
Lecture 1

Contents: Introduction; How to work with Bootstrap; Editors for writing programs using Bootstrap; Installing notepad++ editor; Writing first program using Bootstrap; Text display using three-column format; Advantages of Bootstrap; Features of Bootstrap; Exercises

1.1 Introduction

Bootstrap is a front-end framework that helps us to build mobile responsive websites more quickly and easily. It is free, versatile, and intuitive. It was developed by Mark Otto and Jacob Thornton at Twitter. It powers anything from web applications to WordPress themes. The current version is 5.2.0 as released in July, 2022.

It contains HTML, CSS and (optionally) JavaScript-based design templates or typography, forms, buttons, navigation, and other interface components. With Bootstrap, one can cleverly design complex web pages from standard HTML and customize it as needs. It also comes with additional functionality such as carousels, buttons, and popups.

Bootstrap gives us a lot of shortcuts for creating web pages that will save our time and energy. But, one needs basic understanding of HTML and CSS to create web pages that are responsive, mobile-first, and compatible with modern browsers. Some names of popular websites using Bootstrap are `zoom.us`, `force.com`, `indeed.com`, `spotify.com`, `linkedin.com`, and `salesforce.com`

Note that CSS does not provide a grid system or pre-defined classes and design as provided by Bootstrap.

1.2 How to work with Bootstrap

There are two ways to work with Bootstrap.

- Download Bootstrap from `getbootstrap.com`
- Include Bootstrap from a CDN and jQuery support from a CDN

MaxCDN provides CDN (Content Delivery Network) support for Bootstrap's CSS and JavaScript. In this book, we shall load Bootstrap as well as jQuery via CDNs; see Fig. 1.1.

```
<!-- Compiled and minified CSS -->
<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">

<!-- jQuery library -->
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>

<!-- Compiled JavaScript -->
<script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>
```

Figure 1.1: MaxCDN support for Bootstrap and Google support for jQuery

1.3 Editors for writing programs using Bootstrap

Note that an HTML program contains Bootstrap. There are many editors by which a HTML program could be developed. A few names are given below.

- Atom
- Notepad ++
- Sublime Text
- Visual Studio Code
- Adobe Dreamweaver CC
- Froala
- CoffeeCup

We shall take `notepad++` as an editor for coding HTML programs. `notepad` also serves as an editor.

`notepad++` is a free editor and it supports several languages. Running in the MS Windows environment, its use is governed by GNU General Public License.

Based on the powerful editing component `Scintilla`, `notepad++` is written in C++ and uses pure Win32 API and STL which ensures a higher execution speed and smaller program size.

NOTE: GNU stands for GNU's Not Unix; API has full form application programming interface; STL is a file format native to the stereolithography CAD software created by 3D Systems. STL has several acronyms such as *standard triangle language* and *standard tessellation language*.

1.4 Installing `notepad++` editor

It is a free software. Visit website <https://notepad-plus-plus.org/downloads/> to download `notepad++` software. Otherwise, one can give a search using “download notepad++” using Google search. Follow the instructions to install the software and choose option to create a shortcut at the desktop.

1.5 Writing a program using Bootstrap

Every HTML program has extension `.html`. Our first program `first.html` is presented below.

```
<html>
<head>
  <title>First HTML Program using Bootstrap</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
  <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
  <script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>
</head>
<body>
```

```
<div class="container">
  <h1>First HTML Program using Bootstrap</h1>
  <p>This line of text is placed inside a <b>container</b> class.</p>
  <p>This class provides a responsive fixed width container.</p>
</div>

</body>
</html>
```

Program 1.1: Displaying text using paragraphs

`container` class is a responsive, fixed-width container, meaning its `max-width` changes at each breakpoint. The output (screenshot) of the program is given in Fig. 1.2.

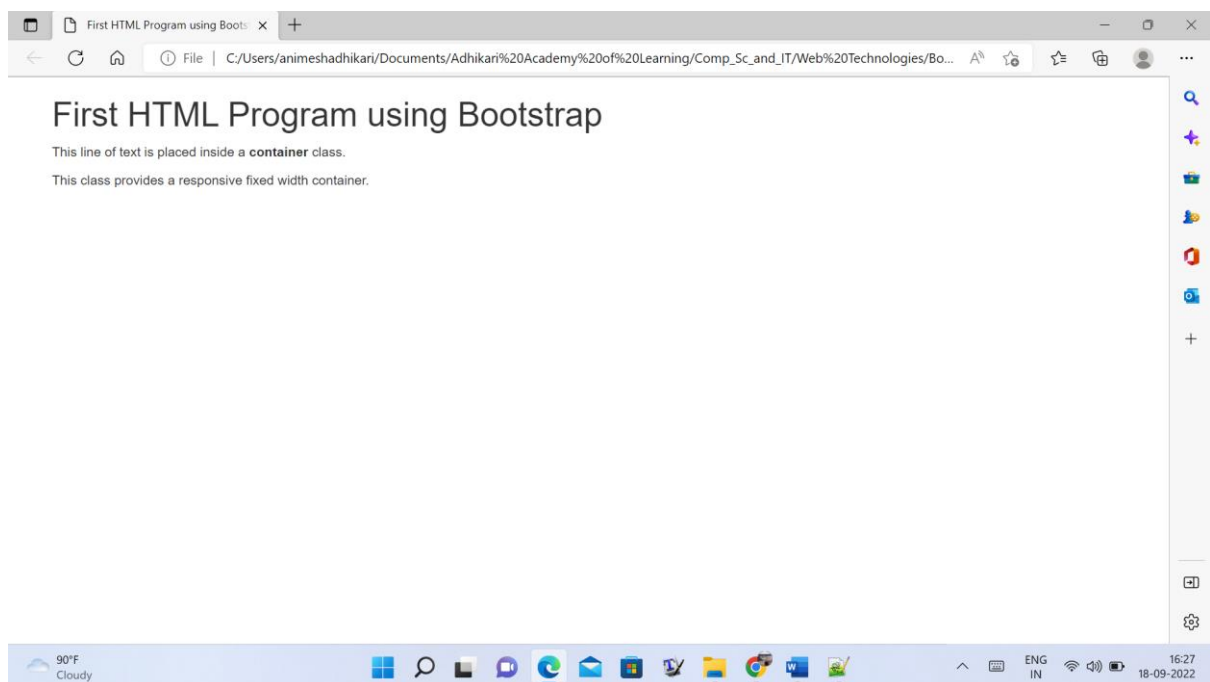


Figure 1.2: The output of above program (Program 1.1)

Breakpoints are customizable widths that determine how the responsive layout behaves across devices or viewport sizes in Bootstrap. Bootstrap includes six default breakpoints, sometimes referred to as *grid tiers*, for building responsivity. These are x-small, small, medium, large, extra-large and extra extra-large. Each breakpoint was chosen to comfortably hold containers whose widths are multiples of 12. Breakpoints are also representative of a subset of common device sizes and viewport dimensions without targeting every use case or device. See below a program for creating three equal-width columns on small, medium, large, and extra-large devices using predefined grid classes. These columns are centered in the page with the parent `container` class.

```
<html>
<head>
  <title>Three columns</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
```

Lecture 2

Contents: Grid system; Headings, texts and tags; Exercises

2.1 Grid system

Grid system allows up to 12 columns across the page. Grid system is responsive, and the columns get re-arranged automatically depending on the screen size. Bootstrap grid system has four types of classes. (Bootstrap 3)

- `xs` (for screens < 768 px) expressing extremely small
- `sm` (for screens ≥ 768 px) expressing small
- `md` (for screens ≥ 992 px) expressing medium
- `lg` (for screens ≥ 1200 px) expressing large

According to the grid system, the screen is divided into 12 equal widths. As we select `class="col-sm-3"`, three such widths are clubbed together to form the width of the division. See below a program for creating four columns of the same width.

```
<html>
<head>
  <title>Four Equal Column</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
  <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
  <script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>
</head>
<body>

<div class="container-fluid">
  <h1>Popular English News Papers</h1>
  <p>Resize the browser window to see the effect.</p>
  <p>Columns get adjusted to stack on top of another one when the screen is less than 768px
wide.</p>
  <div class="row">
    <div class="col-sm-3" style="background-color:LightGrey;">Times of India</div>
    <div class="col-sm-3" style="background-color:Azure;">Indian Express</div>
    <div class="col-sm-3" style="background-color:BlanchedAlmond;">The Hindu</div>
    <div class="col-sm-3" style="background-color:LightBlue;">Hindustan Times</div>
  </div>
</div>
```

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

Program 2.1: Creating columns of equal widths

`container-fluid` class provides a full width container, spanning the entire width of the viewport. The output (screenshot) of the program is given in Fig. 2.1.

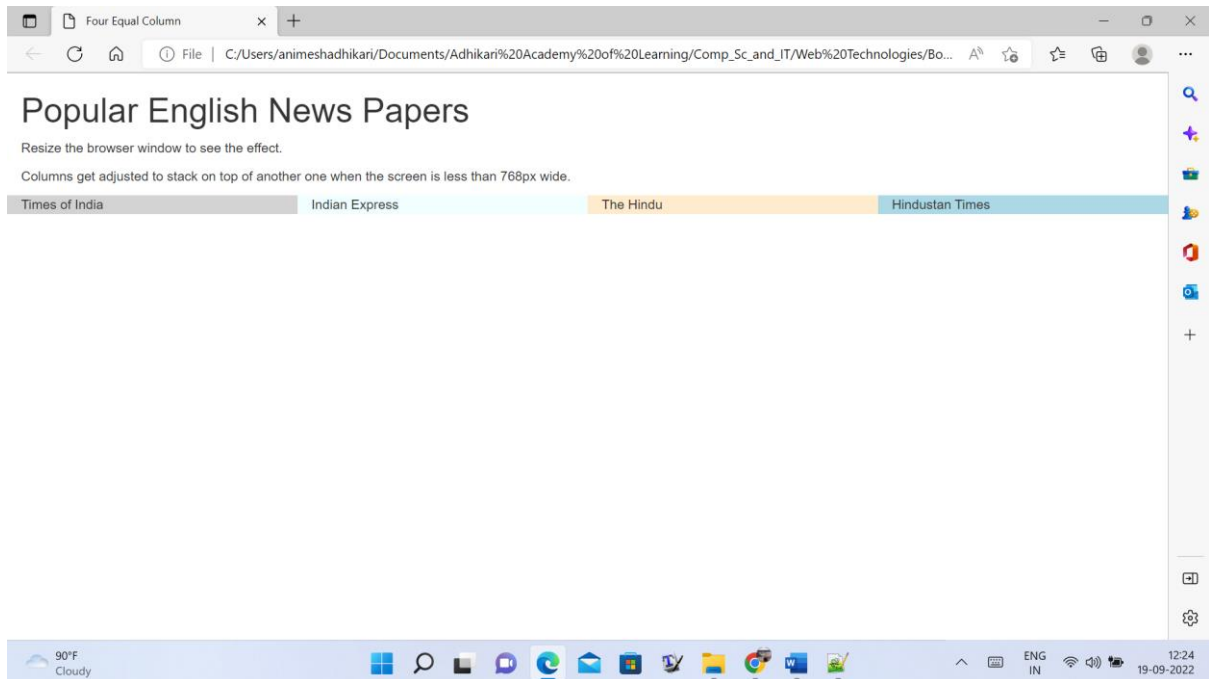


Figure 2.1: The output of the above program (Program 2.1)

UTF-8 is a variable-width character encoding used for electronic communication. It is defined by the Unicode Standard. The full name is *Unicode (or Universal Coded Character Set) Transformation Format - 8-bit*.

Now, we shall consider unequal width for different columns and present a program to create such columns.

```
<html>
<head>
  <title>Unequal Columns</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
  <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
  <script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>
</head>
<body>

<div class="container-fluid">
  <h1>Four Popular English News Papers</h1>
```

```

<p>Resize the browser window to see the effect.</p>
<p>Columns get adjusted to stack on top of another one when the screen is less than 768px wide.</p>
<div class="row">
  <div class="col-sm-2" style="background-color:LightGrey;">Times of India</div>
  <div class="col-sm-3" style="background-color:Azure;">Indian Express</div>
  <div class="col-sm-1" style="background-color:BlanchedAlmond;">The Hindu</div>
  <div class="col-sm-6" style="background-color:LightBlue;">Hindustan Times</div>
</div>
</div>

</body>
</html>

```

Program 2.2: *Creating columns of unequal widths*

The output (screenshot) of the program is given in Fig. 2.2.

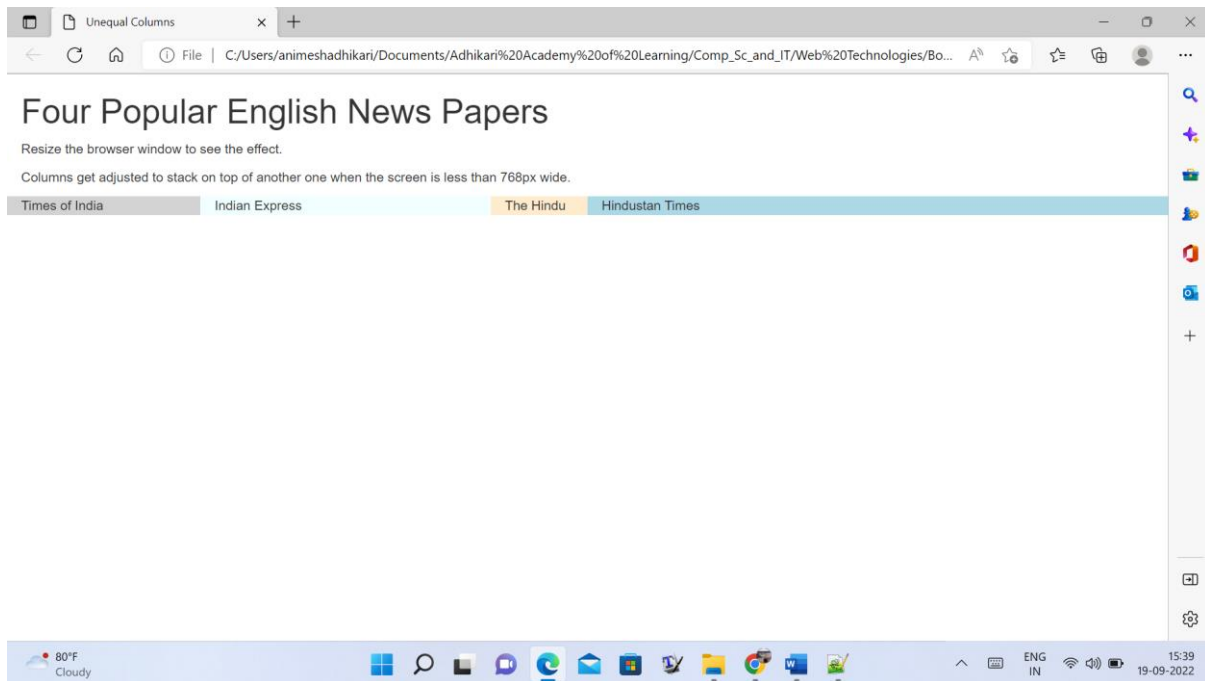


Figure 2.2: The output of the above program (Program 2.2)

See Lecture 13 for more about the grid system.

2.2 Headings, texts and tags

Bootstrap styles HTML headings <h1> , <h2> , <h3> , <h4> , <h5> and <h6> using font sizes 36px, 30px, 24px, 18px, 14px and 12px respectively. See a program given below.

```

<html>
<head>
  <title>Headings and Secondary Texts</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">

```

Lecture 3

Contents: Headings, texts and tags; Contextual Colours; Styled tables; Responsive table; Exercises

3. Headings, texts and tags

We continue learning different tags as done in Lecture 2. All these tags are pre-styled in Bootstrap. Some more tags are **code**, **dl**, **kbd** and **pre**, as experimented using the following program.

```
<html>
<head>
  <title>Different tags</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
  <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
  <script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>
</head>
<body>

<div class="container">
  <h3>Code snippets</h3>
  <p>The following terms <code>Algorithm</code>, <code>Computer networking</code>, and
<code>Deadlock</code> are defined below.</p>
</div>
<div class="container">
  <h3>Description list</h3>
  <dl>
    <dt style = "color: LightCoral";>Algorithm</dt>
    <dd>An algorithm is a finite sequence of well-defined instructions, used to solve a class of
specific problems or to perform a computation.</dd>
    <dt style = "color: LightCoral";>Computer networking</dt>
    <dd>Computer networking is a collection of interconnected devices that can exchange data and
share resources with each other. These connected devices use a system of rules, called
communications protocols, to transmit information over physical or wireless technologies.</dd>
    <dt style = "color: LightCoral";>Deadlock</dt>
    <dd>A deadlock is a situation in which a set of computer programs are in a circular waiting state
to acquire some resource held by the next computer program, and the last computer program waits
for the first computer program to release a resource. This situation prevents each computer
program to proceed further. </dd>
  </dl>
</div>
<div class="container">
```

```

<h3>Keyboard inputs</h3>
<p>Press <code>ctrl + F1</code> for help.</p>
</div>
<div class="container">
<h3>Multiple lines using <code>pre</code> tag</h3>
<pre>
We have learnt here
how to use different tags
using Bootstrap
</pre>
</div>
</body>
</html>

```

Program 3.1: Applying standard tags such as *code*, *dl*, *kbd* and *pre*

The output (screenshot) of the above program is shown below.

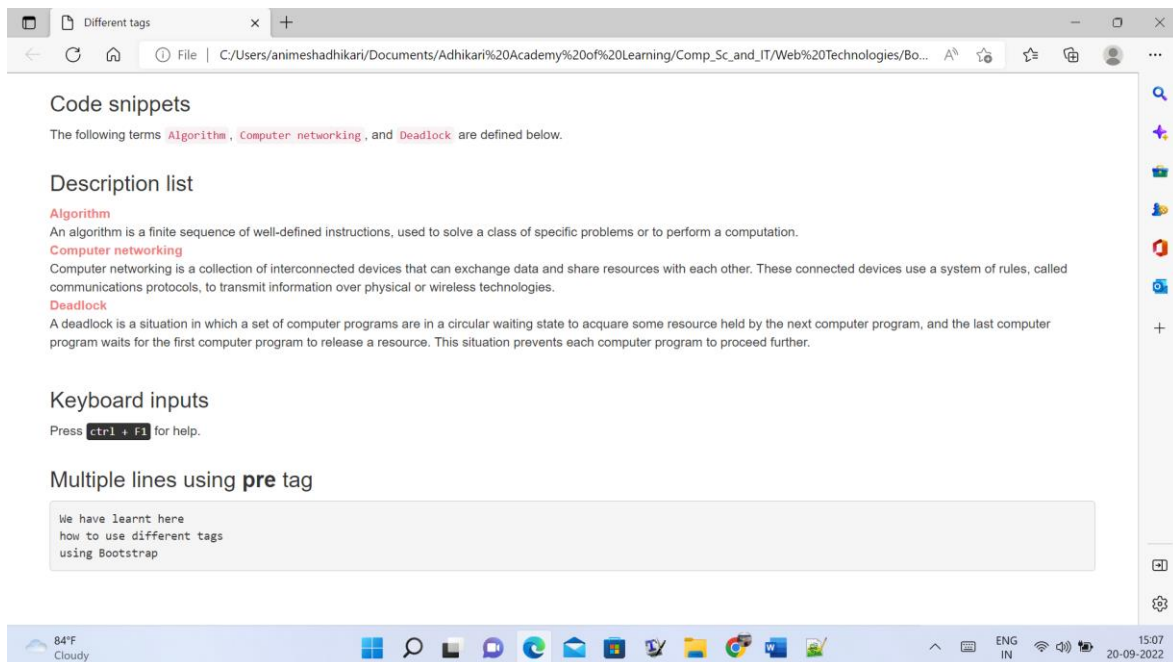


Figure 3.1: The output of the above program (Program 3.1)

3.2 Contextual Colours

Bootstrap gives meaning to colours using contextual classes. This is applicable to both text colours and background colours. A program is given below.

```

<html>
<head>
<title>Contextual colours</title>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>

```



```

<script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>
</head>
<body>

<div class="container">
  <h2>Contextual text colours</h2>
  <p class="text-muted">This line of text has been muted.</p>
  <p class="text-primary">This text line of text is important.</p>
  <p class="text-success">This text line of text indicates a success.</p>
  <p class="text-info">This text line of text represents some information.</p>
  <p class="text-warning">This text line of text represents a warning.</p>
  <p class="text-danger">This text line of text represents a danger.</p>
</div>

<div class="container">
  <h2>Contextual background colours</h2>
  <p class="bg-primary">This line of text is important.</p>
  <p class="bg-success">This line of text indicates a success.</p>
  <p class="bg-info">This line of text represents some information.</p>
  <p class="bg-warning">This line of text represents a warning.</p>
  <p class="bg-danger">This line of text represents a danger.</p>
</div>
</body>
</html>

```

Program 3.2: Applying contextual colours

The output (screenshot) of the program is shown in Fig. 3.2.

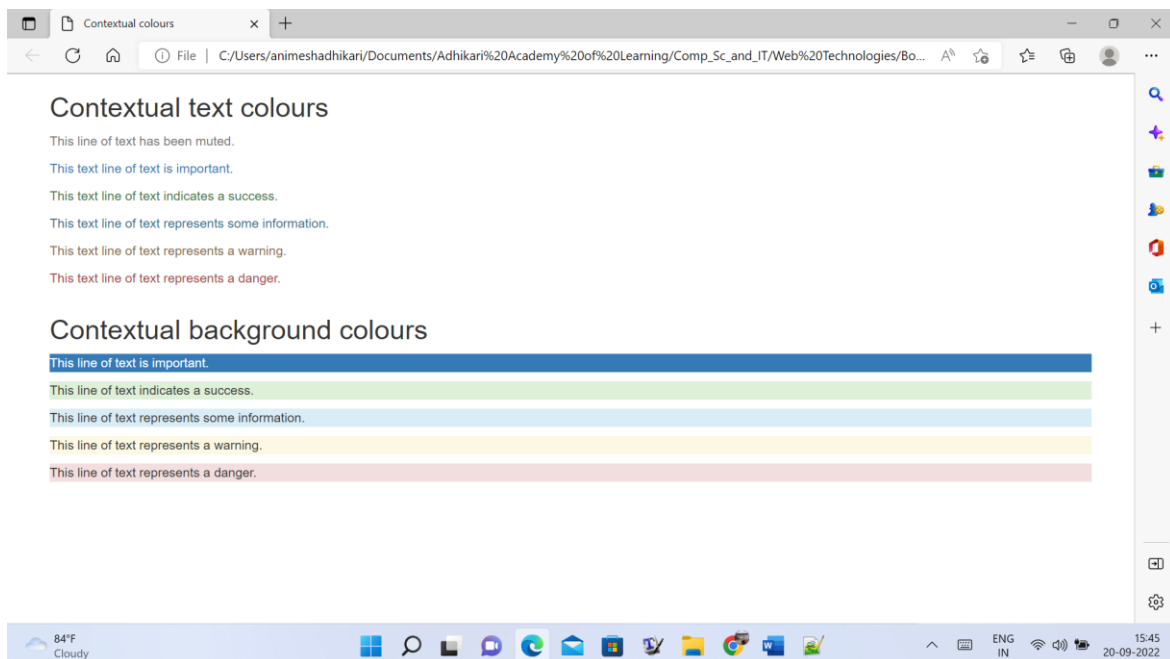


Figure 3.2: The output of the above program (Program 3.2)

3.3 Styled tables