fruit Juice Drinks		
	Apple	Orange	
1	2	3	
	4	5	6

Form

```html
<form method="get" action="/" target="_blank">
        <label>Username:    </label>
        <input type="text" name="username" required placeholder="Enter username"/>
<br/><br/>
        <label>Gender:</label>
        <input type="radio" name="gender" value="m"/><label>Male</label>
        <input type="radio" name="gender" value="f"/><label>Female</label>
        <input type="radio" name="gender" value="x"/><label>Prefer not to say</label>
<br/><br/>
        <label>Hobbies</label><br/>
        <input type="checkbox" name="hobby" value="fb"/><label>Football</label><br/>
        <input type="checkbox" name="hobby" value="cr"/><label>Cricket</label><br/>
        <input type="checkbox" name="hobby" value="rd"/><label>Reading</label><br/>
<br/>
        <label>Country</label><br/>
        <select>      <!--- dropdown menu --->
            <option>India</option>
            <option>Nepal</option>
            <option>China</option>
        </select><br/><br/>
        <label>Email: </label><input type="email" name="email" placeholder="Enter
email"><br/><br/>
```

```html
        <label>Age: </label><input type="number" min="0" max="100" name="age"
step="1" placeholder="Enter age" width="100px"><br/><br/>     // number up down
        <label>Salary:</label><input type="range" min="0" max="10000000" step="10000"
name="salary"><br/><br/>        // slider
        <button type="submit" value="submit">Submit</button>
        <button type="reset" value="reset">Reset</button>
    </form>
```

```html
<html>
<head>
    <title>Test Webpage</title>
</head>
<body>
    <h1>This is a heading</h1>
    <p>This is a paragraph</p>
    <h6>This is a much smaller heading</h6>
    <p>This is an unordered list</p>
    <ul>
        <li>List Item 1</li>
        <li>List Item 2</li>
    </ul>
    <p>This is an ordered list (desc)</p>
    <ol desc>
        <li>List Item 1</li>
        <li>List Item 2</li>
    </ol>
    <dl>
        <dt>First Sem</dt>
        <dd>Python, Chemistry, Maths</dd>
        <dt>Second Sem</dt>
        <dd>C, Physics, Electrical</dd>
    </dl>
    <center>
        <table border="5">
            <caption>Example Table</caption>
            <tr>
                <th>Name</th>
                <th>Class</th>
                <th>Section</th>
            </tr>
            <tr>
                <td>Abhinav</td>
                <td>5</td>
                <td>A</td>
            </tr>
        </table>
        <p/>
        <img height="250" width="200" src="static/logo.png"/>
    </center>
</body>
</html>
```
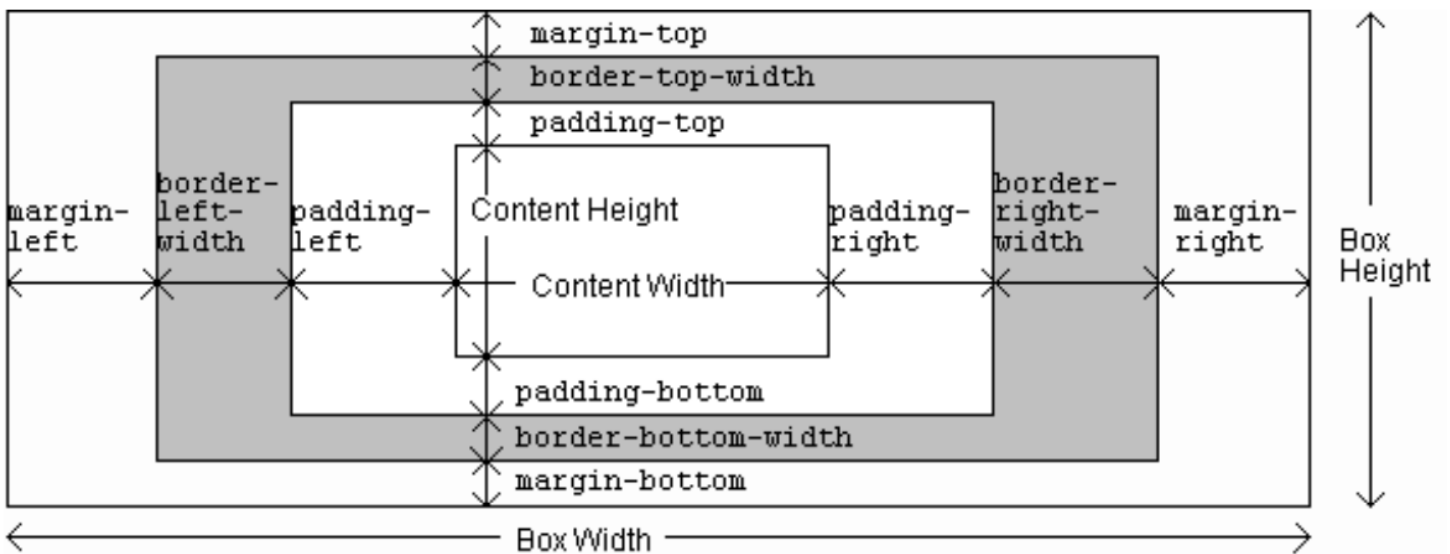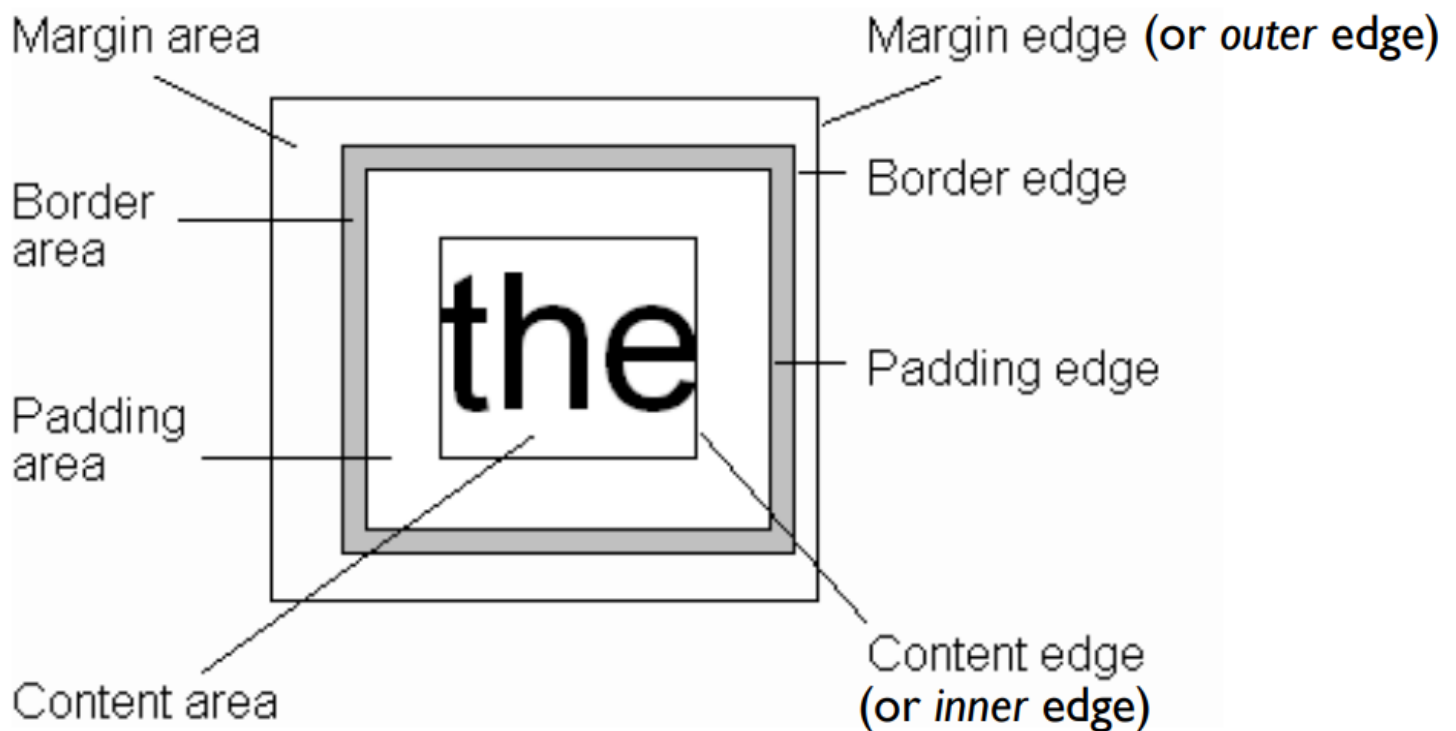
CSS - Cascading Style Sheets

Inline -> Internal Sheet -> External Sheet

Box Model

Chinese Paneer Butter Masala

Inline Styling

```
<p style = "font-size: 15pt; color: skyblue;"> This is formatted. </p>
```

Internal Style Sheet

```
<!DOCTYPE html>
<!-- Embedded style sheet. -->
```

```html
<html>
  <head>
    <meta charset="utf-8">
    <title>Embedded Style Sheet</title>

    <!-- this begins the style sheet section -->
    <!--- Type: Multipurpose Internet Mail Extensions (MIME) --->
    <style type="text/css">
      em     { font-weight: bold;
               color: black; }
      h1     { font-family: tahoma, helvetica, sans-serif; }
      p      { font-size: 12pt;
               font-family: arial, sans-serif; }
      .special { color: purple; }
    </style>
  </head>
  <body>
    <!-- this attribute applies the .special style class -->
    <h1 class="special">Deitel & Associates, Inc.</h1>

    <p>Deitel & Associates, Inc. is an authoring and
       corporate training organization specializing in
       programming languages, Internet and web technology,
       iPhone and Android app development, and object
       technology education.</p>

    <h1>Clients</h1>
    <p class="special">The company's clients include many
       <em>Fortune 1000 companies</em>, government agencies,
       branches of the military and business organizations.</p>
  </body>
</html>
```

Deitel & Associates, Inc.

Deitel & Associates, Inc. is an authoring and corporate training organization specializing in programming languages, Internet and web technology, iPhone and Android app development, and object technology education.

Clients

The company's clients include many **Fortune 1000 companies**, government agencies, branches of the military and business organizations.

MIME type	Description
text/css	CSS documents
image/png	PNG images
text/javascript	JavaScript markup
text/plain	Plain text
image/jpeg	JPEG image
text/html	HTML markup

External Stylesheet

```html
<link rel="stylesheet" type="text/css" href="styles.css"/>
```

Selectors

```html
<style>
        span {background: skyblue; font-family: Consolas;}
        span#id {background: lightcoral;}
        span#id.special {font-family: Helvetica;}
        span a{color: cyan; font-style: italic}
        span > em {color: aquamarine;}
    </style>
  </head>
  <body>
    <span> This is a span </span><br/>
    <span id="id"> This is a span with id id </span><br/>
    <span class="special"> this is a span with special class, no id. <a>this is
anchor tag inside span</a></span><br/>
    <span id="id" class="special">this is a span with special class and id id</span>
<br/>
    <span> <em>this is em within span. </em>
    <p><em>this is em within para of span. </em></p></span>
</body>
```

This is a span
This is a span with id id
this is a span with special class, no id. *this is anchor tag inside span*
this is a span with special class and id id
this is em within span.

this is em within element of span.

Pseudo Classes

:link → :visited → :hover → :focus → :active

Selector	Type	Description
:link	pseudo-class	Selects links that have not been visited
:visited	pseudo-class	Selects links that have been visited
:focus	pseudo-class	Selects elements that have the input focus (e.g., text boxes)
:hover	pseudo-class	Selects elements when the mouse pointer is above them
:active	pseudo-class	Selects an element being activated by the user (e.g., a clicked link)
:checked	pseudo-class	Selects a checked form element (e.g., a radio button)
:first-child	pseudo-class	Selects the first child of its parent element

Selector	Type	Description
`:first-letter`	pseudo-element	Selects the first letter of an element
`:first-line`	pseudo-element	Selects the first line of an element

Block Level vs Inline Level Elements

Block-level elements

- A block-level element always starts on a new line, and the browsers automatically add some space (a margin) before and after the element.
- A block-level element always takes up the full width available (stretches out to the left and right as far as it can).
- Some example block-level elements are: `<div>, <h1>-<h6>, <p>, <ul>,<nav>`

In-Line elements

- An inline element does not start on a new line.
- An inline element only takes up as much width as necessary.
- Some example inline-level elements are: `<span>, <a>, <input>,<button>,<img>`

Block element cannot be nested inside an inline element.

Positioning

Absolute

With `position: absolute`, an element is removed from the document flow and positioned relative to its **nearest positioned parent/ancestor** (i.e., an ancestor with `position: relative`, `absolute`, or `fixed`).

- z-index: allows layering of overlapping elements. lower->bottom, higher->top
- Without z-index, elements are layered from bg to fg as they appear in code

Relative

With `position: relative`, an element is positioned **relative to its normal position** in the document flow. It moves without affecting surrounding elements.

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>All Positioning Types</title>
  <style>
    /* Container for Absolute Position */
```

```css
.container {
  position: relative; /* Positioned ancestor for absolute children */
  width: 300px;
  height: 200px;
  border: 2px solid black;
  margin: 20px auto;
}

/* Static Position (default behavior) */
.static-box {
  position: static; /* Default positioning */
  width: 150px;
  height: 50px;
  background-color: rgb(11, 216, 11);
  margin: 10px auto;
}

/* Relative Position */
.relative-box {
  position: relative;
  width: 150px;
  height: 100px;
  background-color: lightblue;
  top: 20px; /* Moves 20px down */
  left: 20px; /* Moves 20px right */
}

/* Absolute Position */
.absolute-box {
  position: absolute; /* Moves relative to nearest positioned ancestor */
  width: 100px;
  height: 100px;
  background-color: lightcoral;
  bottom: 10px; /* 10px from bottom */
  right: 10px; /* 10px from right */
}

/* Fixed Position */
.fixed-box {
  position: fixed;
  width: 150px;
  height: 50px;
  background-color: rgb(239, 239, 13);
  top: 10px; /* Fixed 10px from top of viewport */
  right: 10px; /* Fixed 10px from right of viewport */
  color: black;
}

/* Sticky Position */
.sticky-box {
  position: sticky;
  top: 20px; /* Sticks 20px from top when scrolling */
  width: 150px;
```

```html
            height: 50px;
            background-color: lightpink;
            margin: 10px auto;
        }
    </style>
</head>
<body>
    <h2>CSS Positioning Examples</h2>

    <!-- Static Box -->
    <div class="static-box">I'm Static</div>

    <!-- Existing Reference Relative Box -->
    <div class="relative-box">this is relative outside container</div>

    <!-- Container for Absolute Box -->
    <div class="container">
        <div class="relative-box">I'm Relative</div>
        <div class="absolute-box">I'm Absolute</div>
    </div>

    <!-- Absolute Box Outside Container -->
    <div class="absolute-box">this is absolute outside container</div>

    <!-- Relative Box Outside Container -->
    <div class="relative-box">this is relative outside container</div>

    <!-- Fixed Box -->
    <div class="fixed-box">I'm Fixed</div>

    <!-- Sticky Box -->
    <div class="sticky-box">I'm Sticky</div>

    <!-- Extra Content for Scroll Effect -->
    <div style="height: 1000px;">
        Scroll down to see sticky and fixed positioning in action!
    </div>
</body>
</html>
```
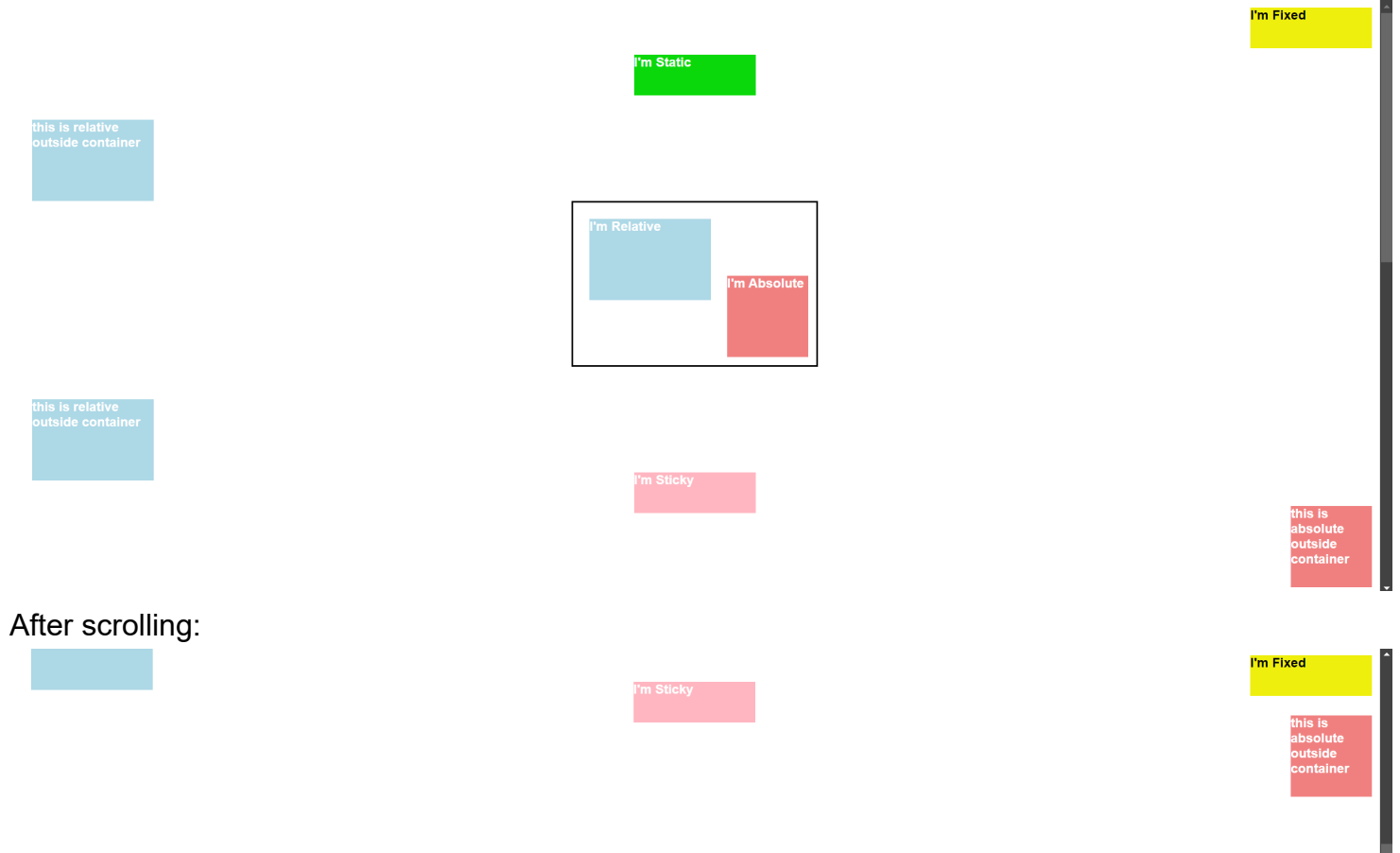
I'm Fixed

I'm Static

this is relative
outside container

I'm Relative

I'm Absolute

this is relative
outside container

I'm Sticky

this is
absolute
outside
container

After scrolling:

I'm Sticky

I'm Fixed

this is
absolute
outside
container

Dropdown Menu Using CSS

```html
<!DOCTYPE html>
<html>
<head>
  <meta charset="utf-8">
  <title>Drop-Down Menu</title>
  <style type="text/css">
    body {
      font-family: arial, sans-serif;
      font-weight: bold;
      color: white;
    }

    nav {
      border: 2px solid royalblue;
      text-align: center;
      background-color: royalblue;
      width: 10em;
      border-radius: 10px;
    }

    nav ul {
      display: none;
      width: 10em;
      list-style: none;
      margin: 0;
      padding: 0;
    }
```

```
      nav:hover ul {
        display: block;
        border-top: 2px solid royalblue;
      }

      nav ul li {
        background-color: white;
        width: 10em;
      }

      nav ul li:hover {
        color: black;
        background-color: powderblue;
      }

      a {
        text-decoration: none;
      }
    </style>
  </head>
  <body>
    <nav>
      Menu
      <ul>
        <li><a href="#">Home</a></li>
        <li><a href="#">News</a></li>
        <li><a href="#">Articles</a></li>
        <li><a href="#">Blog</a></li>
        <li><a href="#">Contact</a></li>
      </ul>
    </nav>
  </body>
</html>
```