Internet

* Huge network that connects computers and other smart devices all around the world
* Collection of physical network devices and software layers
* Physical - Routers, media (cables, radio links), repeaters, modems, etc
* Software - Web browsers, etc

World Wide Web (WWW)

* Information system that uses the internet to present set of documents interconnected with hyperlinks (websites)
* Internet > WWW

Structure of web address

* https://open.uom.lk
  + https:// - Internet Protocol
  + open. - sub domain
  + uom.lk - domain name
* https://online.uom.lk
  + https:// - Internet Protocol
  + online. - sub domain
  + uom.lk - domain name

Internet Protocol (IP)

* Set of rules which controls the data communication over the internet
* Examples
  + FTP (File Transfer Protocol) - To handle large files over the internet
  + HTTP (Hypertext Transfer Protocol) - To share text and multimedia over the internet
  + HTTPS (Hypertext Transfer Protocol Secured) - More secure HTTP

Frontend and backend

* Frontend - Client side
* Backend - Server side

How internet work

* Frontend → (Request) → Backend → (Process) → (Response) → Frontend
* User type the web address on browser
* Domain Name Server (DNS) convert web address to IP address
* Network connects with specified web server
* Download data to client browser
* Web page is rendered and displayed on browser

Client side (Frontend) programming

* Main languages used
  + HTML
  + CSS
  + JS - Javascript

Cloud computing

* On-demand delivery of IT sources and services over the internet with pay as you go pricing
* Types of cloud computing services
  + Software as a service (SaaS)
    - On-demand service
    - Software which hosted by cloud service provider
    - Ex: Gmail, Zoom, Maps, Drive, Google Docs
  + Platform as a service (PaaS)
    - For developers to develop, test, run and manage applications
    - Ex: Azure, Hekoru, Google Cloud Platform
  + Infrastructure as a service (IaaS)
    - Computer infrastructure managed over the internet
    - Ex: Pulumi, Digital Ocean, Compute Enginer

Advantages of cloud computing

* Backup and restore data
* Improved collaboration
* Excellent accessibility
* Low maintenance cost
* Mobility
* Services in pay-per-use
* Unlimited storage capacity
* Data security

Importance of good development setup

* Speed
* Support
* Versioning
* Automation

Frontend technologies

* HTML - Defines the structure of a website
* CSS - Defines the presentation of a website
* JavaScript - Defines functionality of a website

HTML

* HTML is not case sensitive

<!DOCTYPE html>

<html>

<head>

    <title>

        Best Website in the West

    </title>

</head>

<body>

    <h1>

        Enjoy the Ride

    </h1>

    <p>

        Hello World :)

    </p>

</body>

</html>

* <title> within <head> is used for the name of the browser tab
* <body> is used for page content
* <h1> is used for the title of the page content. These are called HTML headings. There are 6 HTML headings from <h1> to <h6>, <h1> being the most important heading. Heading can also be used inside ‘header’ tags
* <p> is used as paragraph for the body of page content
* align attribute in <p> doesn’t work in HTML5
* everything has to be written between <html>

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<body>

    <h1> This is a level 1 heading </h1>

    <h2> This is a level 2 heading </h2>

    <h3> This is a level 3 heading </h3>

    <h6> This is a level 6 heading </h6>

    <p>

        Hello World :)

    </p>

</body>

<header>

    <h1> This is also a level 1 heading </h1>

    <h6> This is also a level 6 heading </h6>

</header>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

HTML text formatting

* <br> adds a new line
* <b> or <strong> will make the text bold
  + <strong> is used to indicate that the text is important
  + This makes the text bold. But the purpose is to show the text is important
  + Ex: Warning, alert
* <i> or <em> will make the text italic
  + <em> is used to show emphasis
* <u> is used to underline the text
* <sup> will make text superscript
* <sub> will make text subscript
* <small> for smaller text

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    This is a normal text <br>

    <b> This is a bold text <br></b>

    <i> This is a italic text <br></i>

    The 1<sup>st</sup> software engineer <br>

    Drink H<sub>2</sub>O <br>

    <small> This is a small text </small>

    <h5> This is a level 5 heading </h5>

    <b><small> This is a bold small text </small></b>

</body>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

* Use align attribute to align text
* <p align="center">some text</p>
* Tags like <img> don’t have closing tags - Empty tags

Nesting

* Adding tag/tags inside tag is nesting

HTML page structure

* <html> is the root of the structure
* <html>

<body>

<p>Welcome, <b>Bob</b></p>

</body>

</html>

* Here, the parent of “Bob” is <p>
* HTML files should be saved as .html or .htm
* <!--This is a comment-->

Lists in HTML

* 3 types
  + Unordered list
  + Ordered list
  + Description list

Unordered list

* List is not in particular order
* <ul> is used for unordered list
* <li> is used when list is added
* List with bullets

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    <ul>

        <li> Carrot </li>

        <li> Onion </li>

        <li> Banana </li>

    </ul>

</body>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

Ordered list

* List is in order
* <ol> is used to create ordered list
* <li> is used when list is added
* List with numbers

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    <ol>

        <li> Batman Begins </li>

        <li> The Dark Knight </li>

        <li> The Dark Knight Rises </li>

    </ol>

</body>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

Description list

* List of items and their descriptions
* Use <dl> tag and use <dt> and <dd> to add data

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    <dl>

        <dt> 1st list title </dt>

        <dd> This is the 1st description </dd>

        <dt> 2nd list title </dt>

        <dd> This is the 2nd description </dd>

    </dl>

</body>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

Nested lists

* <ol>

  <li>Milk</li>

  <li>Apples

    <ul>

      <li>Red</li>

      <li>Green</li>

    </ul>

  </li>

  <li>Bananas</li>

</ol>

Images in HTML

* Use <img> to add photos
* Border can be added as follows
* <img src = “Tree.jpg” border = “1px”>
* <img> tag has 2 attributes
  + Source attribute - <img src = “D:\Job Hunt\HTML\sample.jpg”> for a local file or url

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    <img src = "D:\Job Hunt\Programming\Codes\HTML\Sample.jpg">

</body>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

* + Alternate image when image isn’t available

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    <img src = "D:\Job Hunt\Programming\Codes\HTML\Samples.jpg" alt = "Image isn't available">

</body>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

* + When the image is correctly displayed, alternate text doesn’t appear
* Width and height can also be adjusted

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    <img src = "D:\Job Hunt\Programming\Codes\HTML\Sample.jpg" alt = "Image isn't available" width = "1500" height = "850">

</body>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

* If only one (height or width) is mentioned, other is automatically adjusted

More elements in HTML

* <hr> is used to create horizontal line
* <hr width = “120px”> or <hr width = “50%”> to set line length
* <br> creates a line break

Tables in HTML

* Use <table> to create table
* Table headers <th>
* Table row <tr>
* Table cell <td>

|  |  |  |
| --- | --- | --- |
| ID | Name | Age |
| Student 1 | Emma | 21 |
| Student 2 | Sam | 20 |
| Student 3 | Jane | 22 |

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    <table>

        <tr>

            <th> ID </th>

            <th> Name </th>

            <th> Age </th>

        </tr>

        <tr>

            <td> Student 1 </td>

            <td> Emma </td>

            <td> 21 </td>

        </tr>

        <tr>

            <td> Student 2 </td>

            <td> Sam </td>

            <td> 20 </td>

        </tr>

        <tr>

            <td> Student 3 </td>

            <td> Jane </td>

            <td> 22 </td>

        </tr>

    </table>

</body>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

* th is simply a tr that is bold
* Default - HTML tables don’t have borders
* Use borders to add a border
* Border attribute doesn’t work in HTML5
* <table border="1">

  <tr>

    <td>Amy</td>

    <td>42</td>

  </tr>

  <tr>

    <td>Bob</td>

    <td>19</td>

  </tr>

</table>

* Use colspan to span multiple columns
* <table border="1">

  <tr>

    <th colspan="3">Users</th>

  </tr>

  <tr>

    <th>Name</th>

    <th>Age</th>

    <th>Country</th>

  </tr>

  <tr>

    <td>Amy</td>

    <td>42</td>

    <td>USA</td>

  </tr>

  <tr>

    <td>Bob</td>

    <td>19</td>

    <td>Italy</td>

  </tr>

</table>

* Use rowspan to span multiple rows
* <table border="1">

  <tr>

    <th>Mon</th>

    <th>Tue</th>

    <th>Wed</th>

  </tr>

  <tr>

    <td>Soccer</td>

    <td rowspan="2">Free Time</td>

    <td>Math class</td>

  </tr>

  <tr>

    <td>Biology</td>

    <td>Travel</td>

  </tr>

</table>

* Use align to align the table
* <table align = “center”>
* Use bgcolor to set background color of cells
* <table border="2">

    <tr>

        <td bgcolor="red">Red</td>

        <td>Blue</td>

        <td>Green</td>

    </tr>

    <tr>

        <td>Yellow</td>

        <td colspan="2">Orange</td>

    </tr>

</table>

Navigation bar

* <nav>

  <a href="#">link 1</a>

  <a href="#">link 2</a>

  <a href="#">link 3</a>

 </nav>

* Navigation bar can contain links or any other element

Main content

* Main content can contain different subsections such as <article> and <section>
* There can be only one main content in a page
* <main>

  <article>

    <h2>some heading</h2>

    <p>some text</p>

  </article>

 </main>

form

* <form> is used to create HTML form for user input
* different elements are used inside <form> tags to input data
* <input> is one of them
  + <input type = “text”> - Single line text input field
  + <input type = “radio”> - Radio button
  + <input type = “checkbox”> - Checkbox
  + <input type = “submit”> - Submit button to submit the form
  + <input type = “button”> - Clickable button

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    <form>

        <label for="fname"> First Name </label>

        <input type="text" id="fname"><br><br>

        <label for="lname"> Last Name </label>

        <input type="text" id="lname"><br><br>

        <label for="gender"> Gender: </label>

        <input type="radio" id="male">

        <label for="male"> Male </label>

        <input type="radio" id="female">

        <label for="female"> Female</label><br><br>

        <label for="selection"> Select your choice</label><br>

        <input type="checkbox" id="cb1">

        <label for="cb1"> Online Lectures </label><br>

        <input type="checkbox" id="cb2">

        <label for="cb2"> Physical Lectures</label><br><br>

        <input type="button" value="Submit">

    </form>

</body>

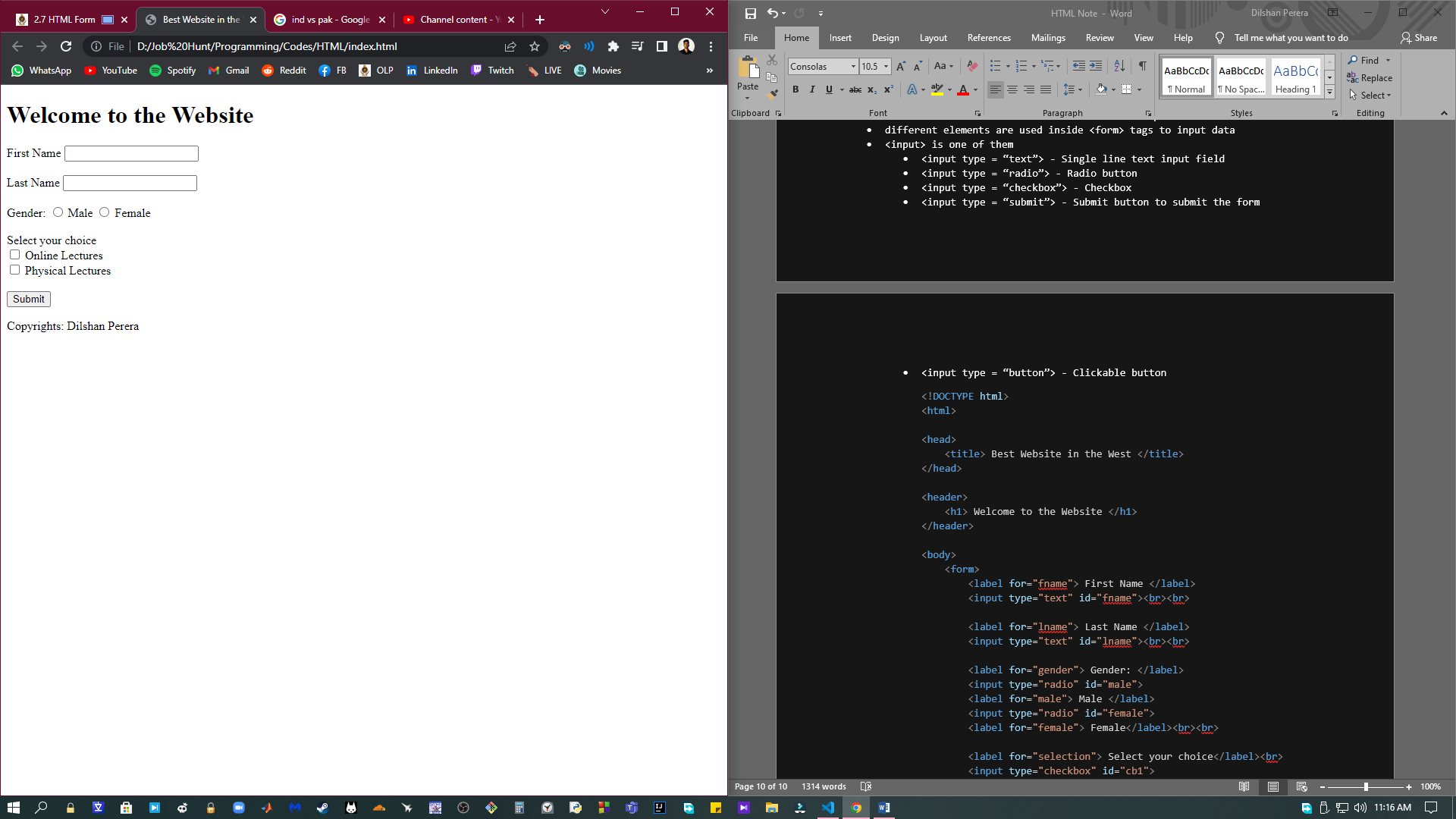
<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

* The website looks like this,



* Use action attribute to point to a webpage that will load after user submits the form
* Ex: <form action="http://www.sololearn.com"></form>
* method specifies the HTTP method (GET or POST) to be used when forms are submitted
* Ex: <form action = “url” method = “GET”> or <form action = “url” method = “POST”>
* GET: form data is visible in page address
* POST: if form is updating data or has sensitive info (Ex: passwords)
* <input> has many variations: text, password, radio, URL, submit, etc
* <form>

    <input type="text" name="username" /><br/>

    <input type="password" name="password" />

</form>

* <form method="POST" action="#">

    <input type="text" name="name">

    <input type="submit" name="submit">

</form>

after form is submitted, data should be processed using programming language such as PHP

placeholder attribute specifies a hint for the input field

HTML content model

* Refers to the set of rules that defines what type of content each element is allowed to have - What elements are allowed to nested inside
* Every HTML element has a default display value. There are 2 display values,
  + Block
    - Stack vertically
    - Ex: div, form, h1 to h6 (headings), li (lists), ol, p (paragraphs), pre, table, ul, navigation menus, footers
    - Browser automatically adds line break after the block element
    - These can contain inline elements
    - Takes the full width available
    - <div> is used as a container for other html elements: used for styling with css
    - <html>

    <body>

        <h1>Headline</h1>

        <div style="background-color:green; color:white; padding:20px;">

            <p>Some paragraph text goes here.</p>

            <p>Another paragraph goes here.</p>

        </div>

    </body>

</html>

* + Inline
    - Stack inline
    - Width of inline element equals the amount of content
    - Browser doesn’t add line break after inline element
    - Ex: a, <b>, <strong>, em, img, input, label, span, strong
    - <a> for hyperlink
      * Almost any element can be made a link
      * <a href="https://www.google.com">

  <img src="http://www.sololearn.com/images/tree.jpg">

</a>

* + - * Here, clicking the image will redirect to link
    - <em> for selected text
    - <span> is used as container for text: used with css to style parts of text
    - <html>

    <body>

        <h2>Some

            <span style="color:red">Important</span>

             Message</h2>

    </body>

</html>

* + Other
    - Can be used as block or inline
    - Ex: APPLET - embeded java applet, IFRAME - inline frame, INS - inserted text, MAP - image map, OBJECT - embedded object, SCRIPT - script within HTML document

Modern HTML content models

* Modern HTML specification split these 2 content models into 7 models
  + Metadata
    - Sets up presentation or behavior of the rest of the content
    - Elements: base, command, link, meta, noscript, stype, title
  + Flow
    - Included in the normal flow of the document
    - Elements: b, br, button, datalist, details, div, embed, fieldset, figure, footer, form, h1 to h6, header, i, iframe, img, input, label, link, math, menu, script, table, textarea, time, ul
  + Sectioning
    - Defines the scope of headings and footers
    - Elements: article, aside, nav, section
  + Heading
    - Defines the header of a section
    - Elements: h1, h2, h3, h4, h5, h6, hgroup
  + Phrasing
    - Used to mark up the text within paragraph level structures
    - Elements: a, area, audio, b, br, button, canvas, cite, code, datalist, embed, i, iframe, img, input, label, link, map, mark, math, noscript, object, output, progress, q, samp, script, select, small, span, strong, sub, sup, svg, time, var, video
  + Embedded
    - Content that import other resources into the document
    - Elements: audio, canvas, embed, iframe, img, math, object, svg, video
  + Interactive
    - Content intended for user interaction
    - Elements: a, audio, button, details, embed, iframe, img, input, keygen, label, menu, object, select, textarea, video
* It’s practical to use 2 elements since they align with existing CSS rules

Multimedia

* Text, graphics (images), audio, video, etc
* Image formats
  + TIFF or tagged images - Very high quality, larger file size
  + JPEG or joint photographic experts groups - For digital cameras and ideal for web use
  + PNG or portable network graphics - Allow for transparency
  + GIF or graphical interchange format - Can be animated
  + <img> tag is used to insert images
  + Ex: <img src = “url” alt = “alternate text” style = “width: 100px; height: 100px”> or <img src = “url”> alt = “alternate text” width = 100 height = 100>
  + If image is saved in the same folder just use the image name instead of ‘url’
* Video
  + Use <video> and its attributes to add video

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    <video width = "108" height = "192" controls>

        <source src = "Sample.mp4" type = "video/mp4">

    </video>

</body>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

* + Use ‘autoplay’ instead of ‘controls’ to autoplay the video
  + Use ‘autoplay muted’ instead of ‘controls’ to autoplay without audio
* Audio
  + Use <audio> element

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    <audio controls>

        <source src = "Sample.mp3" type = "audio/mp3">

    </audio>

</body>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

* + Use ‘autoplay’ and ‘muted’ as necessary

Hyperlinks

* Use <a> ‘anchor’ tag to add hyperlinks
* To open link in a new tab use ‘blank’ or ‘\_blank’ with ‘target’ attribute

<!DOCTYPE html>

<html>

<head>

    <title> Best Website in the West </title>

</head>

<header>

    <h1> Welcome to the Website </h1>

</header>

<body>

    <a href="https://www.youtube.com/channel/UCnNnOnwsnIEZ9h13-Q48WJw" target="\_blank" title=”New Tab”> Pickle Rick Channel </a>

</body>

<footer>

    <p> Copyrights: Dilshan Perera </p>

</footer>

</html>

* Here, title is what you see when you hover the mouse over to hyperlink