



KU BCA 502

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# Web Technology



By  
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## Introduction to Markup Languages

*Frames: Introduction to Frames and Its Applications, Creating Frames, Targeting Named Frames, Nested <frameset> Tags, Creating Floating Frames.*

### Introduction to Frames and Its Applications

HTML frames are used to divide the web browser window into multiple sections where each section can load a separate webpage. A collection of frames in the browser window is known as a frameset. The window is divided into frames in a similar way the HTML tables are organized into rows and columns.

One of the uses of frames has always been to display banner in one frame, to load navigation menu in second frame, and to load main pages in third frame that can be scrolled or replaced by the navigation menu in the second frame.

### Creating Frames

To use frames in a web browser we use `<frameset>` tag instead of `<body>` tag. The `<frameset>` tag defines how to divide the web browser window into frames. The ‘rows’ attribute of `<frameset>` tag defines horizontal frames and ‘cols’ attribute defines vertical frames. Each frame is indicated by `<frame>` tag and it defines which HTML document shall open into the frame. There is no end tag for the `<frame>` tag. `<frameset>` and `<frame>` tags are not supported by HTML5 and we should use `<iframe>` or `<div>` with CSS.

Old web browsers do not support frames, then `<noframes>` elements should be used to display the error message to the user. In practice, the `<body>` element should be placed inside `<noframes>` element because the `<frameset>` element is supposed to replace the `<body>` element. If the browser fails to understand `<frameset>` element then it understands the contents of the `<body>` element which is contained in `<noframes>` element.

**Syntax:**

```
<frameset>
    <frame src = "URL" />
    <frame src = "URL" />
    ...
</frameset>
```

**Attributes of <frameset> Tag:** Some of the important attributes of the <frameset> tag are listed below—

- **cols:** It specifies how many columns are contained in the frameset and the size of each column. We can specify the width of each column in one of the four ways—
  - (i) Using absolute values in pixels. For example, to create three vertical frames, use cols = “100, 500, 100”.
  - (ii) Using percentages of the web browser window. For example, to create three vertical frames, use cols = “10%, 80%, 10%”.
  - (iii) Using a wildcard symbol. For example, to create three vertical frames, use cols = “10%, \*, 10%”. In this case, wildcard takes remainder of the window, i.e., 80%.
  - (iv) Using relative widths of the web browser window. For example, to create three vertical frames, use cols = “3\*, 2\*, 1\*”. This is an alternative to percentages. Here the window is divided into six parts; the first column takes up half of the window, the second takes one third, and the third takes one sixth.
- **rows:** It specifies how many rows are contained in the frameset and the size of each row. We can specify the height of each row in one of the four ways—
  - (i) Using absolute values in pixels. For example, to create three horizontal frames, use rows = “100, 500, 100”.
  - (ii) Using percentages of the web browser window. For example, to create three horizontal frames, use rows = “10%, 80%, 10%”.
  - (iii) Using a wildcard symbol. For example, to create three horizontal frames, use rows = “10%, \*, 10%”. In this case, wildcard takes remainder of the window, i.e., 80%.

(iv) Using relative widths of the web browser window. For example, to create three horizontal frames, use cols = “3\*, 2\*, 1\*”. This is an alternative to percentages. Here the window is divided into six parts; the first row takes up half of the window, the second takes one third, and the third takes one sixth.

- **border:** It specifies the width of the border of each frame in pixels. For example, border = “5”. A value of zero means no border.
- **frameborder:** It specifies whether a three-dimensional border should be displayed between frames. This attribute takes value either 1 (yes) or 0 (no). For example, frameborder = “0” specifies no three-dimensional border. The default value is “1”.
- **framespacing:** It specifies the amount of space in pixels between frames in a frameset. For example, framespacing = “10”.

**Attributes of <frame> Tag:** Some of the important attributes of the <frame> tag are listed below—

- **src:** It is used to give the name of the file with location that should be loaded in the frame. For example, src = “Ozone\_Layer.html” will load an HTML file available in current directory.
- **name:** It is used to give a name to a frame. It indicates which frame a document should be loaded into. This is especially important when we want to create links in one frame that load pages into another frame, in which case the second frame needs a name to identify itself as the target of the link.
- **frameborder:** It specifies whether a border should be displayed between frames. This attribute overrides the value given in the ‘frameborder’ attribute on the <frameset> tag if one is given. This attribute takes value either 1 (yes) or 0 (no).
- **marginwidth:** It specifies the width of the space between the frame’s content and the left and right of the frame’s borders. The value is given in pixels. For example, marginwidth = “10”.
- **marginheight:** It specifies the height of the space between the frame’s content and the top and bottom of the frame’s borders. The value is given in pixels. For example, marginheight = “10”.

- ***noresize***: By default, we can resize any frame by clicking and dragging on the borders of a frame. The noresize attribute prevents a user from being able to resize the frame. For example, noresize = “noresize”.
- ***scrolling***: It controls the appearance of the horizontal and vertical scrollbars that appear on the frame. This attribute takes value either “yes”, “no” or “auto”. The default value is “auto”. For example, scrolling = “no” means it should not have scrollbars.
- ***longdesc***: It provides a link to another page containing a long description of the contents of the frame. This description should supplement the short description provided using the ‘title’ attribute, and may be particularly useful for non-visual user agents. For example, longdesc = “Frame\_Long\_Description.htm”.

### Example:

```
<!DOCTYPE html>
<!--
    File: Frame1.html
    Author: Riki Sutradhar
    Date: DD-MM-YYYY
    Description: Example of HTML frames.
-->

<html>
    <head>
        <title>Example of HTML Frames</title>
    </head>

    <frameset cols = "33.33%, 33.33%, 33.33%">
        <frame src = "Ozone_Layer.html" />
        <frame src = "Metric_System.html" />
        <frame src = "Quietest_Room.html" />

        <noframes>
            <body>Your browser does not support frames.</body>
        </noframes>
    </frameset>
</html>

<!DOCTYPE html>
<!--
    File: Ozone_Layer.html
    Author: Riki Sutradhar
    Date: DD-MM-YYYY
    Description: Program to display some information about Ozone Layer of our home planet Earth.
-->
```

```
-->

<html>
    <head>
        <title>Ozone Layer</title>
    </head>

    <body>
        <table cellpadding = "10" bgcolor = "#272727">
            <tr>
                <td align = "center" height = "45" bgcolor = "#272727"><font size = "4" color = "#FFE400"><b>The Earth's ozone layer will make a full recovery in 45 years.</b></font></td>
            </tr>
            <tr>
                <td align = "center"><img src = "Ozone_Layer.jpg" alt = "Image of Earth with Ozone Layer" width = "100%" height = "100%"></td>
            </tr>
            <tr>
                <td align = "justify">
                    <font color = "#66FCF1">
                        <p>Because of pollution, the Earth's ozone layer has suffered a lot. That's bad news for everyone, since the fragile gas layer protects our planet and shields us from the sun's harmful ultraviolet rays. Fortunately, climate change experts believe that the ozone layer will fully heal within 50 years, according to a 2018 report from the United Nations.
                    </p>
                    <p>The recovery is thanks in large part to the Montreal Protocol of 1987, which put a global ban on the use of one of the main culprits for the damage: chlorofluorocarbons (CFOs). Previously, CFOs had been common in refrigerators, aerosol cans, and dry-cleaning chemicals.
                    </p>
                </td>
            </tr>
        </table>
    </body>
</html>

<!DOCTYPE html>
<!--
    File: Metric_System.html
    Author: Riki Sutradhar
    Date: DD-MM-YYYY
    Description: Program to display some information about Metric System of U.S.
-->
```

```

<html>
    <head>
        <title>Metric System</title>
    </head>

    <body>
        <table cellpadding = “10” bgcolor = “#272727”>
            <tr>
                <td align = “center” height = “45” bgcolor = “#272727”><font size = “4”
color = “#FFE400”><b>There’s only one country in the world that doesn’t use the metric
system.</b></font></td>
            </tr>
            <tr>
                <td><img src = “Metric_System.jpg” alt = “Image of Wooden Ruler” width =
“100%” height = “100%”></td>
            </tr>
            <tr>
                <td align = “justify”>
                    <font color = “#66FCF1”>
                        <p>For simplicity’s sake, most of the more than 200 countries
in the world use the metric system when describing things like
                            length or mass. However, there were recently three countries
that stood out: Liberia, Myanmar, and the United States.
                        </p>
                        <p>In 2018, Liberia commerce and industry minister Wilson
Tarpeh said the government planned to adopt the metric system in
                            order to promote accountability and transparency in trade,
according to the Liberian Observer. Myanmar made a similar
                            commitment, which leaves the U.S. as the lone holdout.
                        </p>
                    </font>
                </td>
            </tr>
        </table>
    </body>
</html>

```

```

<!DOCTYPE html>
<!--
    File: Quietest_Room.html
    Author: Riki Sutradhar
    Date: DD-MM-YYYY
    Description: Program to display some information about Quietest Room located at Microsoft’s
headquarters in Washington State.
-->

```

```

<html>
    <head>

```

```

<title>Quietest_Room</title>
</head>

<body>
    <table cellpadding = "10" bgcolor = "#272727">
        <tr>
            <td align = "center" height = "45" bgcolor = "#272727"><font size = "4"
color = "#FFE400"><b>The World's Quietest Room</b></font></td>
        </tr>
        <tr>
            <td><img src = "Quietest_Room.jpg" alt = "Image of Microsoft's
headquarters in Washington State." width = "100%" height = "100%"></td>
        </tr>
        <tr>
            <td align = "justify">
                <font color = "#66FCF1">
                    <p>Silence is golden, as they say. And while it may not be
worth quite as much as jewels and gold to most people, it certainly
was the primary goal for those who built the quietest room in
the world. Located at Microsoft's headquarters in Redmond,
Washington State, the lab room measures a background noise
of -20.35 dBA, which is 20 decibels below the threshold of human
hearing and breaks previous records for spaces that were
deemed the planet's quietest places, according to CNN.
                </p>
                </font>
            </td>
        </tr>
    </table>
</body>
</html>

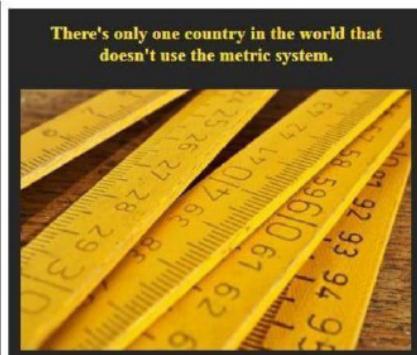
```

## Output:



Because of pollution, the Earth's ozone layer has suffered a lot. That's bad news for everyone, since the fragile gas layer protects our planet and shields us from the sun's harmful ultraviolet rays. Fortunately, climate change experts believe that the ozone layer will fully heal within 50 years, according to a 2018 report from the United Nations.

The recovery is thanks in large part to the Montreal Protocol of 1987, which put a global ban on the use of one of the main culprits for the damage: chlorofluorocarbons (CFCs). Previously, CFCs had been common in refrigerators, aerosol cans, and dry-cleaning chemicals.



For simplicity's sake, most of the more than 200 countries in the world use the metric system when describing things like length or mass. However, there were recently three countries that stood out: Liberia, Myanmar, and the United States.

In 2018, Liberia commerce and industry minister Wilson Tarpeh said the government planned to adopt the metric system in order to promote accountability and transparency in trade, according to the Liberian Observer. Myanmar made a similar commitment, which leaves the U.S. as the lone holdout.



Silence is golden, as they say. And while it may not be worth quite as much as jewels and gold to most people, it certainly was the primary goal for those who built the quietest room in the world. Located at Microsoft's headquarters in Redmond, Washington state, the lab room measures a background noise of -20.35 dBA, which is 20 decibels below the threshold of human hearing and breaks previous records for spaces that were deemed the planet's quietest places, according to CNN.

## Targeting Named Frames

By default, a linked document loads into the same frame as the link; however, it is often desirable to have a link in one frame load a page into a different frame in the frameset. One of the most popular uses of frames is to place navigation bars in one frame and then load main pages into a separate frame.

This is done by using the 'target' attribute in the `<a>` (anchor) tag to specify the name of a target frame where a document is to be opened. First, it is necessary to assign a name to the frame using the 'name' attribute in the `<frame>` tag as follows:

```
<frame src = "Main.html" name = "Main_Page" />
```

Now any link can load a document into that frame by specifying its name as the target window, as follows:

```
<a href = "Ozone_Layer.html" target = "Main_Page">Ozone Layer</a>
```

In the above example, the document "Ozone\_Layer.html" would load into the frame named "Main\_Page" replacing "Main.html".

The 'target' attribute may be set for elements that create links (using `<a>` and `<link>` tags), image maps (using `<map>` and `<area>` tags), and forms (using `<form>` tag).

## Example:

```
<!DOCTYPE html>
<!--
    File: Frame2.html
    Author: Riki Sutradhar
    Date: DD-MM-YYYY
    Description: Example of HTML target frames.
-->

<html>
    <head>
        <title>Example of HTML Target Frames</title>
    </head>

    <frameset cols = "200, *">
        <frame src = "Menu.html" name = "Menu_Page" />
        <frame src = "Main.html" name = "Main_Page" />

        <noframes>
            <body>Your browser does not support frames.</body>
        </noframes>
    </frameset>
</html>

<!DOCTYPE html>
<!--
    File: Menu.html
    Author: Riki Sutradhar
    Date: DD-MM-YYYY
    Description: Program to display a simple menu.
-->

<html>
    <head>
        <title>Menu</title>
    </head>

    <body bgcolor = "#44318D">
        <table cellpadding = "10" width = "100%">
            <tr>
                <td bgcolor = "#FC4445" align = "center"><h4><a href =
"Ozone_Layer.html" target = "Main_Page">Ozone Layer</a></h4></td>
            </tr>
            <tr>
                <td bgcolor = "#45A29E" align = "center"><h4><a href =
"Metric_System.html" target = "Main_Page">Metric System</a></h4></td>
```

```

</tr>
<tr>
    <td bgcolor = "#66FCF1" align = "center"><h4><a href =
"Quietest_Room.html" target = "Main_Page">Quietest Room</a></h4></td>
</tr>
</table>
</body>
</html>

<!DOCTYPE html>
<!--
    File: Main.html
    Author: Riki Sutradhar
    Date: DD-MM-YYYY
    Description: Program to display a simple message.
-->

<html>
    <head>
        <title>Main</title>
    </head>

    <body bgcolor = "#D9B08C">
        <table align = "center">
            <tr>
                <td align = "center" valign = "middle" height = "650">
                    <h3>This is main page and content from any link will be displayed
here.</h3>
                    <p>So now click any link from left menu and see the result.</p>
                </td>
            </tr>
        </table>
    </body>
</html>

```

## Output:

This is main page and content from any link will be displayed here.

So now click any link from left menu and see the result.

The Earth's ozone layer will make a full recovery in 45 years.

Because of pollution, the Earth's ozone layer has suffered a lot. That's bad news for everyone, since the fragile gas layer protects our planet and shields us from the sun's harmful ultraviolet rays. Fortunately, climate change experts believe that the ozone layer will fully heal within 50 years, according to a 2018 report from the United Nations.

The recovery is thanks in large part to the Montreal Protocol of 1987, which put a global ban on the use of one of the main culprits for the damage: chlorofluorocarbons (CFCs). Previously, CFCs had been common in refrigerators, aerosol cans, and dry-cleaning chemicals.

## Nested <frameset> Tags

We can achieve more complex layouts by using nested `<frameset>` tags. A `<frameset>` tag can contain another `<frameset>` tag. `<frameset>` tags may be nested to any level.

### Syntax:

```

<frameset>
    <frameset>
        <frame src = "URL" />
        <frame src = "URL" />
        ...
        ...
    </frameset>
</frameset>

```

**Example:**

```

<!DOCTYPE html>
<!--
    File: Frame4.html
    Author: Riki Sutradhar
    Date: DD-MM-YYYY
    Description: Example of HTML nested frames.
-->

<html>
    <head>
        <title>Example of HTML Nested Frames</title>
    </head>

    <frameset rows = "83%, 17%">
        <frameset cols = "200, *">
            <frame src = "Menu.html" name = "Menu_Page" />
            <frame src = "Main.html" name = "Main_Page" />
        </frameset>

        <frame src = "Footer.html" />

        <noframes>
            <body>Your browser does not support frames.</body>
        </noframes>
    </frameset>
</html>

<!DOCTYPE html>
<!--
    File: Footer.html
    Author: Riki Sutradhar
    Date: DD-MM-YYYY
    Description: Program to display a simple footer.
-->

<html>
    <head>

```

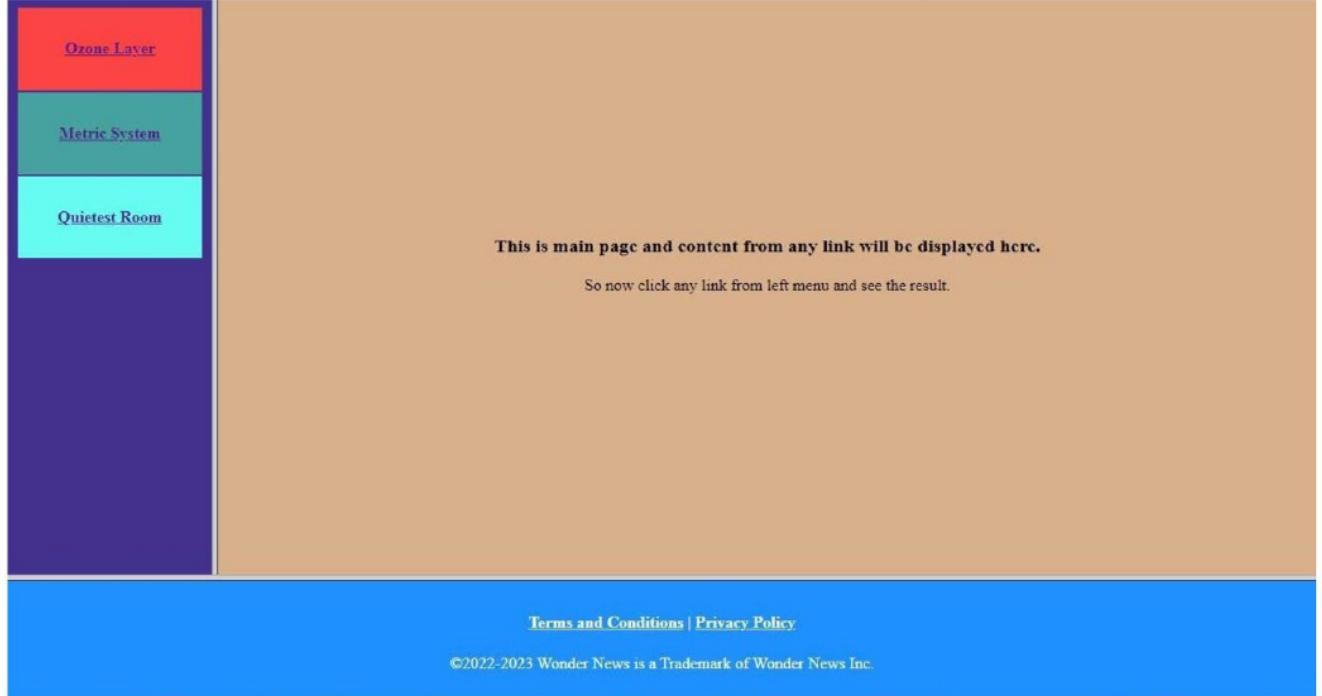
```

<title>Footer</title>
</head>

<body bgcolor = "DodgerBlue">
    <table align = "center">
        <tr>
            <td align = "center" valign = "middle">
                <h4><font color = "White"><u>Terms and Conditions</u> |</font></h4>
                <u>Privacy Policy</u></font></h4>
                <p><font color = "White">©2022-2023 Wonder News is a Trademark  
of Wonder News Inc.</font></p>
            </td>
        </tr>
    </table>
</body>
</html>

```

## Output:



Ozone Layer

Metric System

Quietest Room

The World's Quietest Room



Silence is golden, as they say. And while it may not be worth quite as much as jewels and gold to most people, it certainly was the primary goal for those who built the quietest room in the world. Located at Microsoft's headquarters in Redmond, Washington state, the lab room measures a background noise of -20.35 dBA, which is 20 decibels below the threshold of human hearing and breaks previous records for spaces that were deemed the planet's quietest places, according to CNN.

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## Creating Floating Frames

Microsoft Internet Explorer 3.0 introduced a feature called *Floating Frame* (also called as *Inline Frame* or *iframe*). We can define an inline frame with `<iframe>` tag and is used to embed another document within the current HTML document. The `<iframe>` tag is not somehow related to `<frameset>` tag, instead, it can appear anywhere in our HTML document. The `<iframe>` tag defines a rectangular region within the document in which the web browser can display a separate document, including scrollbars and borders.

The contents of the `<iframe>` element should only be displayed by web browser that do not support floating frames or are configured not to display floating frames.

### Syntax:

```
<iframe src = "URL">content</iframe>
```

**Attributes of `<iframe>` Tag:** Some of the important attributes of the `<iframe>` tag are listed below–

- **`src`:** It is used to give the name of the file with location that should be loaded in the frame. For example, `src = "Ozone_Layer.html"` will load an HTML file available in current directory.
- **`srcdoc`:** It is used to embed the HTML content of a webpage in the `<iframe>` tag. It overrides the ‘`src`’ attribute. If the web browser doesn’t support the

‘srcdoc’ attribute, it will use the URL provided by the ‘src’ attribute, if supplied and valid, otherwise the `<iframe>` tag will remain blank. Note that, `<!DOCTYPE>` and `<title>` tags of the embedded webpage are optional when using the ‘srcdoc’ attribute within a `<iframe>` tag.

- **width:** It specifies the width of the frame.
- **height:** It specifies the height of the frame.
- **name:** It is used to give a name to a frame. It indicates which frame a document should be loaded into. This is especially important when we want to create links in one frame that load pages into another frame, in which case the second frame needs a name to identify itself as the target of the link.
- **sandbox:** It is used to apply extra restrictions for the content of the frame. We can remove each restriction in one of the eight ways–
  - (i) **(empty string):** By using the empty string, all sandbox restrictions are applied.
  - (ii) **allow-top-navigation:** Allows the nested browsing context to navigate (load) content to the top-level browsing context.
  - (iii) **allow-same-origin:** Allows the content to be treated as being from its normal origin. Without this token, the content is forced into a unique origin, thus preventing it from accessing other content from the same origin. Also, without the allow-same-origin token, scripts are prevented from reading from or writing to the ‘document.cookie’ IDL attribute, and blocks access to ‘localStorage’ and ‘openDatabase()’.
  - (iv) **allow-forms:** Allows form submission.
  - (v) **allow-scripts:** Allows script execution (but not popup windows).
  - (vi) **allow-pointer-lock:** Enables Pointer lock. Pointer lock provides input methods based on the movement of the mouse over time, not just the absolute position of the mouse cursor. Pointer lock is useful for applications that require significant mouse input to control movements, rotate objects, and change entries. It is particularly essential for highly visual applications, such as those that use first-person perspective, as well as 3D views and modeling. By default, sandboxed `<iframe>` tag blocks pointer lock.
  - (vii) **allow-popups:** Allows popup windows.
  - (viii) **allow-presentation:** Lets the resource start a presentation session.
- **allowfullscreen:** If true then that frame can be opened in full screen.

- **allowpaymentrequest:** Whether the iframe's contents are allowed to use the Payment Request API to make payment requests.
- **vspace:** It leaves gaps on the top and bottom of the frame. This attribute is similar to 'cellspacing' attribute of a <table> tag.
- **hspace:** It leaves gaps on the left and right sides of the frame. This attribute is similar to 'cellpadding' attribute of a <table> tag.
- **hidden:** It hides the <iframe> element. Although the <iframe> element is not visible, its position on the page is maintained.
- **frameborder:** It specifies whether a border should be displayed between frames. This attribute overrides the value given in the 'frameborder' attribute on the <frameset> tag if one is given. This attribute takes value either 1 (yes) or 0 (no).
- **marginwidth:** It specifies the width of the space between the frame's content and the left and right of the frame's borders. The value is given in pixels. For example, marginwidth = "10".
- **marginheight:** It specifies the height of the space between the frame's content and the top and bottom of the frame's borders. The value is given in pixels. For example, marginheight = "10".
- **scrolling:** It controls the appearance of the horizontal and vertical scrollbars that appear on the frame. This attribute takes value either "yes", "no" or "auto". The default value is "auto". For example, scrolling = "no" means it should not have scrollbars.
- **longdesc:** It provides a link to another page containing a long description of the contents of the frame. This description should supplement the short description provided using the 'title' attribute, and may be particularly useful for non-visual user agents. For example, longdesc = "Frame\_Long\_Description.htm".

The 'frameborder', 'marginwidth', 'marginheight', 'scrolling', and 'longdesc' attributes are not supported in HTML5.

### Example:

```
<!DOCTYPE html>
<!--
File: Frame3.html
```

Author: Riki Sutradhar  
Date: DD-MM-YYYY  
Description: Example of HTML Floating Frames.

-->

```
<html>
    <head>
        <title>Example of HTML Floating Frames</title>
    </head>

    <body bgcolor = "#272727">
        <table cellspacing = "5" align = "center">
            <tr>
                <td align = "center" colspan = "2"><h2><font color = "#66FCF1">Windows
Operating System (Windows OS)</font></h2></td>
            </tr>
            <tr>
                <td align = "justify" valign = "top">
                    <font color = "#66FCF1">
                        It is developed by Microsoft Corporation to run personal
computers (PCs), featuring the first Graphical User Interface (GUI)
for IBM-compatible PCs. The first Windows version,
Windows 1.0 launched in 20th November, 1985 was nothing more than a GUI
offered as an extension to the existing Microsoft Disk
Operating System (MS-DOS) based pretty much on licensed concepts of
the Macintosh System Software. IBM no longer manufactures
PCs and hence now Windows OS is used for Intel's x86 architecture
compatible PCs. Recent survey shows that about 90% of all
desktop or laptop computers are running on a Windows platform.
                    <p>List of all GUI versions of Windows Operating System
(Windows OS) are given in the table on right side.</p>
                    </font>
                </td>
                <td rowspan = "2"><iframe src = "Windows_Versions.html" frameborder =
"0" width = "800" height = "556">Your browser does not support floating frames.</iframe></td>
            </tr>
            <tr>
                <td align = "center"><img src = "Windows_1.jpg" alt = "Image of
Windows_1.0 OS"></img></td>
            </tr>
        </table>
    </body>
</html>

<!DOCTYPE html>
<!--
    File: Windows_Versions.html
    Author: Riki Sutradhar
-->
```

Date: DD-MM-YYYY

Description: Program to display a list of all GUI versions of Windows Operating System.

-->

```
<html>
    <head>
        <title>Windows Versions</title>
    </head>

    <body bgcolor = "#272727">
        <table align = "center" cellpadding = "10" border = "1" bgcolor = "#45A29E">
            <thead>
                <tr bgcolor = "#FC4445">
                    <th>Version</th>
                    <th>Code Name</th>
                    <th>Release Date</th>
                </tr>
            </thead>
            <tbody>
                <tr>
                    <td>Windows 1.0</td>
                    <td>Interface Manager</td>
                    <td>20th November, 1985</td>
                </tr>
                <tr>
                    <td>Windows 1.02</td>
                    <td>Not Applicable</td>
                    <td>14th May, 1986</td>
                </tr>
                <tr>
                    <td>Windows 1.03</td>
                    <td>Not Applicable</td>
                    <td>21st August, 1986</td>
                </tr>
                <tr>
                    <td>Windows 1.04</td>
                    <td>Not Applicable</td>
                    <td>10th April, 1987</td>
                </tr>
                <tr>
                    <td>Windows 2.03</td>
                    <td>Not Applicable</td>
                    <td>9th December, 1987</td>
                </tr>
                <tr>
                    <td>Windows 2.10</td>
                    <td>Not Applicable</td>
                    <td>27th May, 1988</td>
                </tr>
            </tbody>
        </table>
    </body>
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</tr>
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<td>Windows 2.11</td>
<td>Not Applicable</td>
<td>13th March, 1989</td>
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<td>Windows 3.0</td>
<td>Not Applicable</td>
<td>22nd May, 1990</td>
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<td>Not Applicable</td>
<td>6th April, 1992</td>
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<tr>
<td>Windows NT 3.1</td>
<td>Razzle</td>
<td>27th July, 1993</td>
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<td>Windows for Workgroups 3.11</td>
<td>Snowball</td>
<td>8th November, 1993</td>
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<td>Windows 3.2</td>
<td>N/A</td>
<td>22nd November, 1993</td>
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<td>Windows NT 3.5</td>
<td>Daytona</td>
<td>21st September, 1994</td>
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<tr>
<td>Windows NT 3.51</td>
<td>N/A</td>
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<td>Windows 95</td>
<td>Chicago</td>
<td>15th August, 1995</td>
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<tr>
<td>Windows NT 4.0</td>

<td>Shell Update Release (SUR)</td>
<td>31st July, 1996</td>
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<td>Windows 98</td>
<td>Memphis, ChiCairo, London</td>
<td>15th May, 1998</td>
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<td>Windows 2000</td>
<td>Windows NT 5.0</td>
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<td>Windows Me</td>
<td>Millennium</td>
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<td>Whistler</td>
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<tr>
<td>Windows Vista</td>
<td>Longhorn</td>
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<td>Windows 7</td>
<td>BlackComb</td>
<td>22nd July, 2009</td>
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<tr>
<td>Windows 8</td>
<td>Metro</td>
<td>1st August, 2012</td>
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<td>Windows 8.1</td>
<td>Blue</td>
<td>27th August, 2013</td>
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<tr>
    <td>Windows 10</td>
    <td>Threshold, Redstone, 19H1, 19H2, 20H1, 20H2, 21H1,<br/>YYHx</td>
    <td>15th July, 2015</td>
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## Output:

Windows Operating System (Windows OS)		
Version	Code Name	Release Date
Windows 1.0	Interface Manager	20th November, 1985
Windows 1.02	Not Applicable	14th May, 1986
Windows 1.03	Not Applicable	21st August, 1986
Windows 1.04	Not Applicable	10th April, 1987
Windows 2.03	Not Applicable	9th December, 1987
Windows 2.10	Not Applicable	27th May, 1988
Windows 2.11	Not Applicable	13th March, 1989
Windows 3.0	Not Applicable	22nd May, 1990
Windows 3.1	Not Applicable	6th April, 1992
Windows NT 3.1	Razzle	27th July, 1993
Windows for Workgroups 3.11	Snowball	8th November, 1993

