LAB # 01
Introduction to Internet Programming

Objectives:

- Be able to learn theoretical concept related to Internet programming

Theory:

Basic Ideas of the Web

The World Wide Web (Web) is a hypermedia system. It has largely achieved the goal of Tim Berners-Lee, its British inventor, of a universal information space. Thanks to the global reach of the Internet, there is potentially universal access to an enormous volume of documents over the Internet. (Of course, in many developing countries, access is poor, which raises issues of disenfranchisement and disempowerment.) Many organizations make publicly available collections of hypermedia documents as part of either their marketing program, customer service or global operations. Computer suppliers, for example, now publish very detailed specifications of their products via the Web.

Web servers and clients may be located at any part of the world and connected to each other by telecommunication links. If the Web is in some sense a digital library, it is one with no single geographical location. When it comes to commerce, distance begins to lose importance. As long as a supplier can provide goods or services where they are required, the location of the vendor and the consumer will not matter. (This gives rise to issues about jurisdiction for taxes, consumer laws, legality of product, etc.) This absence of distance is supported by the ease with which Web documents may be located world-wide; the mechanism is straightforward thanks to the way the location of such 'resources' are identified by a Uniform Resource Location (URL). The URL format unambiguously specifies locations of 'documents' on the Web. This location mechanism allows the actual implementation of geography-independent feature of the Web.

Generally speaking, there is no central authority controlling the Web, although fully qualified domain names are subject to controlled allocation, and Internet Service Providers may be subject to the laws of the countries in which they operate. Furthermore, the World-Wide Web Consortium (W3C), headed by Tim Berners-Lee at the Massachusetts Institute of Technology, is influencing — and to a large degree controlling — how technologies are deployed on the Web. The W3C specifies HTML and XML, but others bodies, such as the European Computer Manufacturers Association (ECMA), have standardized other Web technologies, such as what we mostly call JavaScript. JavaScript is a programming language originally developed by Netscape.

Anyone with the appropriate knowledge, and with access to server space, can create a Web document. These Web documents can make reference to any other document. Moreover, a user does not require specific, proprietary software on their computer platform to access the Web, with many Web browsers being free software. While browsers can access and display the information on the Web, not all of them can supply the user with the interactive portions of the Web pages. For example, if Java applets are prohibited or a browser does not support JavaScript, interactivity with the Web document will be limited; some information may even be missing if that information required the presence of these interactive components.

The implications are easy to predict. With different browsers supporting different features, and with the navigation difficulties associated with hypertext's mesh / graph connections, chaos might ensue. However, even the most inexperienced users currently cope and the Web, and it is becoming both a universal world of information, and a universal place for doing business.

Dynamic pages can respond interactively to user input. It is possible to have portions of a hypertext document be produced by a programed as the document is requested. In this way, Web pages are increasingly being used as a front end to databases.

This allows the user to fill out a query and send it off for processing by the hypertext document. The server queries the database using the user's information and returns the output as HTML. To allow data to be sent in such a way to and from Web servers, a standard called the Common Gateway Interface (CGI) has been created. The difference between dynamic Web pages and non-dynamic (so called 'static') Web pages is transparent to the browser and user.

It is also possible to embed programs inside HTML. When the browser loads such a page, the code is immediately executed. This mechanism supports remote transactions for the commercial aspect of the Web

Hypertext Transfer Protocol (HTTP)

HTTP is a network protocol used to retrieve documents from a variety of machines in a minimum of time. It was invented by Tim Berners-Lee to support a project in developing a distributed hypertext system. Distributed hypertext requires the retrieval of documents from many different machines. File Transfer Protocol (FTP), which predates the Web, would be too slow for this purpose as it is a connection-oriented protocol that requires a permanent connection to a server, thus requiring a connection-maintenance overhead when accessing different machines.

Therefore, to support browsing, HTTP has the following characteristics:

- connection-less: a connection is established only for the period of transfer, and the connection need not be maintained after thereafter;

- stateless: the server has no 'history' of client visits (although the implementation of cookies overcomes this);
- comprehensive addressing: diverse files on any HTTP server world-wide can be referenced via URLs
- diverse data: using extensible MIME-types (see later), HTTP servers can supply information of every possible data types;
- rapid: allows request-response cycles of less than 100 milliseconds

HTTP is not mandatory for distributed hypertext; there are other techniques and protocols that can be used to access or transfer information. However, like TCP/IP and HTML it is ubiquitous, and so enables investment to develop e-commerce.

Fields of Application

The Web began as a tool to share knowledge and has successfully evolved into a general communications mechanism. With the support of transactions and synchronous communications, the Web has application in many different fields.

A primary use is the dissemination of knowledge, which takes many forms. For example, chat rooms and bulletin boards are integral to interactive discussion of all kinds of subjects. Frequently Asked Questions (FAQs), published on Web sites, and offer answers to users' questions on how to do certain kinds of tasks. The variety of information that can be pulled out of the Web is wide-ranging.

Education includes a variation of the dissemination of knowledge. Open- or distance-learning programs spearhead this aspect of the Web. Basically, any kind of demonstration on how to carry out certain tasks can be considered education. For example, a user can learn how to create a Web page from the numerous websites publishing such instructions.

With the possibilities of online trading, business transactions are carried out on the Web. The user supplies their order and credit card details so as to buy products advertised on the Web. The Selling module would cover this subject area in depth.

Network Protocols

A network protocol is a standard way of regulating data transmission between computers. Just as diplomats adhere to protocols — rules of behavior — when in foreign lands, network communications do the same. They have to obey agreed rules if they are to communicate and 'get on with each other'. After many years of both public and private research and development, two network protocols are now dominant: TCP (Transaction Control Protocol) and IP (Internet Protocol), together known as TCP/IP. (These were actually unlikely protocols to be so widely accepted, as faster, standardized protocols had been agreed upon, but none had the same robustness and extensibility as TCP/IP.)

Very often protocols were implemented without any formal acceptance and, because they worked most of the time, they became standards by default. Although TCP/IP is an accepted, de facto standard, work on Internet protocols continue in order to improve communication quality and support the continued growth of the Internet. There is no dictating authority for the Internet. Without a controlling authority, interim proposals about protocol changes are made by groups of interested individuals and then opened up for discussion. Documents containing the various proposed standards are published as Requests for Comment documents (RFCs). You may see references to a specific RFC as the best description of a protocol!

Uniform Resource Locator (URL)

An URL is needed to locate any resources on the Web. It is an address format that specifies how and where to find a document. The general format is as follows, where the various items in italics must be substituted with part of a real URL, or omitted altogether.

http://machine_name:port/path/file_name.file_extension

machine_name is either an IP address, for example 137.234.33.89, or a Fully Qualified Domain Name (also known as a DNS name, because Domain Name Servers map between Domain Names and IP addresses), for example, **www.apple.com**

port is the TCP port to connect to; this is an entry point to software on the server; an optional part of a URL

path is a relative file path from the server's document root; the server will start looking for a file in a specific directory and paths are relative to this

file_name is the name of the file to be browsed, e.g. welcome

file_extension is one of a number of suffixes which, by convention and operating system setup, indicate the type of data contained within the file, e.g. htm,html, txt.

The Client-server Computing Model

When you are surfing the Web, you are using a Web browser. When you go to a website for documents, the site delivers them using software called the Web server. The browser is considered to be a client in the relationship with the server as it is requesting information services from the server. This is just one particular example of the client-server model of computing.

A Definition and some History

The client-server model has been defined as:

A software partitioning paradigm in which a distributed system is split between one or more server tasks which accept requests, according to some protocol, from (distributed) client tasks, asking for information or action. There may be either one centralized server or several distributed ones. This model allows clients and servers to be placed independently on nodes in a network.

Client-server computing is mainly about the client computer possessing its own computing power. In the days of mainframes, all the processing power took place on central computers. The client 'terminals' were little more than a television that could send and receive characters. When microprocessors became available, it was possible to make the terminals more powerful so that they could handle some of the processing. Over time this has meant that mainframes have been replaced by smaller server machines and terminals have been replaced by more powerful client workstations.

The client-server model provides a good division of processing power, since the server primarily provides information to the client which is responsible for interpreting and displaying it. This means that servers do not have to be powerful machines, allowing more people to become service providers.

A more important characteristic is that because the client-server model provides for significant processing power at the (remote) client end, the operator of the client system has considerable autonomous power in contributing to the enterprise of which he or she is a part. This means that local decisions can be made, possibly faster than if they were made remotely, and action taken.

You may hear client-server computing being talked about as a modern computing 'paradigm'. Other than being part of a sales pitch, this is likely to mean that the model has made a significant impact on, and change to, the way we design and use computer systems. In particular, it is the current model for distributed business systems, and fits nicely into the emerging Web.

Functionality

In the context of the Web, users run client programmes (i.e. Web browsers) which provide the following functionality:

- They allow the user to send a request for information to the server.
- They format the request so that the server can understand it.
- They format the response from the server in a way that the user can read it.

Server programs carry out the following:

- They receive a request from a client and process the request.
- They respond by sending the requested information back to the client.

Information and Processing on the Web

Information is passed from the server to the browser. This information may be in the form of HTML documents, GIF files, Excel spreadsheets, movies — just about any digital content.

Information can also be passed from the browser to the server. When you click on a hyperlink you are sending information to the server, and when you fill in an online form, you are usually sending information to the server.

In addition to passing information backwards and forwards, some processing can also be done in the browser. For instance, you might have a simple Web page that calculates the overall cost of a loan once the initial value of the loan, the interest rate and the length of the loan have been entered.

But where does the processing take place? Does the server process the information and generate the result, or is it the client that processes the information? If the client does the processing, then this is a client-side application; if it is the server, it is a server-side application.

In the loan example above, the client has the information (the principle, rate and time). It could send this information to the server to process the information, generate the result and send it back to the client. Alternatively, the server could send a program to the client that will carry out the processing. In the latter case, since the client has all the information and program is pretty small, it is probably better to run the application on the client side.

Of course, there is also a problem of who has the information. If the server has a database, and the client wants to query it, then there are two possibilities. The server could send the database and the querying program to the client to process it or the server could process it and simply send the result. In this case, it would probably be better to do the processing on the server side.

Conclusion

In this lab you have got enough idea about what is internet programming and why it is used.

Tasks:

Q1. Write down your ideas about the possible benefits of hypertext using the following headings. If you like, go on-line to discuss these with colleagues before writing them down.

- Ease of insertion of new information
- Pointers to external materials
- Browsing

Q2. Write down your ideas about the possible drawbacks of hypertext using the following headings. If you like, go on-line to discuss these with colleagues before writing them down.

- Navigation Difficulties
- No Main Catalogues
- Network Overload
- Link Fossilisation

Q3. The client-server model applies to a lot of things outside of computers. Imagine going to a bank to withdraw some money? Who is the client and who is the server? Clearly, you are the client and the bank is the server.

One of the advantages of the client server model is that one server can handle many clients. The teller in the bank (server) handles many customers (clients). Also, you can use lots of different servers to get the service you need. (That is there are a lot of tellers, and for that matter, bank branches and cash machines.)

For any website, say the Hamdard University Website, think about the following questions and write down your answers:

a. Are there multiple clients?
b. Who are these clients?
c. Are there multiple servers?
d. Why would there be multiple servers?

Q4. On the East Med. Trading Co. website, they would like to display to the user the number of pages that he or she has visited at that site. Think about the following questions and make a note of your answers.

a. What data is needed?
b. Where is the data stored?
c. Should this be a client or a server side application

Lab # 04

Bootstrap 5 Grids, Text/Typography, Colors

Objectives:

In this lab you will learn about Bootstrap's grid system that is built with flexbox and allows up to 12 columns across the page.

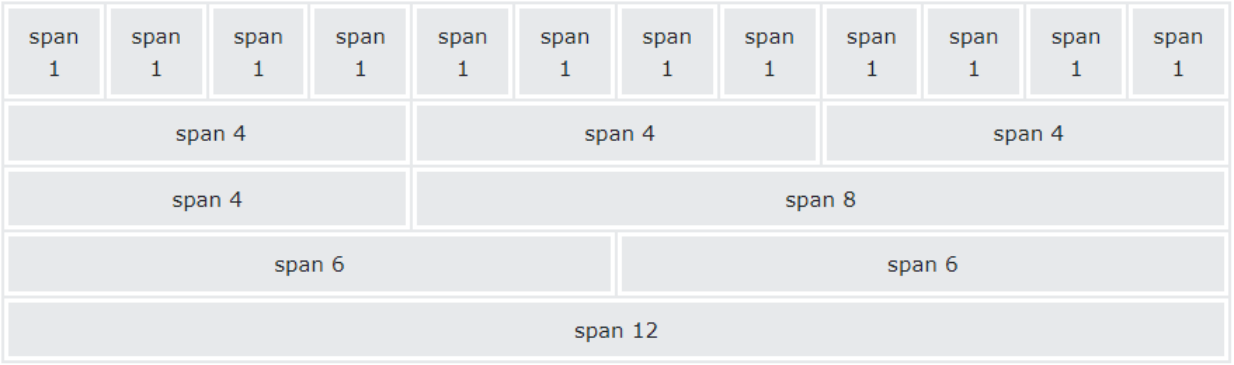
Theory:

Bootstrap 5 Grid System

A grid system in graphic design **uses a two-dimensional framework to align and lay out design elements**. Breaking down a single design space into a grid can help position individual components in ways that can catch the eye, create a user flow and make information and visuals more appealing and accessible to audiences.

Bootstrap's grid system is built with flexbox(**a one-dimensional layout method for arranging items in rows or columns**) and allows up to 12 columns across the page.

If you do not want to use all 12 columns individually, you can group the columns together to create wider columns:



The grid system is responsive, and the columns will re-arrange automatically depending on the screen size.

Make sure that the sum adds up to 12 or fewer (it is not required that you use all 12 available columns).

Grid Classes

The Bootstrap 5 grid system has six classes:

- .col- (extra small devices - screen width less than 576px)
- .col-sm- (small devices - screen width equal to or greater than 576px)
- .col-md- (medium devices - screen width equal to or greater than 768px)
- .col-lg- (large devices - screen width equal to or greater than 992px)
- .col-xl- (xlarge devices - screen width equal to or greater than 1200px)
- .col-xxl- (xxlarge devices - screen width equal to or greater than 1400px)

The classes above can be combined to create more dynamic and flexible layouts.

Tip: Each class scales up, so if you want to set the same widths for sm and md, you only need to specify sm.

Basic Structure of a Bootstrap 5 Grid

The following is a basic structure of a Bootstrap 5 grid:

```
<!-- Control the column width, and how they should appear on different devices -->
<div class="row">
  <div class="col-*-*"></div>
  <div class="col-*-*"></div>
</div>
<div class="row">
  <div class="col-*-*"></div>
  <div class="col-*-*"></div>
  <div class="col-*-*"></div>
</div>

<!-- Or let Bootstrap automatically handle the layout -->
<div class="row">
  <div class="col"></div>
  <div class="col"></div>
  <div class="col"></div>
</div>
```

Second example: instead of adding a number to each col, let bootstrap handle the layout, to create equal width columns: two "col" elements = 50% width to each col, while three cols = 33.33% width to each col. Four cols = 25% width, etc. You can also use .col-sm|md|lg|xl|xxl to make the columns responsive.

Below we have collected some examples of basic Bootstrap 5 grid layouts.

Three Equal Columns

.col	.col	.col

The following example shows how to create three equal-width columns, on all devices and screen widths:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>
    <h1>Three equal width columns</h1>
  <p>Note: Try to add a new div with class="col" inside the row class - this will create four equal-width columns.</p>
  <div class="row">
    <div class="col p-3 bg-primary text-white">.col</div>
    <div class="col p-3 bg-dark text-white">.col</div>
    <div class="col p-3 bg-primary text-white">.col</div>
  </div>
</div>
</body>
</html>
```

Responsive Columns

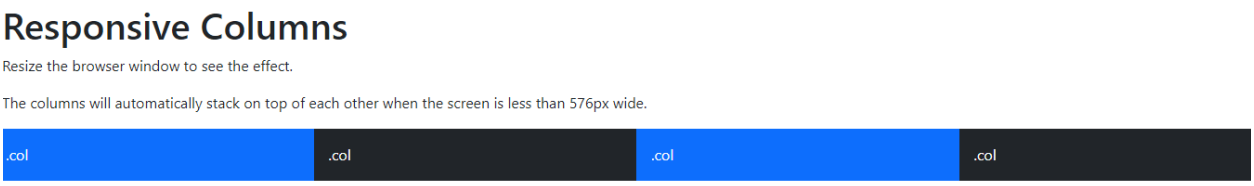
.col-sm-3	.col-sm-3	.col-sm-3	.col-sm-3

The following example shows how to create four equal-width columns starting at tablets and scaling to extra large desktops. **On mobile phones or screens that are less than 576px wide, the columns will automatically stack on top of each other**:

```
<!DOCTYPE html>
<html lang="en">
```

```
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>
 <h1>Responsive Columns</h1>
  <p>Resize the browser window to see the effect.</p>
  <p>The columns will automatically stack on top of each other when the screen is less than
576px wide.</p>
  <div class="row">
    <div class="col-sm-3 p-3 bg-primary text-white">.col</div>
    <div class="col-sm-3 p-3 bg-dark text-white">.col</div>
    <div class="col-sm-3 p-3 bg-primary text-white">.col</div>
    <div class="col-sm-3 p-3 bg-dark text-white">.col</div>
  </div>
</body>
</html>
```

Output:



Two Unequal Responsive Columns

.col-sm-4

.col-sm-8

The following example shows how to get two various-width columns starting at tablets and scaling to large extra desktops:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
```

```
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>
  <h1>Two Unequal Responsive Columns</h1>
  <p>Resize the browser window to see the effect.</p>
  <p>The columns will automatically stack on top of each other when the screen is less than
576px wide.</p>
  <div class="row">
    <div class="col-sm-4 p-3 bg-primary text-white">.col</div>
    <div class="col-sm-8 p-3 bg-dark text-white">.col</div>
  </div>
</body>
</html>
```

Bootstrap 5 Text/Typography

Bootstrap 5 Default Settings

Bootstrap 5 uses a default font-size of 1rem (16px by default), and its line-height is 1.5.

In addition, all <p> elements have margin-top: 0 and margin-bottom: 1rem (16px by default).

<h1> - <h6>

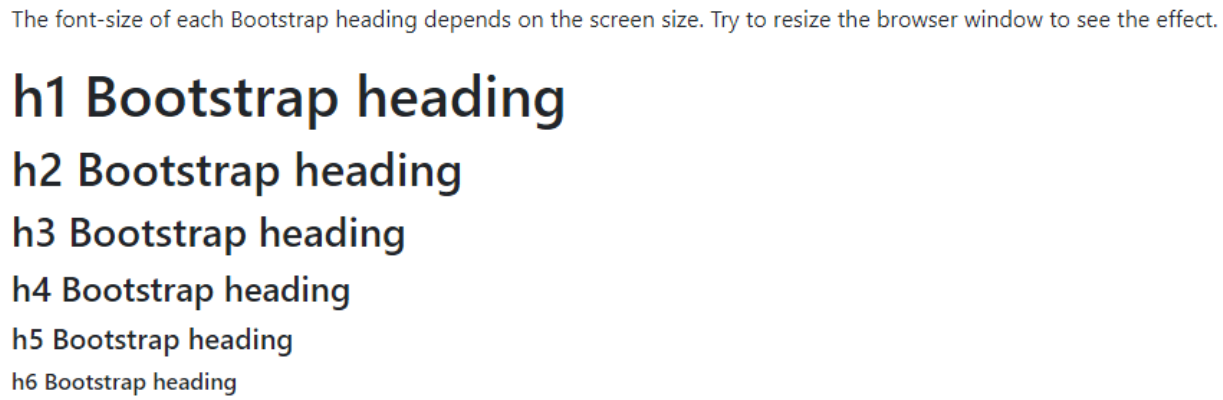
Bootstrap 5 styles HTML headings (<h1> to <h6>) with a bolder font-weight and a responsive font-size.

Program:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>
  <div class="container mt-3">
  <p>The font-size of each Bootstrap heading depends on the screen size. Try to resize the browser
window to see the effect.</p>
```

```
  <h1>h1 Bootstrap heading</h1>
  <h2>h2 Bootstrap heading</h2>
  <h3>h3 Bootstrap heading</h3>
  <h4>h4 Bootstrap heading</h4>
  <h5>h5 Bootstrap heading</h5>
  <h6>h6 Bootstrap heading</h6>
</div>

</body>
</html>
```

Output:



You can also use .h1 to .h6 classes on other elements to make them behave as headings if you want:

Program:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>
  <div class="container mt-3">
  <p class="h1">h1 Bootstrap heading</p>
  <p class="h2">h2 Bootstrap heading</p>
  <p class="h3">h3 Bootstrap heading</p>
  <p class="h4">h4 Bootstrap heading</p>
```

```
  <p class="h5">h5 Bootstrap heading</p>
  <p class="h6">h6 Bootstrap heading</p>
</div>
</body>
</html>
```

Output:

Display Headings

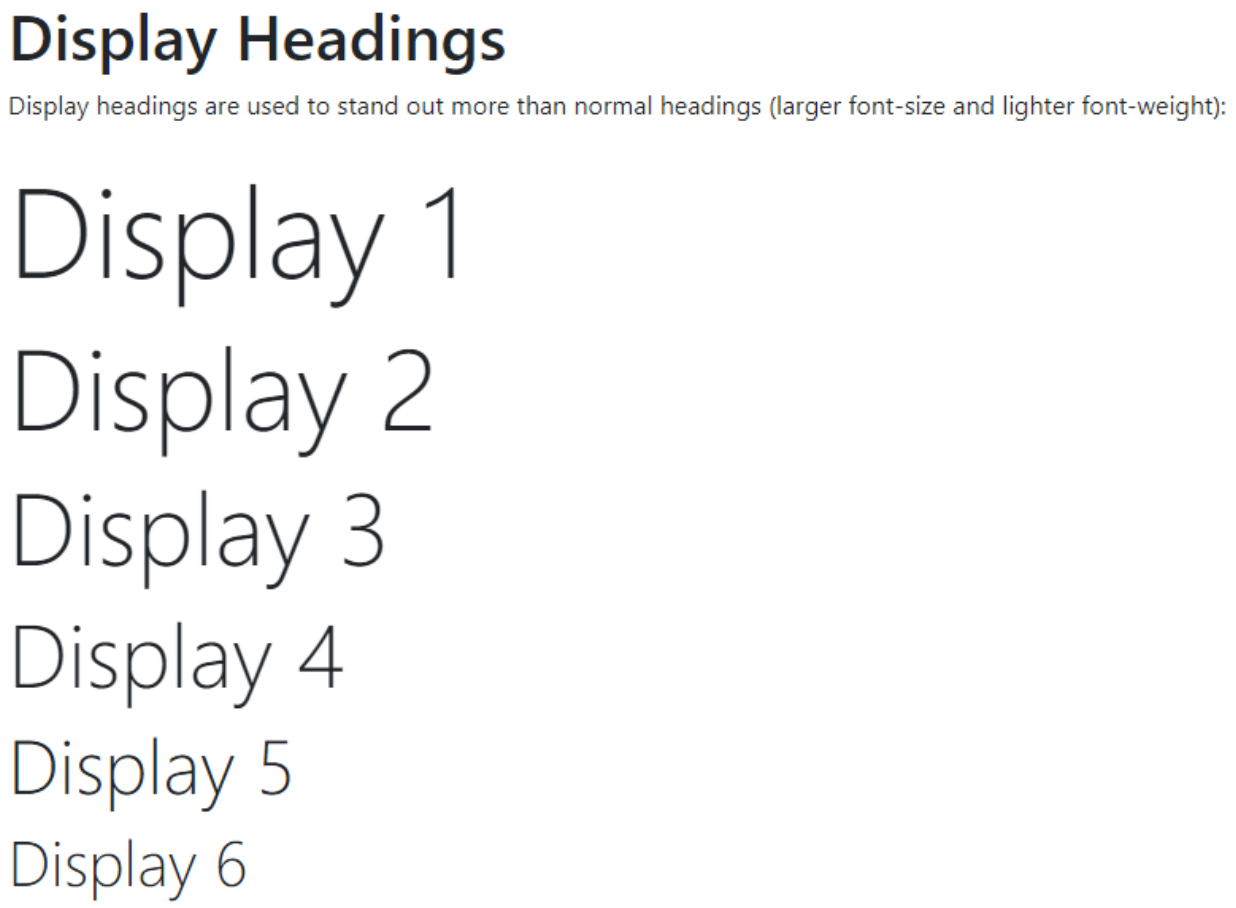
Display headings are used to stand out more than normal headings (larger font-size and lighter font-weight), and there are six classes to choose from: .display-1 to .display-6:

Program:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>
  <div class="container mt-3">
  <h1>Display Headings</h1>
```

```
  <p>Display headings are used to stand out more than normal headings (larger font-size and
lighter font-weight):</p>
  <h1 class="display-1">Display 1</h1>
  <h1 class="display-2">Display 2</h1>
  <h1 class="display-3">Display 3</h1>
  <h1 class="display-4">Display 4</h1>
  <h1 class="display-5">Display 5</h1>
  <h1 class="display-6">Display 6</h1>
</div>
</body>
</html>
```

Output:



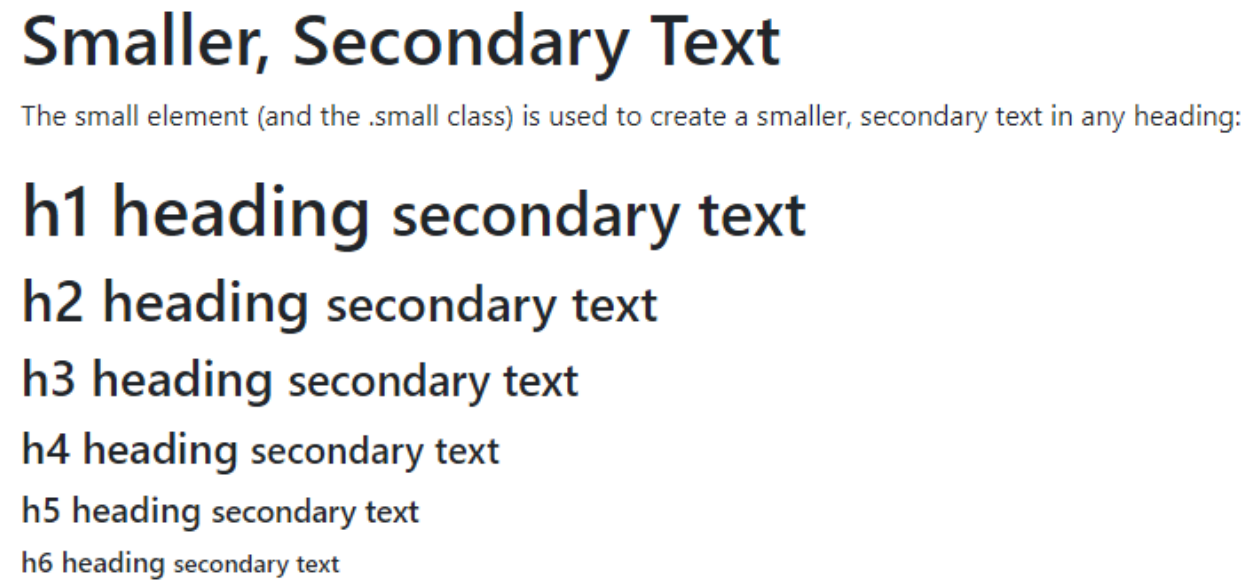
<small>

In Bootstrap 5 the HTML <small> element (and the .small class) is used to create a smaller, secondary text in any heading:

Program:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>
  <div class="container mt-3">
  <h1>Smaller, Secondary Text</h1>
  <p>The small element (and the .small class) is used to create a smaller, secondary text in any heading:</p>
  <h1>h1 heading <small>secondary text</small></h1>
  <h2>h2 heading <small>secondary text</small></h2>
  <h3>h3 heading <small>secondary text</small></h3>
  <h4>h4 heading <small>secondary text</small></h4>
  <h5>h5 heading <small>secondary text</small></h5>
  <h6>h6 heading <small>secondary text</small></h6>
</div>
</body>
</html>
```

Output:



<mark>

Bootstrap 5 will style <mark> and .mark with a yellow background color and some padding:

<abbr>

Bootstrap 5 will style the HTML <abbr> element with a dotted border bottom and a cursor with question mark on hover:

<blockquote>

Add the .blockquote class to a <blockquote> when quoting blocks of content from another source. And when naming a source, like "from WWF's website", use the .blockquote-footer class:

<dl>

Bootstrap 5 will style the HTML <dl> element.

<code>

Bootstrap 5 will style the HTML <code>.

<pre>

Bootstrap 5 will style the HTML <pre> element in the following way:

Complete Program using <mark>, <abbr>, <blockquote>, <dl>, <code> and <pre> elements:

Program:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

<div class="container mt-3">
  <h1>Highlight Text</h1>
  <p>Use the mark element (or the .mark class) to <mark>highlight</mark> text.</p>

  <h1>Abbreviations</h1>
  <p>The abbr element is used to mark up an abbreviation or acronym:</p>
  <p>The <abbr title="World Health Organization">WHO</abbr> was founded in 1948.</p>

<h1>Blockquotes</h1>
  <p>The blockquote element is used to present content from another source:</p>
  <blockquote class="blockquote">
    <p>For 50 years, WWF has been protecting the future of nature. The world's leading conservation organization, WWF works in 100 countries and is supported by 1.2 million members in the United States and close to 5 million globally.</p>
    <footer class="blockquote-footer">From WWF's website</footer>
  </blockquote>

 <h1>Description Lists</h1>
  <p>The dl element indicates a description list:</p>
  <dl>
    <dt>Coffee</dt>
    <dd>- black hot drink</dd>
    <dt>Milk</dt>
```

```
    <dd>- white cold drink</dd>
  </dl>

<h1>Code Snippets</h1>
  <p>Inline snippets of code should be embedded in the code element:</p>
  <p>The following HTML elements: <code>span</code>, <code>section</code>, and
<code>div</code> defines a section in a document.</p>


<h1>Keyboard Inputs</h1>
  <p>To indicate input that is typically entered via the keyboard, use the kbd element:</p>
  <p>Use <kbd>ctrl + p</kbd> to open the Print dialog box.</p>

<h1>Multiple Code Lines</h1>
<p>For multiple lines of code, use the pre element:</p>
<pre>
Text in a pre element
is displayed in a fixed-width
font, and it preserves
both      spaces and
line breaks.
</pre>

</div>
</body>
</html>
```

More Typography Classes

The Bootstrap 5 classes below can be added to style HTML elements further:

Class	Description
.lead	Makes a paragraph stand out
.text-start	Indicates left-aligned text
.text-break	Prevents long text from breaking layout
.text-center	Indicates center-aligned text
.text-decoration-none	Removes the underline from a link
.text-end	Indicates right-aligned text
.text-nowrap	Indicates no wrap text
.text-lowercase	Indicates lowercased text
.text-uppercase	Indicates uppercased text
.text-capitalize	Indicates capitalized text
.initialism	Displays the text inside an <abbr> element in a slightly smaller font size
.list-unstyled	Removes the default list-style and left margin on list items (works on both and). This class only applies to immediate children list items (to remove the default list-style from any nested lists, apply this class to any nested lists as well)
.list-inline	Places all list items on a single line (used together with .list-inline-item on each elements)

Text Colors

Bootstrap 5 has some contextual classes that can be used to provide "meaning through colors".

The classes for text colors are: .text-muted, .text-primary, .text-success, .text-info, .text-warning, .text-danger, .text-secondary, .text-white, .text-dark, .text-body (default body color/often black) and .text-light:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

 <h2>Contextual Colors</h2>
  <p>Use the contextual classes to provide "meaning through colors":</p>
  <p class="text-muted">This text is muted.</p>
  <p class="text-primary">This text is important.</p>
  <p class="text-success">This text indicates success.</p>
  <p class="text-info">This text represents some information.</p>
  <p class="text-warning">This text represents a warning.</p>
  <p class="text-danger">This text represents danger.</p>
  <p class="text-secondary">Secondary text.</p>
  <p class="text-dark">This text is dark grey.</p>
  <p class="text-body">Default body color (often black).</p>
  <p class="text-light">This text is light grey (on white background).</p>
  <p class="text-white">This text is white (on white background).</p>

</body>
</html>
```

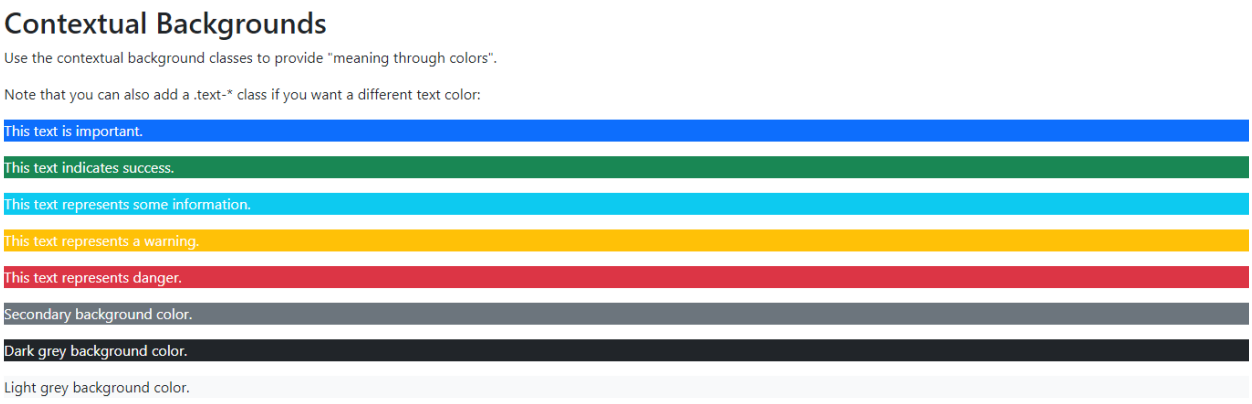
Background Colors

The classes for background colors are: .bg-primary, .bg-success, .bg-info, .bg-warning, .bg-danger, .bg-secondary, .bg-dark and .bg-light.

Note that background colors do not set the text color, so in some cases you'll want to use them together with a .text-* color class.

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

 <h2>Contextual Backgrounds</h2>
  <p>Use the contextual background classes to provide "meaning through colors".</p>
  <p>Note that you can also add a .text-* class if you want a different text color:</p>
  <p class="bg-primary text-white">This text is important.</p>
  <p class="bg-success text-white">This text indicates success.</p>
  <p class="bg-info text-white">This text represents some information.</p>
  <p class="bg-warning text-white">This text represents a warning.</p>
  <p class="bg-danger text-white">This text represents danger.</p>
  <p class="bg-secondary text-white">Secondary background color.</p>
  <p class="bg-dark text-white">Dark grey background color.</p>
  <p class="bg-light text-dark">Light grey background color.</p>
</body>
</html>
```

Output:

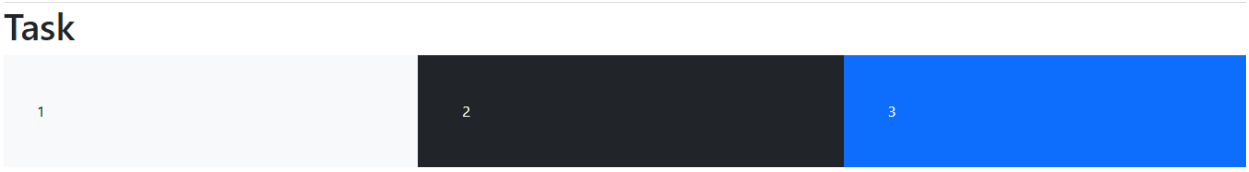


Conclusion:

In this lab we learn about the Bootstrap 5 Grids, Text/Typography, Colors

Tasks:

Q1. Write the code to generate following output:

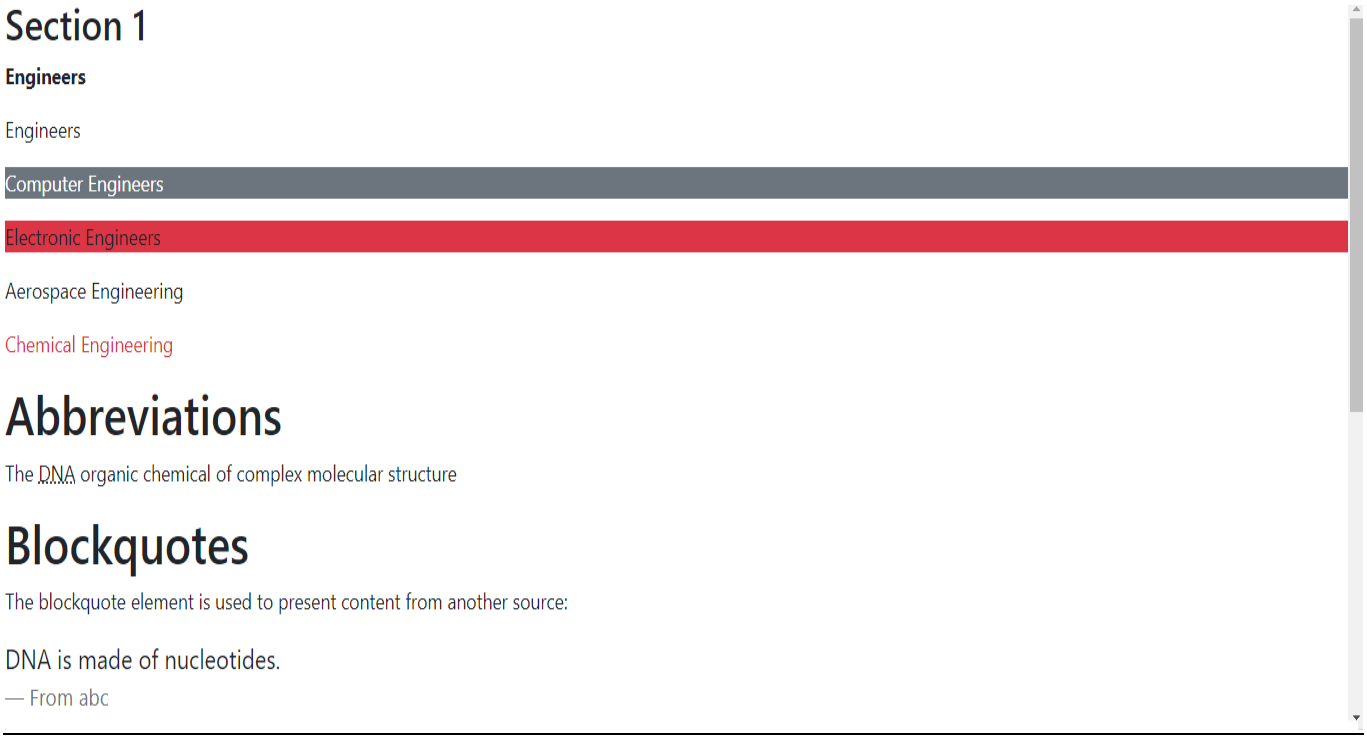


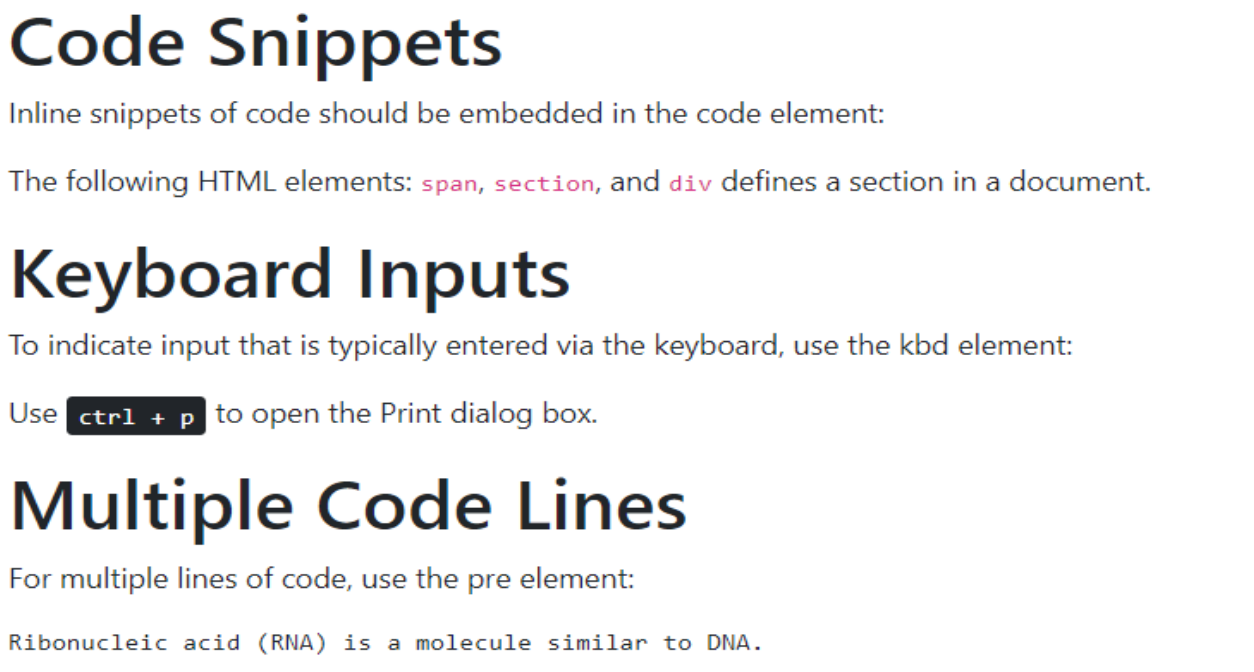
Q2. Write a program using following bootstrap functions:

- ✓ list-inline
- ✓ .list-unstyled
- ✓ .text-decoration-none
- ✓ .text-end
- ✓ .text-nowrap

Q3. Write the code to generate following output:

Output





USE Following Text for Output:

Section 1

Engineers

Engineers

Computer Engineers

Electronic Engineers

Aerospace Engineering

Chemical Engineering

Abbreviations

The DNA organic chemical of complex molecular structure

Blockquotes

The blockquote element is used to present content from another source:

> DNA is made of nucleotides.
>
> From abc

Code Snippets

Inline snippets of code should be embedded in the code element:

The following HTML elements: `span`, `section`, and `div` defines a section in a document.

Keyboard Inputs

To indicate input that is typically entered via the keyboard, use the kbd element:

Use <kbd>ctrl + p</kbd> to open the Print dialog box.

Multiple Code Lines

For multiple lines of code, use the pre element:

```
Ribonucleic acid (RNA) is a molecule similar to DNA.
```

Learning outcomes:

Lab # 05
Bootstrap Tables and Images

Objectives:

- To learn the basic structure of .

Theory:

Basic Table

A basic Bootstrap 5 table has a light padding and horizontal dividers.

The .table class adds basic styling to a table:

Code:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
<link rel="stylesheet" href="css/bootstrap.min.css">

  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

<div class="container mt-3">
  <h2>Basic Table</h2>
  <p>The .table class adds basic styling (light padding and horizontal dividers) to a table:</p>
  <table class="table">
    <thead>
      <tr>
        <th>Firstname</th>
        <th>Lastname</th>
        <th>Email</th>
      </tr>
```

```
    </thead>
    <tbody>
      <tr>
        <td>John</td>
        <td>Doe</td>
        <td>john@example.com</td>
      </tr>
      <tr>
        <td>Mary</td>
        <td>Moe</td>
        <td>mary@example.com</td>
      </tr>
      <tr>
        <td>July</td>
        <td>Dooley</td>
        <td>july@example.com</td>
      </tr>
    </tbody>
  </table>
</div>
</body>
</html>
```

Output:

Basic Table

The .table class adds basic styling (light padding and horizontal dividers) to a table:

Firstname	Lastname	Email
John	Doe	john@example.com
Mary	Moe	mary@example.com
July	Dooley	july@example.com

Striped Rows

The .table-striped class adds zebra-stripes to a table:

<table class="table table-striped">

Bordered Table

The .table-bordered class adds borders on all sides of the table and cells:

```
<table class="table table-bordered">
```

Hover Rows

The .table-hover class adds a hover effect (grey background color) on table rows:

```
<table class="table table-hover">
```

Black/Dark Table

The .table-dark class adds a black background to the table:

```
<table class="table table-dark">
```

Borderless Table

The .table-borderless class removes borders from the table:

```
<table class="table table-borderless">
```

Contextual Classes

Contextual classes can be used to color the whole table (<table>), the table rows (<tr>) or table cells (<td>).

Code:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
<link rel="stylesheet" href="css/bootstrap.min.css">

  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>
```

```
<div class="container mt-3">
  <h2>Contextual Classes</h2>
  <p>Contextual classes can be used to color the table, table rows or table cells. The classes that can be used are: .table-primary, .table-success, .table-info, .table-warning, .table-danger, .table-active, .table-secondary, .table-light and .table-dark:</p>
  <table class="table">
    <thead>
      <tr>
        <th>Firstname</th>
        <th>Lastname</th>
        <th>Email</th>
      </tr>
    </thead>
    <tbody>
      <tr>
        <td>Default</td>
        <td>Defaultson</td>
        <td>def@somemail.com</td>
      </tr>
      <tr class="table-primary">
        <td>Primary</td>
        <td>Joe</td>
        <td>joe@example.com</td>
      </tr>
      <tr class="table-success">
        <td>Success</td>
        <td>Doe</td>
        <td>john@example.com</td>
      </tr>
      <tr class="table-danger">
        <td>Danger</td>
        <td>Moe</td>
        <td>mary@example.com</td>
      </tr>
      <tr class="table-info">
        <td>Info</td>
        <td>Dooley</td>
        <td>july@example.com</td>
      </tr>
      <tr class="table-warning">
        <td>Warning</td>
        <td>Refs</td>
```

```
      <td>bo@example.com</td>
    </tr>
    <tr class="table-active">
      <td>Active</td>
      <td>Activeson</td>
      <td>act@example.com</td>
    </tr>
    <tr class="table-secondary">
      <td>Secondary</td>
      <td>Secondson</td>
      <td>sec@example.com</td>
    </tr>
    <tr class="table-light">
      <td>Light</td>
      <td>Angie</td>
      <td>angie@example.com</td>
    </tr>
    <tr class="table-dark">
      <td>Dark</td>
      <td>Bo</td>
      <td>bo@example.com</td>
    </tr>
  </tbody>
 </table>
</div>
</body>
</html>
```

Output:

Contextual Classes

Contextual classes can be used to color the table, table rows or table cells. The classes that can be used are: .table-primary, .table-success, .table-info, .table-warning, .table-danger, .table-active, .table-secondary, .table-light and .table-dark:

Firstname	Lastname	Email
Default	Defaultson	def@somemail.com
Primary	Joe	joe@example.com
Success	Doe	john@example.com
Danger	Moe	mary@example.com
Info	Dooley	july@example.com
Warning	Refs	bo@example.com
Active	Activeson	act@example.com
Secondary	Secondson	sec@example.com
Light	Angie	angie@example.com
Dark	Bo	bo@example.com

The contextual classes that can be used are:

Class	Description
.table-primary	Blue: Indicates an important action
.table-success	Green: Indicates a successful or positive action
.table-danger	Red: Indicates a dangerous or potentially negative action
.table-info	Light blue: Indicates a neutral informative change or action
.table-warning	Orange: Indicates a warning that might need attention
.table-active	Grey: Applies the hover color to the table row or table cell
.table-secondary	Grey: Indicates a slightly less important action
.table-light	Light grey table or table row background
.table-dark	Dark grey table or table row background

Responsive Tables

The .table-responsive class adds a scrollbar to the table when needed (when it is too big horizontally):

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
<link rel="stylesheet" href="css/bootstrap.min.css">

  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

<div class="table-responsive">
   <table class="table table-bordered">
     <thead>
       <tr>
         <th>#</th>
         <th>Firstname</th>
         <th>Lastname</th>
         <th>Age</th>
         <th>City</th>
```

```
        <th>Country</th>
        <th>Sex</th>
        <th>Example</th>
        <th>Example</th>
        <th>Example</th>
        <th>Example</th>
        <th>Example</th>
        <th>Example</th>
        <th>Example</th>
        <th>Example</th>
        <th>Example</th>
        <th>Example</th>
        <th>Example</th>
        <th>Example</th>
      </tr>
    </thead>
    <tbody>
      <tr>
        <td>1</td>
        <td>Anna</td>
        <td>Pitt</td>
        <td>35</td>
        <td>New York</td>
        <td>USA</td>
        <td>Female</td>
        <td>Yes</td>
        <td>Yes</td>
        <td>Yes</td>
        <td>Yes</td>
        <td>Yes</td>
        <td>Yes</td>
        <td>Yes</td>
        <td>Yes</td>
        <td>Yes</td>
        <td>Yes</td>
        <td>Yes</td>
        <td>Yes</td>
      </tr>
    </tbody>
  </table>
 </div>
</div>
</body>
```

</html>

Bootstrap 5 Images

Image Shapes

The .rounded class adds rounded corners to an image:

The .rounded-circle class shapes the image to a circle:

The .img-thumbnail class shapes the image to a thumbnail (bordered):

Aligning Images

Float an image to the left with the .float-start class or to the right with .float-end:

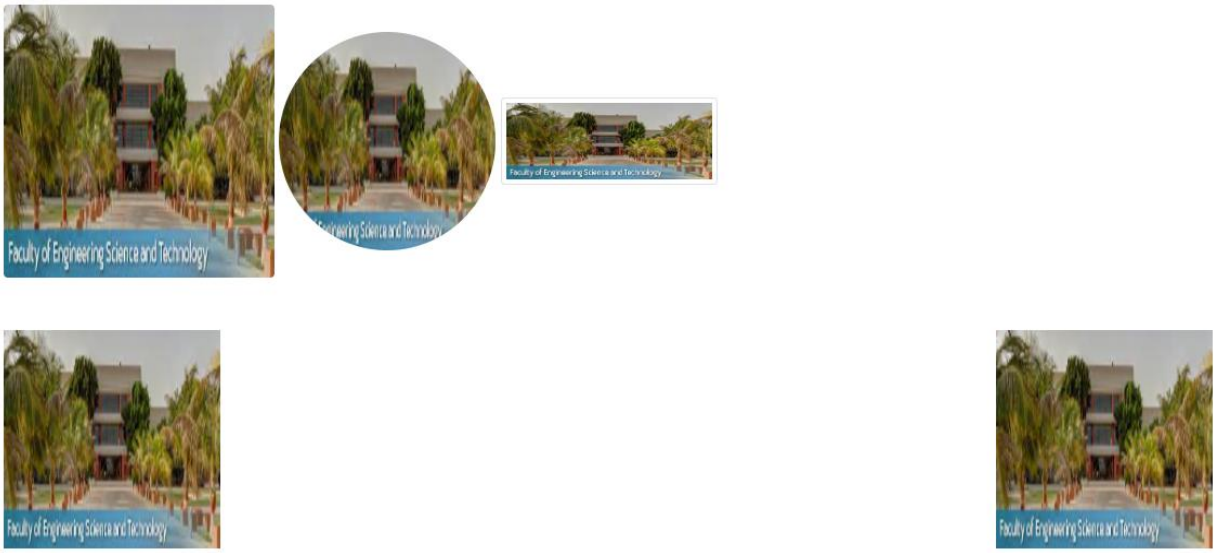
```
<img src="image.jpg" class="float-start" alt="Cinque Terre" width="200" height="200">
  <img src="image.jpg" class="float-end" alt="Cinque Terre" width="200" height="200">
```

Code:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
<link rel="stylesheet" href="css/bootstrap.min.css">

  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>
```

```
<div class="container mt-3">

  <img src="image.jpg" class="rounded" alt="Cinque Terre" width="250" height="250">
  <img src="image.jpg" class="rounded-circle" alt="Cinque Terre" width="200" height="200">
  <img src="image.jpg" class="img-thumbnail" alt="Cinque Terre" width="200" height="200">
<br>
<br>
<br>
  <img src="image.jpg" class="float-start" alt="Cinque Terre" width="200" height="200">
  <img src="image.jpg" class="float-end" alt="Cinque Terre" width="200" height="200">
</div>
</body>
</html>
```

Output:



Responsive Images

Images come in all sizes. So do screens. Responsive images automatically adjust to fit the size of the screen.

Create responsive images by adding an .img-fluid class to the <img> tag. The image will then scale nicely to the parent element.

The .img-fluid class applies max-width: 100%; and height: auto; to the image:

Code:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
<link rel="stylesheet" href="css/bootstrap.min.css">

  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>
 <div class="container mt-3">
<img class="img-fluid" src="image.jpg" alt="New York" width="1100" height="500">
</div>
</body>
</html>
```

Tasks:

Q1. Write the code to print your time table with the Combination of .table-dark, table-hover and .table-striped to create a dark, striped table.
Hint:
<table class="table table-dark table-hover … ">

Q2. Write the code to place an image in your web page with following image properties:

The corners of image is rounded and shape of image is circle. The position of image is to the right of the screen. The image should also be responsive.

Learning outcomes:

Lab # 06
Bootstrap Forms

Objectives:

- .

Theory:

Stacked Form

All textual <input> and <textarea> elements with class .form-control get proper form styling:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

<form action="/action_page.php">
  <div class="mb-3 mt-3">
    <label for="email" class="form-label">Email:</label>
    <input type="email" class="form-control" id="email" placeholder="Enter email"
name="email">
  </div>
  <div class="mb-3">
    <label for="pwd" class="form-label">Password:</label>
    <input type="password" class="form-control" id="pwd" placeholder="Enter password"
name="pswd">
  </div>
  <div class="form-check mb-3">
    <label class="form-check-label">
      <input class="form-check-input" type="checkbox" name="remember"> Remember me
    </label>
  </div>
```

```
  <button type="submit" class="btn btn-primary">Submit</button>
</form>

</body>
</html>
```

Also note that we add a .form-label class to each label element to ensure correct padding.

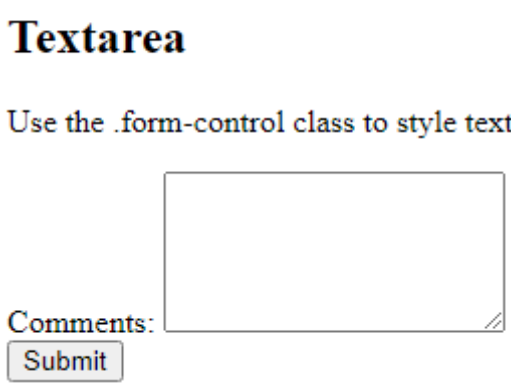
Checkboxes have different markup. They are wrapped around a container element with .form-check, and labels have a class of .form-check-label, while checkboxes and radio buttons use .form-check-input.

Text area

Code:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

<div class="container mt-3">
  <h2>Textarea</h2>
  <p>Use the .form-control class to style textareas as well:</p>
  <form action="/action_page.php">
    <div class="mb-3 mt-3">
      <label for="comment">Comments:</label>
      <textarea class="form-control" rows="5" id="comment" name="text"></textarea>
    </div>
    <button type="submit" class="btn btn-primary">Submit</button>
  </form>
</div>


</body>
</html>
```

Output:



Form Row/Grid (Inline Forms)

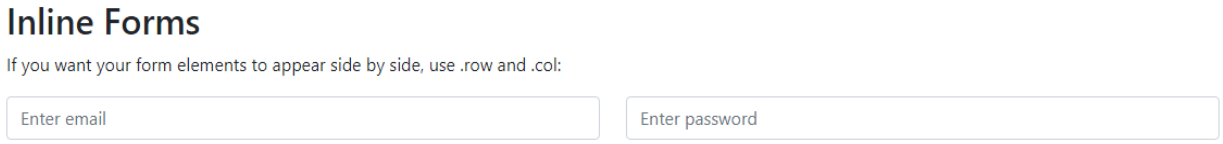
If you want your form elements to appear side by side, use .row and .col:

Code:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
<link rel="stylesheet" href="css/bootstrap.min.css">

  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

<div class="container mt-3">
  <h2>Inline Forms</h2>
  <p>If you want your form elements to appear side by side, use .row and .col:</p>
  <form>
    <div class="row">
      <div class="col">
        <input type="text" class="form-control" placeholder="Enter email" name="email">
      </div>
```

```
    <div class="col">
      <input type="password" class="form-control" placeholder="Enter password"
name="pswd">
    </div>
   </div>
  </form>
</div>
</body>
</html>
```

Output:



Form Control Size

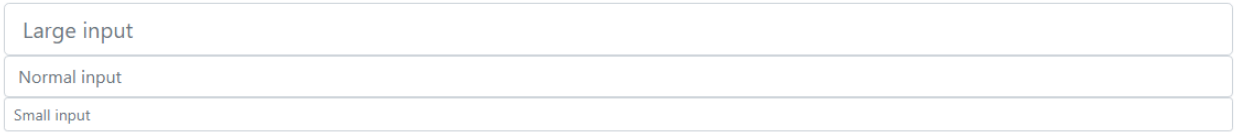
You can change the size of .form-control inputs with .form-control-lg or .form-control-sm:

Code:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
<link rel="stylesheet" href="css/bootstrap.min.css">

  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

<div class="container mt-3">
  <h2>Inline Forms</h2>
  <p>If you want your form elements to appear side by side, use .row and .col:</p>
  <form>
    <input type="text" class="form-control form-control-lg" placeholder="Large input">
<input type="text" class="form-control" placeholder="Normal input">
<input type="text" class="form-control form-control-sm" placeholder="Small input">
```

```
  </form>
</div>
</body>
</html>
```

Output:



Disabled and Readonly

Use the disabled and/or readonly attributes to disable the input field:

```
<input type="text" class="form-control" placeholder="Normal input">
<input type="text" class="form-control" placeholder="Disabled input" disabled>
<input type="text" class="form-control" placeholder="Readonly input" readonly>
```

Plain text Inputs

Use the .form-control-plaintext class to style an input field without borders, but keep proper marigins and padding:

```
<input type="text" class="form-control-plaintext" placeholder="Plaintext input">
<input type="text" class="form-control" placeholder="Normal input">
```

Color Picker

```
<input type="color" class="form-control form-control-color" value="#CCCCCC">
```

Bootstrap 5 Select

Select menus are used if you want to allow the user to pick from multiple options.

To style a select menu in Bootstrap 5, add the .form-select class to the <select> element:

```
<div class="container mt-3">
   <form>
    <select class="form-select">
  <option>1</option>
  <option>2</option>
  <option>3</option>
  <option>4</option>
</select>
  </form>
</div>
```

Data Lists

Bootstrap will also style data lists, which is a list of pre-defined options for an <input> element:

Code:

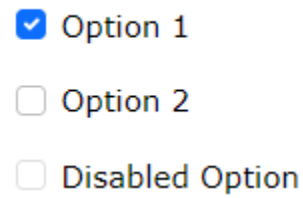
```
Choose your browser from the list:
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
<link rel="stylesheet" href="css/bootstrap.min.css">

  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

<label for="browser" class="form-label">Choose your browser from the list:</label>
<input class="form-control" list="browsers" name="browser" id="browser">
<datalist id="browsers">
  <option value="Edge">
  <option value="Firefox">
  <option value="Chrome">
  <option value="Opera">
  <option value="Safari">
</datalist>
```

```
</body>
</html>
```

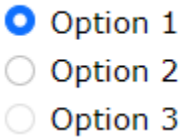
Bootstrap 5 Checkboxes and Radio buttons::

Checkboxes, Radio buttons, Toggle Switches, ,Range

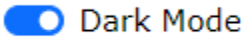
Checkboxes are used if you want the user to select any number of options from a list of preset options.



Radio buttons are used if you want to limit the user to just one selection from a list of preset options.



If you want your checkbox to be styled as a toggle switch, use the .form-switch class together with the .form-check container:



Code:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
```

```
<link rel="stylesheet" href="css/bootstrap.min.css">

  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

<div class="container mt-3">
  <h2>Stacked form</h2>
  <form action="/action_page.php">
    <div class="mb-3 mt-3">
      <label for="email">Email:</label>
      <input type="email" class="form-control" id="email" placeholder="Enter email"
name="email">
    </div>
    <div class="mb-3">
      <label for="pwd">Password:</label>
      <input type="password" class="form-control" id="pwd" placeholder="Enter password"
name="pswd">
    </div>
    <div class="form-check mb-3">
      <label class="form-check-label">
        <input class="form-check-input" type="checkbox" name="remember"> Remember me
      </label>
    </div>
    <button type="submit" class="btn btn-primary">Submit</button>
  </form>
</div>

<br> <br> <br>
<div class="form-check">
  <input type="radio" class="form-check-input" id="radio1" name="optradio" value="option1"
checked>Option 1
  <label class="form-check-label" for="radio1"></label>
</div>
<div class="form-check">
  <input type="radio" class="form-check-input" id="radio2" name="optradio"
value="option2">Option 2
  <label class="form-check-label" for="radio2"></label>
</div>
<div class="form-check">
  <input type="radio" class="form-check-input" disabled>Option 3
  <label class="form-check-label"></label>
</div>
```

```
<br> <br> <br>

<div class="form-check form-switch">
  <input class="form-check-input" type="checkbox" id="mySwitch" name="darkmode"
value="yes" checked>
  <label class="form-check-label" for="mySwitch">Dark Mode</label>
</div>

</body>
</html>
```

Bootstrap 5 Form Validation

Form Validation

You can use different validation classes to provide valuable feedback to users. Add either .was-validated or .needs-validation to the <form> element, depending on whether you want to provide validation feedback before or after submitting the form. The input fields will have a green (valid) or red (invalid) border to indicate what's missing in the form. You can also add a .valid-feedback or .invalid-feedback message to tell the user explicitly what's missing, or needs to be done before submitting the form.

Coding:

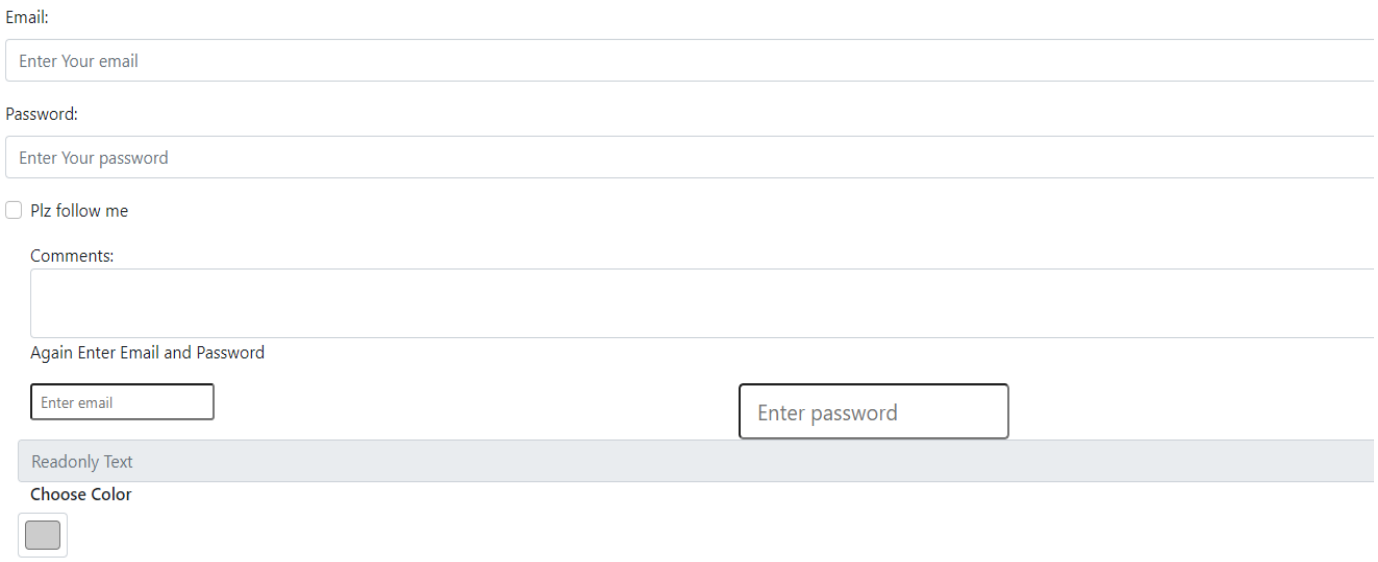
```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="css/bootstrap.css">
<link rel="stylesheet" href="css/bootstrap.min.css">

  <script src="js/bootstrap.bundle.min.js"></script>
</head>
<body>

<div class="container mt-3">
  <h3>Form Validation</h3>
  <p>Try to submit the form.</p>

  <form action="/action_page.php" class="was-validated">
```

```
    <div class="mb-3 mt-3">
      <label for="uname" class="form-label">Username:</label>
      <input type="text" class="form-control" id="uname" placeholder="Enter username"
name="uname" required>
      <div class="valid-feedback">Valid.</div>
      <div class="invalid-feedback">Please fill out this field.</div>
    </div>
    <div class="mb-3">
      <label for="pwd" class="form-label">Password:</label>
      <input type="password" class="form-control" id="pwd" placeholder="Enter password"
name="pswd" required>
      <div class="valid-feedback">Valid.</div>
      <div class="invalid-feedback">Please fill out this field.</div>
    </div>
    <div class="form-check mb-3">
      <input class="form-check-input" type="checkbox" id="myCheck"  name="remember"
required>
      <label class="form-check-label" for="myCheck">I agree on blabla.</label>
      <div class="valid-feedback">Valid.</div>
      <div class="invalid-feedback">Check this checkbox to continue.</div>
    </div>
  <button type="submit" class="btn btn-primary">Submit</button>
  </form>
</div>


</body>
</html>
```

Output:

Tasks:

Q1. Write the code to print the following screen:



Q2. Write the code to print the following screen:

Data for Q2:

Options:

- ✓ 1
- ✓ 2
- ✓ 3
- ✓ 4

Browser Datalist Options:

- ✓ Edge
- ✓ Firefox
- ✓ Chrome
- ✓ Opera
- ✓ Safari

Learning outcomes:

Lab # 07

Introduction to jQuery

Objectives:

To familiar with the environment of Jquery.

Theory:

The purpose of jQuery is to make it much easier to use JavaScript on your website.

What You Should Already Know

Before you start studying jQuery, you should have a basic knowledge of:

- HTML
- CSS
- JavaScript

What is jQuery?

jQuery is a lightweight, "write less, do more", JavaScript library.

The purpose of jQuery is to make it much easier to use JavaScript on your website.

jQuery takes a lot of common tasks that require many lines of JavaScript code to accomplish, and wraps them into methods that you can call with a single line of code.

jQuery also simplifies a lot of the complicated things from JavaScript, like AJAX calls and DOM manipulation.

The jQuery library contains the following features:

- HTML/DOM manipulation
- CSS manipulation
- HTML event methods
- Effects and animations
- AJAX

- Utilities

Why jQuery?

There are lots of other JavaScript libraries out there, but jQuery is probably the most popular, and also the most extendable.

Many of the biggest companies on the Web use jQuery, such as:

- Google
- Microsoft
- IBM
- Netflix

Will jQuery work in all browsers?

The jQuery team knows all about cross-browser issues, and they have written this knowledge into the jQuery library. jQuery will run exactly the same in all major browsers.

jQuery Get Started

Adding jQuery to Your Web Pages

There are several ways to start using jQuery on your web site. You can:

- Download the jQuery library from jQuery.com
- Include jQuery from a CDN, like Google

Downloading jQuery

There are two versions of jQuery available for downloading:

- Production version - this is for your live website because it has been minified and compressed
- Development version - this is for testing and development (uncompressed and readable code)

Both versions can be downloaded from jQuery.com.

The jQuery library is a single JavaScript file, and you reference it with the HTML <script> tag (notice that the <script> tag should be inside the <head> section):

```
<head>
<script src="jquery-3.6.0.min.js"></script>
</head>
```

Tip: Place the downloaded file in the same directory as the pages where you wish to use it.

jQuery Syntax

With jQuery you select (query) HTML elements and perform "actions" on them.

jQuery Syntax

The jQuery syntax is tailor-made for **selecting** HTML elements and performing some **action** on the element(s).

Basic syntax is: **$(*selector*).*action*()**

- A $ sign to define/access jQuery
- A (*selector*) to "query (or find)" HTML elements
- A jQuery *action*() to be performed on the element(s)

Examples:

$(this).hide() - hides the current element.

$("p").hide() - hides all <p> elements.

$(".test").hide() - hides all elements with class="test".

$("#test").hide() - hides the element with id="test".

The Document Ready Event

You might have noticed that all jQuery methods in our examples, are inside a document ready event:

```
$(document).ready(function(){

  // jQuery methods go here...
```

});

This is to prevent any jQuery code from running before the document is finished loading (is ready).

It is good practice to wait for the document to be fully loaded and ready before working with it. This also allows you to have your JavaScript code before the body of your document, in the head section.

Here are some examples of actions that can fail if methods are run before the document is fully loaded:

- Trying to hide an element that is not created yet
- Trying to get the size of an image that is not loaded yet

Tip: The jQuery team has also created an even shorter method for the document ready event:

```
$(function(){

  // jQuery methods go here...

});
```

Use the syntax you prefer. We think that the document ready event is easier to understand when reading the code.

jQuery Selectors

jQuery selectors are one of the most important parts of the jQuery library.

Query selectors allow you to select and manipulate HTML element(s).

jQuery selectors are used to "find" (or select) HTML elements based on their name, id, classes, types, attributes, values of attributes and much more. It's based on the existing CSS Selectors, and in addition, it has some own custom selectors.

All selectors in jQuery start with the dollar sign and parentheses: $().

The element Selector

The jQuery element selector selects elements based on the element name.

You can select all <p> elements on a page like this:

$("p")

Example

When a user clicks on a button, all <p> elements will be hidden:

Code:

```
<!DOCTYPE html>
<html>
<head>

<script>
$(document).ready(function(){
  $("button").click(function(){
    $("p").hide();
  });
});
</script>
</head>
<body>

<h2>This is a heading</h2>

<p>This is a paragraph.</p>
<p>This is another paragraph.</p>

<button>Click me to hide paragraphs</button>

</body>
</html>
```

The #id Selector

The jQuery *#id* selector uses the id attribute of an HTML tag to find the specific element.

An id should be unique within a page, so you should use the #id selector when you want to find a single, unique element.

To find an element with a specific id, write a hash character, followed by the id of the HTML element:

$("#test")

Example

When a user clicks on a button, the element with id="test" will be hidden:

Code:

```
<!DOCTYPE html>
<html>
<head>
<script src="jquery-3.6.0.min.js"></script>
<script>


$(document).ready(function(){
  $("button").click(function(){
    $("#test").hide();
  });
});
</script>
</head>
<body>

<h2>This is a heading</h2>

<p>This is a paragraph.</p>
<p id="test">This is another paragraph.</p>

<button>Click me</button>

</body>
</html>
```

The .class Selector

The jQuery *.class* selector finds elements with a specific class.

To find elements with a specific class, write a period character, followed by the name of the class:

$(".test")

Example

When a user clicks on a button, the elements with class="test" will be hidden:

Example

```
$(document).ready(function(){
  $("button").click(function(){
    $(".test").hide();
  });
});
```

Code:

```
<!DOCTYPE html>
<html>
<head>
<script src="jquery-3.6.0.min.js"></script>


<script>
$(document).ready(function(){
  $("button").click(function(){
    $(".test").hide();
  });
});
</script>
</head>
<body>

<h2 class="test">This is a heading</h2>

<p class="test">This is a paragraph.</p>
```

```
<p>This is another paragraph.</p>

<button>Click me</button>

</body>
</html>
```

Functions In a Separate File

If your website contains a lot of pages, and you want your jQuery functions to be easy to maintain, you can put your jQuery functions in a separate .js file.

When we demonstrate jQuery in this tutorial, the functions are added directly into the <head> section. However, sometimes it is preferable to place them in a separate file, like this (use the src attribute to refer to the .js file):

Example:

```
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
<script src="my_jquery_functions.js"></script>
</head>
```

Tasks:

Q1. Write a function in JS that hides the class elements of HTML paragraph.
Q2. Write a function in JS that hides the class elements of HTML heading.
Q3. Write a program in JS in which when a user clicks on a button, the element with an id will be hidden:

Learning outcomes:

Lab # 08

jQuery Event Methods

Objectives:

To familiar with the Jquery event methods.

Theory:

jQuery is tailor-made to respond to events in an HTML page.

What are Events?

All the different visitors' actions that a web page can respond to are called events.

An event represents the precise moment when something happens.

Examples:

- moving a mouse over an element
- selecting a radio button
- clicking on an element

The term **"fires/fired"** is often used with events. Example: "The keypress event is fired, the moment you press a key".

Here are some common DOM events:

Mouse Events	**Keyboard Events**	**Form Events**	**Document/Window Events**
click	keypress	submit	load

dblclick	keydown	change	resize
mouseenter	keyup	focus	scroll
mouseleave		blur	unload

jQuery Syntax For Event Methods

In jQuery, most DOM events have an equivalent jQuery method.

To assign a click event to all paragraphs on a page, you can do this:

```
$("p").click();
```

The next step is to define what should happen when the event fires. You must pass a function to the event:

```
$("p").click(function(){
  // action goes here!!
});
```

Commonly Used jQuery Event Methods

$(document).ready()

The $(document).ready() method allows us to execute a function when the document is fully loaded.

click()

The click() method attaches an event handler function to an HTML element.

The function is executed when the user clicks on the HTML element.

The following example says: When a click event fires on a <p> element; hide the current <p> element:

Coding:

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
<script>
$(document).ready(function(){
  $("p").click(function(){
    $(this).hide();
  });
});
</script>
</head>
<body>

<p>If you click on me, I will disappear.</p>
<p>Click me away!</p>
<p>Click me too!</p>

</body>
</html>
```

dblclick()

The dblclick() method attaches an event handler function to an HTML element.

The function is executed when the user double-clicks on the HTML element:

Coding:

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
<script>
$(document).ready(function(){
  $("p").dblclick(function(){
    $(this).hide();
  });
});
</script>
</head>
<body>

<p>If you double-click on me, I will disappear.</p>
<p>Click me away!</p>
<p>Click me too!</p>

</body>
</html>
```

mouseenter()

The mouseenter() method attaches an event handler function to an HTML element.

The function is executed when the mouse pointer enters the HTML element:

Coding:

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
<script>
$(document).ready(function(){
  $("#p1").mouseenter(function(){
    alert("You entered p1!");
  });
```

```
});
</script>
</head>
<body>

<p id="p1">Enter this paragraph.</p>

</body>
</html>
```

mouseleave()

The mouseleave() method attaches an event handler function to an HTML element.

The function is executed when the mouse pointer leaves the HTML element:

Coding:

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
<script>
$(document).ready(function(){
  $("#p1").mouseleave(function(){
    alert("Bye! You now leave p1!");
  });
});
</script>
</head>
<body>

<p id="p1">This is a paragraph.</p>

</body>
</html>
```

mousedown()

The mousedown() method attaches an event handler function to an HTML element.

The function is executed, when the left, middle or right mouse button is pressed down, while the mouse is over the HTML element:

Coding:

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
<script>
$(document).ready(function(){
  $("#p1").mousedown(function(){
    alert("Mouse down over p1!");
  });
});
</script>
</head>
<body>

<p id="p1">This is a paragraph.</p>

</body>
</html>
```

mouseup()

The mouseup() method attaches an event handler function to an HTML element.

The function is executed, when the left, middle or right mouse button is released, while the mouse is over the HTML element:

Coding:

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
```

```
<script>
$(document).ready(function(){
  $("#p1").mouseup(function(){
    alert("Mouse up over p1!");
  });
});
</script>
</head>
<body>

<p id="p1">This is a paragraph.</p>

</body>
</html>
```

hover()

The hover() method takes two functions and is a combination of the mouseenter() and mouseleave() methods.

The first function is executed when the mouse enters the HTML element, and the second function is executed when the mouse leaves the HTML element:

Coding:

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
<script>
$(document).ready(function(){
  $("#p1").hover(function(){
  alert("You entered p1!");
},
function(){
  alert("Bye! You now leave p1!");
});
});
</script>
```

```
</head>
<body>

<p id="p1">This is a paragraph.</p>

</body>
</html>
```

focus()

The focus() method attaches an event handler function to an HTML form field.

The function is executed when the form field gets focus:

Coding:

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
<script>
$(document).ready(function(){
  $("input").focus(function(){
    $(this).css("background-color", "yellow");
  });
  $("input").blur(function(){
    $(this).css("background-color", "green");
  });
});
</script>
</head>
<body>

Name: <input type="text" name="fullname"><br>
Email: <input type="text" name="email">

</body>
</html>
```

blur()

The blur() method attaches an event handler function to an HTML form field.

The function is executed when the form field loses focus:

Coding:

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
<script>
$(document).ready(function(){
  $("input").focus(function(){
    $(this).css("background-color", "yellow");
  });
  $("input").blur(function(){
    $(this).css("background-color", "green");
  });
});
</script>
</head>
<body>

Name: <input type="text" name="fullname"><br>
Email: <input type="text" name="email">

</body>
</html>
```

Tasks:

Q1. Write the code with output given below. When you click on heading "Click me - I will go away" then this heading must disapper.

Click me - I will not go away

Click me for no effect

Click me - I will go away

Q2. Write the code with output given below. When you double click on paragraph "Click two time me then i will go away" then this must disapper.

Click me - I will not go away

Click two time me then i will go away

Q3. Write the program that display following paragraph with id. When you click on the paragraph then alert box will appear and display sum of 2 and 3.

2+3

On click 2+3 alert box will appear as shown below: