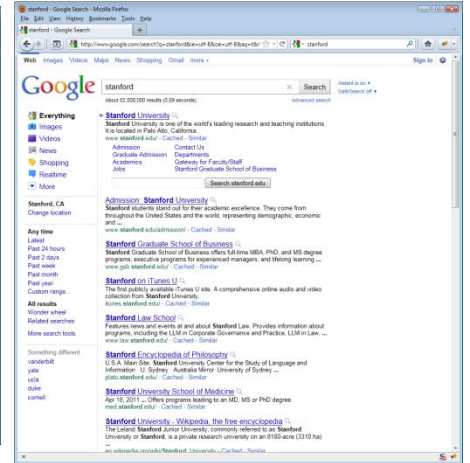


Cascading Style Sheets

Dr. Patrick Young, Stanford University

CS193C

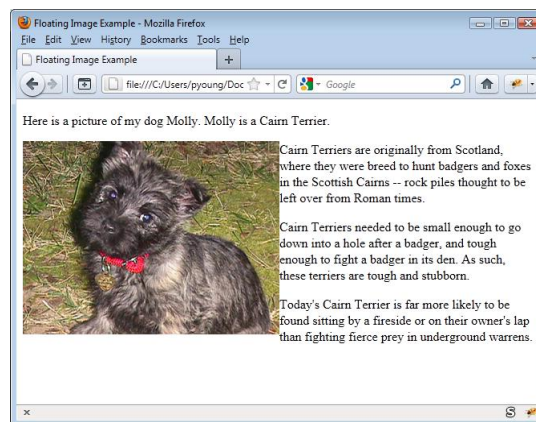
Most webpages contain columns. Consider for example these three webpages:



While a variety of techniques can be used to create columns on a webpage, one of the most commonly used is taking advantage of the CSS float property. That's how we'll learn how to create columns.

Float Review

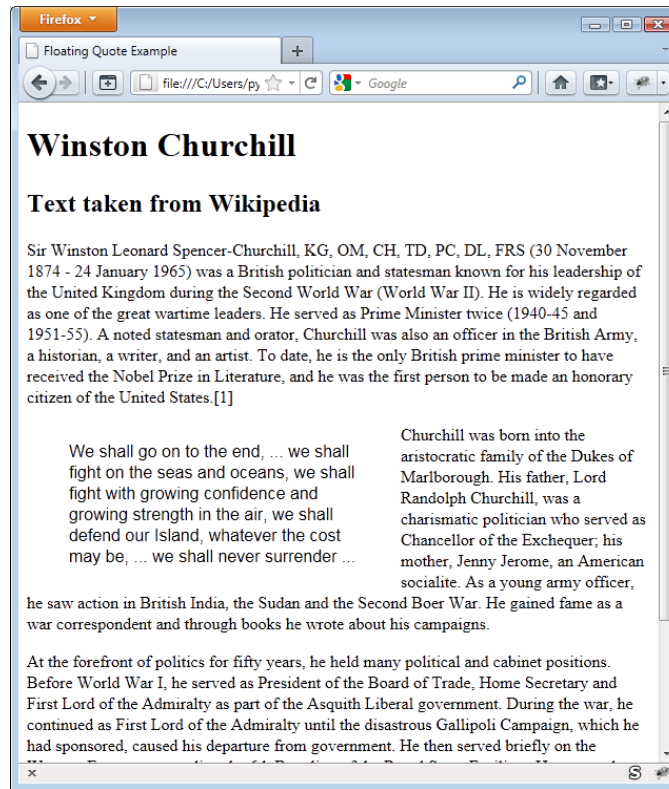
As you'll recall, the CSS float property places an image on the left or right side of a webpage and floats the text alongside the image. Here is an example of floating an image:



Here's the style rule we used to float this image:

```
#puppy {float: left}
```

While floating images is very common, we can also float other items, such as the blockquote shown here:



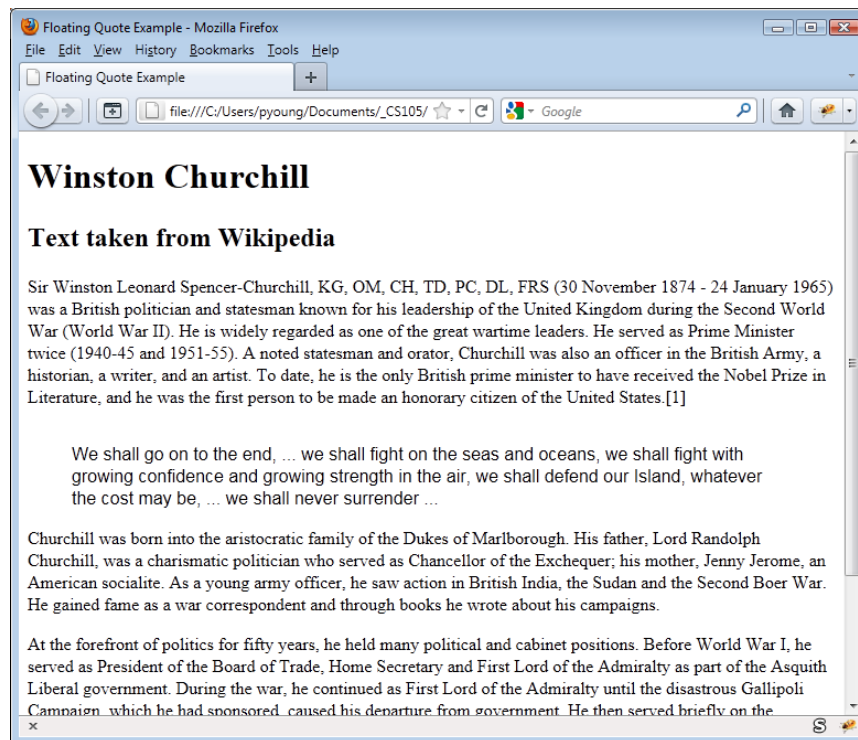
Here is our HTML:

```
...  
<p>Sir Winston Leonard Spencer-Churchill, KG, OM, CH, TD,  
PC, DL, FRS ...</p>  
  
<blockquote id="ww2Quote">We shall go on to the end, ... we  
shall fight on the seas and oceans, we shall fight with  
growing confidence and growing strength in the air, we  
shall defend our Island, whatever the cost may be, ... we  
shall never surrender ...</blockquote>  
  
<p>Churchill was born ....</p>  
...
```

And our corresponding CSS

```
#ww2Quote {  
  float: left;  
  width: 275px;  
  font-family: sans-serif;  
}
```

One important difference between floating an image and floating a blockquote, images have a natural width, blockquotes can expand out to fill as much space as is available to them. Without a width, our blockquote will look like this:



The quote is floated to the left, but the quote has expanded to take up the entire width of the webpage, squeezing out any space for text to flow alongside.

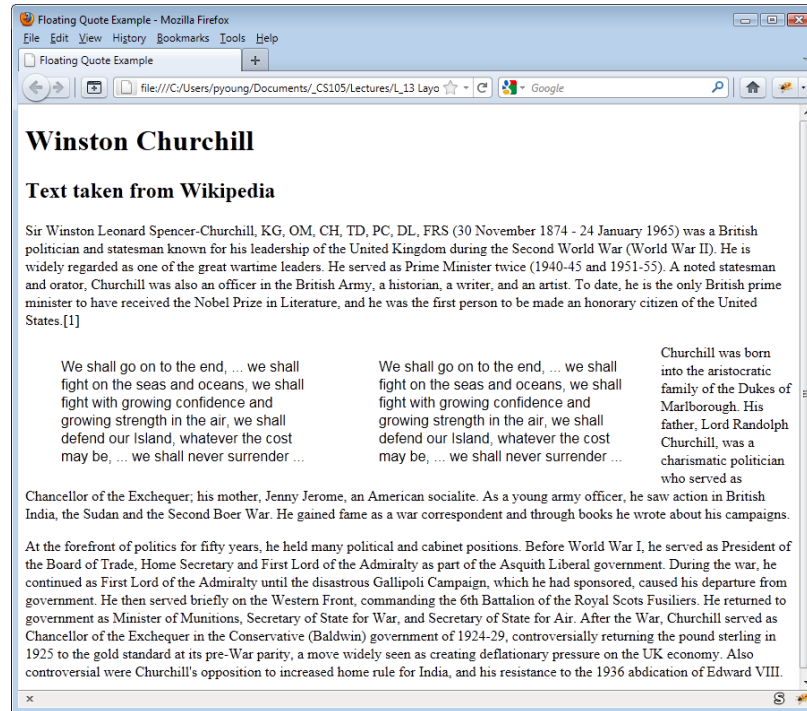
Floating Multiple Items

What happens if we create a second image or second blockquote and float it as well? The web browser will float the two items next to each other. Here we've duplicated the blockquote and created a second style rule, which is the same as the first style rule. Now our style rules are:¹

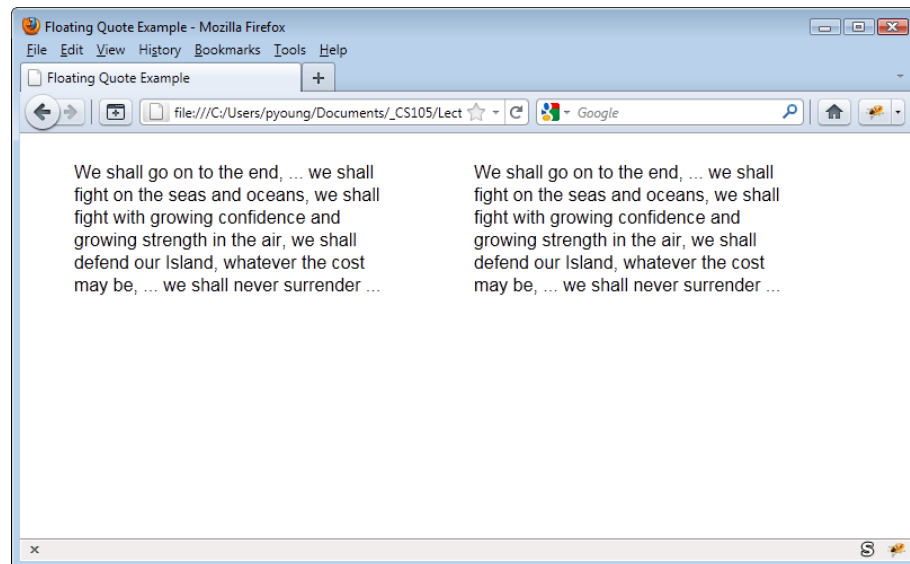
```
#ww2Quote {float: left;
            width: 275px;
            font-family: sans-serif;
}
#secondQuote {float: left;
              width: 275px;
              font-family: sans-serif;
}
```

Here's what our two blockquotes look like in the web browser:

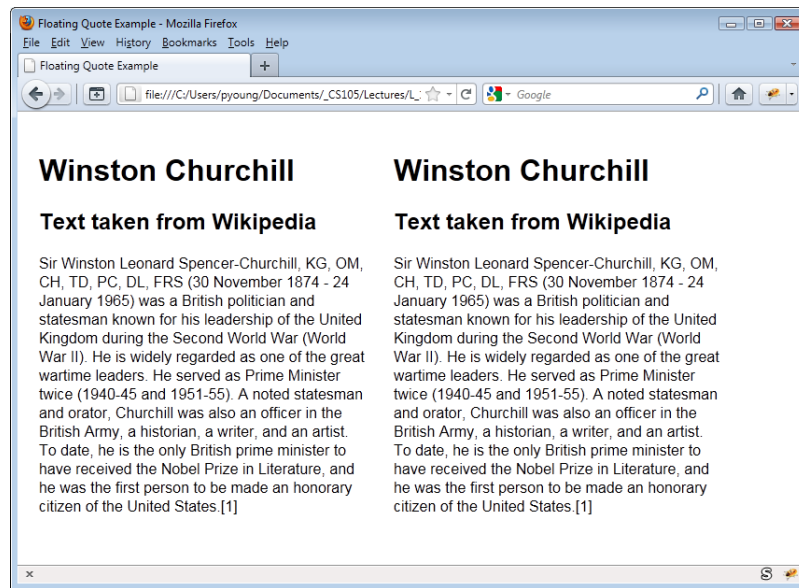
¹ As the two style rules are identical, you may wonder if it might make more sense to define a class instead of using ids. In fact, this is often done.



As you can see our two quotes end up side-by-side. If we remove the rest of the text of the website, we discover we essentially have a basic two column layout:



We just need to make a few changes and we'll have a basic two-column webpage. First, we switch from using the blockquote element and instead use a more generic div element. While blockquote has a default margin, div does not, so we'll add a bit of a margin. With a div, we can place whatever text we want into the div, including headings and paragraphs. Here's what this might look like in the web browser:



Here's our revised HTML and CSS:

```
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8" />
<title>Floating Quote Example</title>
<style>
#firstDiv {float: left;
            width: 350px;
            font-family: sans-serif;
            margin: 15px;
        }
#secondDiv {float: left;
            width: 350px;
            font-family: sans-serif;
            margin: 15px;
        }
</style>
</head>
<body>

<div id="firstDiv"><hgroup>
<h1>Winston Churchill</h1>
<h2>Text taken from Wikipedia</h2>
</hgroup>

<p>Sir Winston Leonard Spencer-Churchill, KG, OM, CH, TD,
PC, DL, FRS (30 November 1874 - 24 January 1965) was a
British politician ...</p>
</div>
```

```

<div id="secondDiv"><hgroup>
<h1>Winston Churchill</h1>
<h2>Text taken from Wikipedia</h2>
</hgroup>

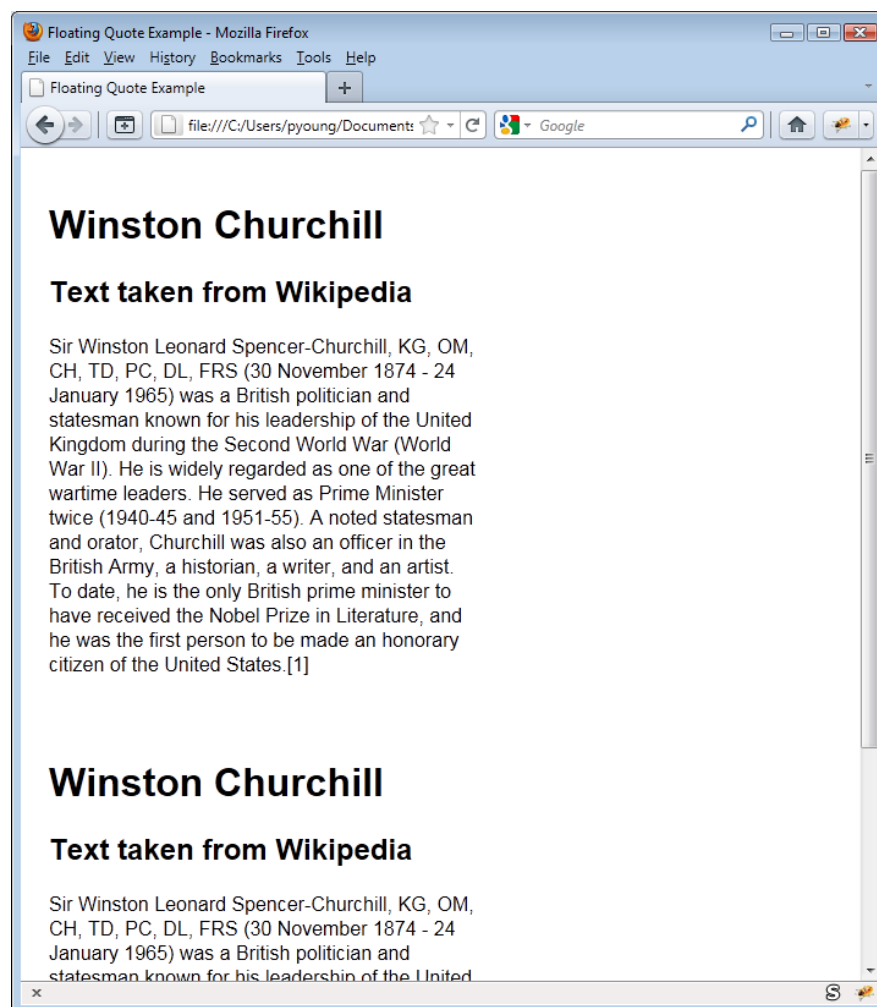
<p>Sir Winston Leonard Spencer-Churchill, KG, OM, CH, TD,
PC, DL, FRS (30 November 1874 - 24 January 1965) was a
British politician ...</p>
</div>

</body>
</html>

```

Width Issues

One problem that will arise is what happens if the web browser window gets too narrow for both our divs to appear side-by-side. When this happens the divs stop floating next to each other and instead appear one on top of the other like this:



This generally isn't what we want to happen. We can correct the problem by forcing the webpage to a specific width. The simplest way to do this is to set a width on the body itself. However, a more common technique is to place the entire webpage inside of a div:

```
...
<body>

<div id="main">
<div id="firstDiv"><hgroup>
<h1>Winston Churchill</h1>
<h2>Text taken from Wikipedia</h2>
</hgroup>

<p>Sir Winston Leonard Spencer-Churchill, KG, OM, CH, TD,
PC, DL, FRS (30 November 1874 - 24 January 1965) was a
British politician ...</p>
</div>

<div id="firstDiv"><hgroup>
<h1>Winston Churchill</h1>
<h2>Text taken from Wikipedia</h2>
</hgroup>

<p>Sir Winston Leonard Spencer-Churchill, KG, OM, CH, TD,
PC, DL, FRS (30 November 1874 - 24 January 1965) was a
British politician ...</p>
</div>
</div>
</body>
...
```

We now give our surrounding div a width:

```
#main {width: 760px}
```

Make sure you make this div wide enough to fit the divs. If the surrounding div is too narrow, the divs won't be able to sit side by side, leading to our original situation in which one div was placed on top of the other. Don't forget the inner divs' width does not including margin, padding, or border. The surrounding div needs to be wide enough to account for not only the divs inside, but any margin, padding, and border you place around them.

Depending on what you want your webpage to look like you can make one addition to this style rule. If you set margin to auto, the web browser will automatically center your webpage content.

```
#main {
  width: 760px;
  margin: auto;
}
```

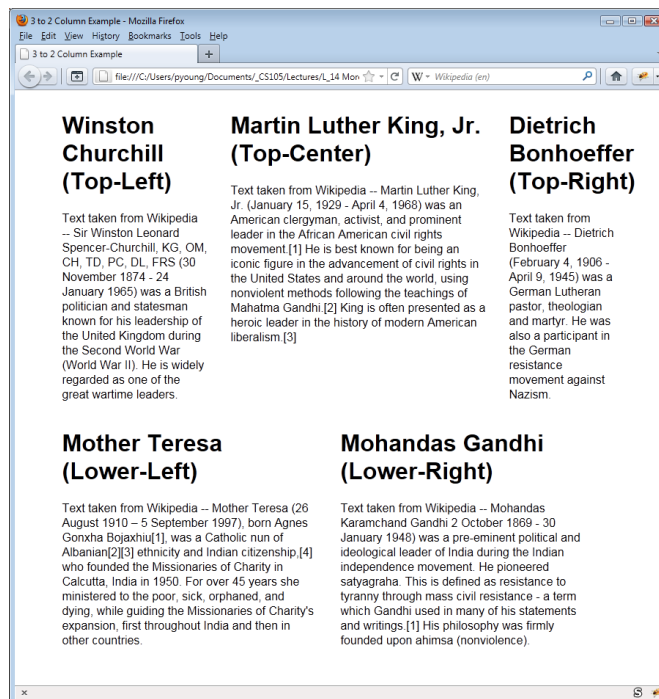
Mixed Layouts

While columns are central to most websites, real websites don't just have a single set of columns. Instead they are composed of different sections, where each section is composed of columns:



We will now learn how to create these different sections. As the term *section* already has specific meaning in HTML, I will instead refer to these as panels.

We'll start out by trying to make this webpage layout with three columns in the upper panel and two columns in the lower panel:



Div Elements

We'll use div elements to represent each of our panels. To see why this works consider how a web browser usually displays two block elements, whether those elements are p paragraph elements, blockquote elements, h1, ..., h6 elements, or div elements. The browser places the elements one on top of the other. For example, if my HTML source contains:


```
<p>Paragraph 1</p>
<p>Paragraph 2</p>
```

the web browser will display paragraph 1 followed by paragraph 2 like this:

Paragraph 1

Paragraph 2

This is essentially the same behavior we want for our 3-column to 2-column webpage. But instead of simply wanting one paragraph on top of the other element, we want an entire 3-column panel on top of a 2-column panel.

In order to get this effect we'll place the columns into a div. So if our HTML looks something like this:

```
<div>Stuff creating top three-column-wide panel</div>
<div>Stuff creating bottom two-column-wide panel</div>
```

The web browser will dutifully place the three-column div above the two-column div—which is just what we want.

Here's how we'll setup our divs:

```
<body>

<div id="main"> <!-- div for entire webpage contents -->

<div id="upperPanel"> <!-- div for entire upper half of webpage -->
>
<div id="firstDiv">
<h1>Winston Churchill (Top-Left)</h1>

<p>Text taken from Wikipedia -- Sir Winston Leonard
Spencer-Churchill, KG, OM, CH, TD, PC, DL, FRS ...</p>
</div>

<div id="secondDiv">
<h1>Martin Luther King, Jr. (Top-Center)</h1>

<p>Text taken from Wikipedia -- Martin Luther King, Jr.
(January 15, 1929 - April 4, 1968) was an American
clergyman, activist, ...</p>
</div>

<div id="thirdDiv">
<h1>Dietrich Bonhoeffer (Top-Right)</h1>

<p>Text taken from Wikipedia -- Dietrich Bonhoeffer
(February 4, 1906 - April 9, 1945) was a German Lutheran
pastor, theologian and martyr. He was also a participant in
the German resistance movement against Nazism ...</p>
</div>
</div> <!-- end upper half panel -->

<div id="lowerPanel "> <!-- div for entire lower half of webpage -->
<div id="lowerFirstDiv">
```

```

<h1>Mother Teresa (Lower-Left)</h1>

<p>Text taken from Wikipedia -- Text taken from Wikipedia
-- Mother Teresa (26 August 1910 - 5 September 1997), born
Agnes Gonxha Bojaxhiu[1], was a Catholic nun of
Albanian[2][3] ethnicity and Indian citizenship,[4] ... </p>
</div>

<div id="lowerSecondDiv"><h1>Mohandas Gandhi (Lower-
Right)</h1>

<p>Text taken from Wikipedia -- Mohandas Karamchand Gandhi
2 October 1869 - 30 January 1948) was a pre-eminent
political and ideological leader of India during the Indian
independence movement. ... </p>
</div>
</div> <!-- end lower half panel -->

</div> <!-- end div for entire webpage -->
</body>

```

We'll use the techniques we used in the last handout to create our columns—we'll float each of the inner divs representing the columns to the left and we'll set them to specific widths:

```

#firstDiv {float: left;
           width: 200px;
           font-family: sans-serif;
           margin: 0px 15px;
}
#secondDiv {float: left;
            width: 350px;
            font-family: sans-serif;
            margin: 0px 15px;
}
#thirdDiv {float: left;
            width: 150px;
            font-family: sans-serif;
            margin: 0px 15px;
}

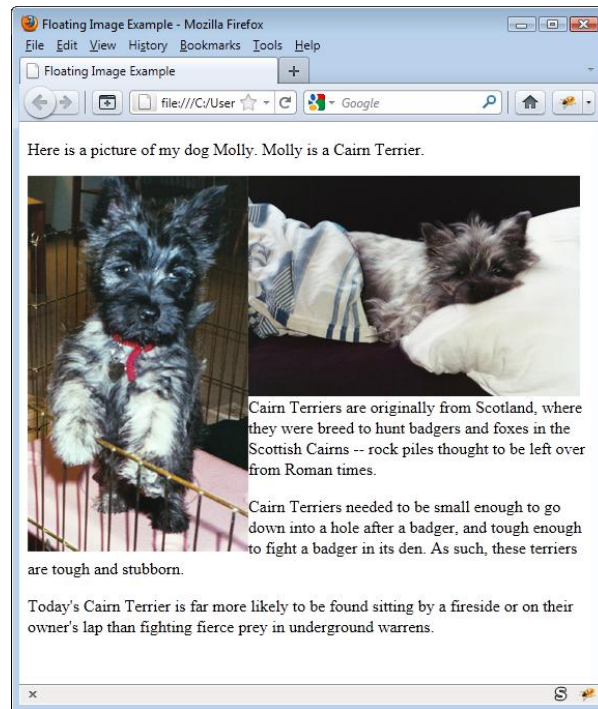
#lowerFirstDiv {float: left;
                width: 350px;
                font-family: sans-serif;
                margin: 0px 15px;
}
#lowerSecondDiv {float: left;
                 width: 350px;
                 font-family: sans-serif;
                 margin: 0px 15px;
}

#main {width: 790px;
       margin: auto;
}

```

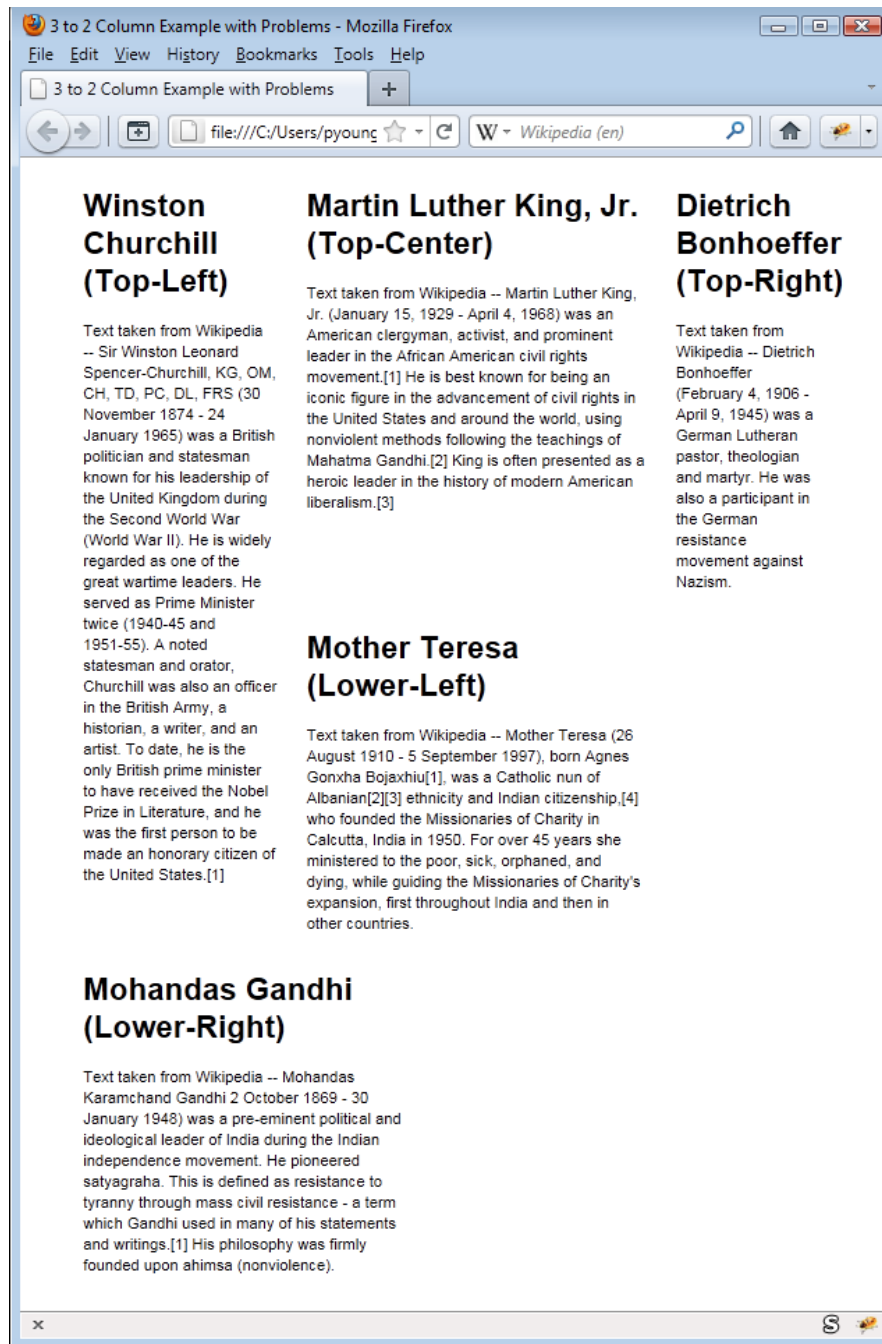
Floats Appearing in the Wrong Places

I wish we could just stop there. Just place each section of the document into a div and let the web browser place the divs on top of each other. Unfortunately there are a number of problems when a div contains a float. Keep in mind how a float normally behaves. Suppose we have several pictures floated to the left. What happens to whatever paragraphs come after the float? These paragraphs are pushed into whatever space is available beside the float like



this:

The same thing happens with our columns. You might think that putting the three columns all into a div for the top panel followed by the two columns in another div for the bottom panel would take care of this—and in Internet Explorer it does. But in Firefox and Chrome the placement of floats within the panel div elements is ignored if there's sufficient space to move one of the floating elements up and you get something like this:



I've lengthened the top-left column to highlight the effect. You can see that what's happened is that Firefox and Chrome have decided that there is sufficient space to the right of the bottom of the Top-Left column to let the Lower-Left column float alongside it.

What we need is a way to tell the web browsers that we do not want to allow the bottom columns to float alongside any of the top divs. Fortunately there's a special style property that does exactly that. It's called the clear property. If the clear property is set to left, it means that no items may float to the item's left. If there is a previous item floating to the left, the item with clear: left must be placed below the floating item. If clear is set to right, then no items may float to the item's right. Finally if clear is set to both, then no item may float to either side of the item.

In this case we'll place a `clear:` both on the div for each of our sections. One on the upper panel and one on the lower panel.

```
#lowerPanel {
    clear: both;
}

#upperPanel {
    clear: both;
}
```

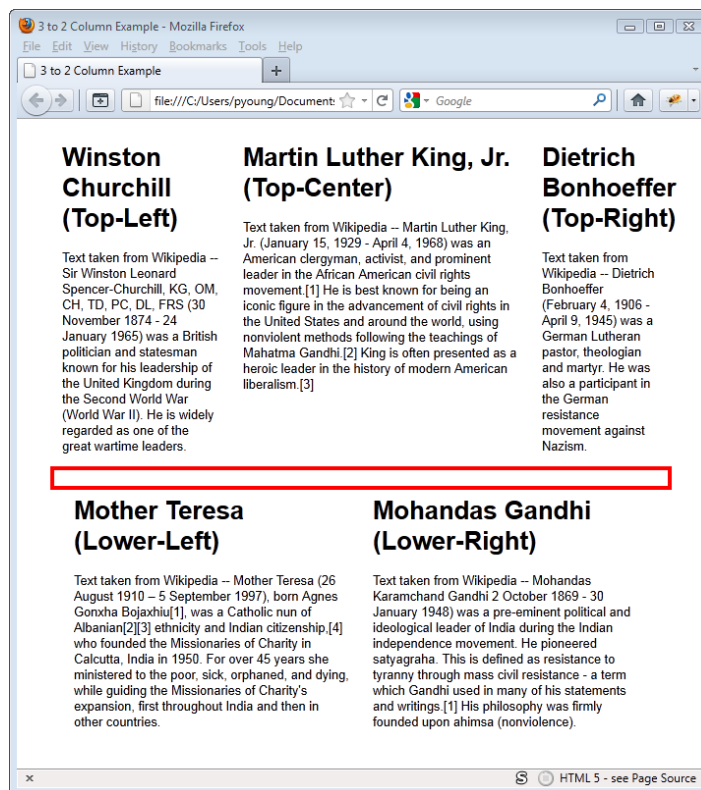
With the addition of this one fix, our webpage now works properly.

Panel Borders or Backgrounds

We've got one more problem which we need to take care of. If we decide to put a border or use a background-color on one of our panels we'll discover that it doesn't quite work the way we want it to. Let's try putting a red border around the lower panel. I've also added on a bit of padding to highlight the effect. Here's our revised style rule:

```
#lowerPanel {
    clear: both;
    border: 5px solid red;
    padding: 10px;
}
```

and here is what is displayed:



What happened? Float content is not considered part of the actual panel div for the purposes of borders or background colors. Since we may want to use borders and background colors to enhance our layout, this is a problem. Fortunately there is a solution. What we need to do is to place another element inside of the panel divs. This element must appear after the floating columns, and it can't itself float. The only purpose for this element will be to have the panel div contain an element below the floating columns that forces the web browser to acknowledge the actual size of the panel for the purposes of borders and background.

Here is the revised body of our HTML file:

```

1. <body>
2.
3. <div id="main"> <!-- div for entire webpage contents -->
4.
5. <div id="upperPanel"> <!-- div for entire upper half of webpage -->
6. <div id="firstDiv">
7. <h1>Winston Churchill (Top-Left)</h1>
8.
9. <p>Text taken from Wikipedia -- Sir Winston Leonard Spencer-Churchill,
10. KG, OM, CH, TD, PC, DL, FRS ...</p>
11. </div>
12.
13. <div id="secondDiv">
14. <h1>Martin Luther King, Jr. (Top-Center)</h1>
15.
16. <p>Text taken from Wikipedia -- Martin Luther King, Jr. (January 15, 1929 -
17. April 4, 1968) was an American clergyman, activist, ...</p>
18. </div>
19.
20. <div id="thirdDiv">
21. <h1>Dietrich Bonhoeffer (Top-Right)</h1>
22.
23. <p>Text taken from Wikipedia -- Dietrich Bonhoeffer (February 4, 1906 -
    April
24. 9, 1945) was a German Lutheran pastor, theologian and martyr. He was also a
25. participant in the German resistance movement against Nazism ...</p>
26. </div>
27.
28. <div class="endPanelDiv">
29. <!-- this div forces panel to correct height for border and background -->
30. </div>
31. </div> <!-- end upper half panel -->
32.
33. <div id="lowerPanel "> <!-- div for entire lower half of webpage -->
34. <div id="lowerFirstDiv">
35. <h1>Mother Teresa (Lower-Left)</h1>
36.
37. <p>Text taken from Wikipedia -- Text taken from Wikipedia -- Mother
    Teresa
38. (26 August 1910 - 5 September 1997), born Agnes Gonxha Bojaxhiu[1], was a
39. Catholic nun of Albanian[2][3] ethnicity and Indian citizenship,[4] ... </p>
40. </div>
41.

```

```

42. <div id="lowerSecondDiv"><h1>Mohandas Gandhi (Lower-Right)</h1>
43.
44. <p>Text taken from Wikipedia -- Mohandas Karamchand Gandhi 2 October 1869
    -
45. 30 January 1948) was a pre-eminent political and ideological leader of
    India
46. during the Indian independence movement. ... </p>
47. </div>
48.
49. <div class="endPanelDiv">
50. <!-- this div forces panel to correct height for border and background -->
51. </div>
52. </div> <!-- end lower half panel -->
53.
54. </div> <!-- end div for entire webpage -->
55. </body>

```

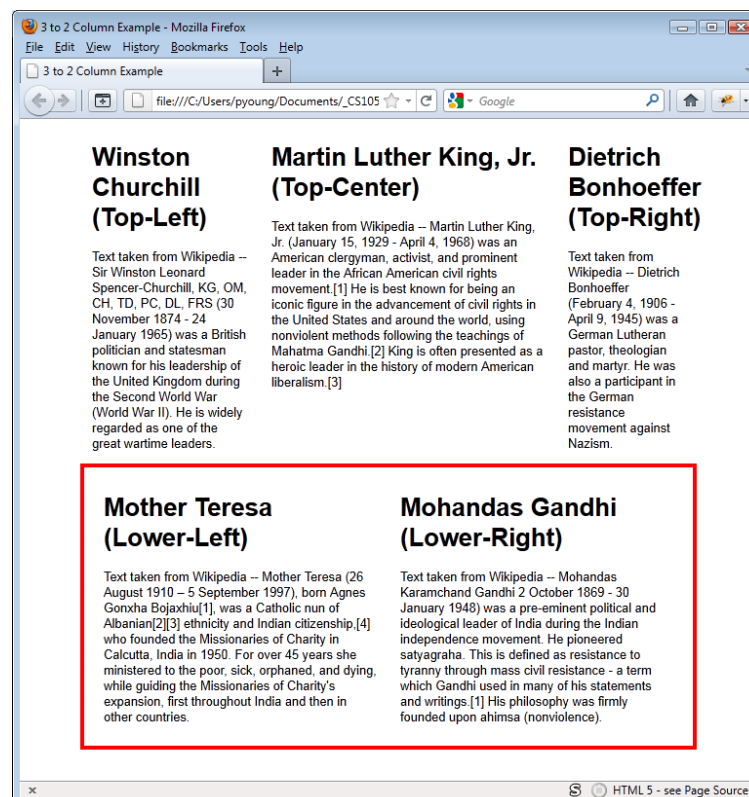
We've added new div elements on lines 28-30 and 49-51. As noted in the comments within these div elements, these force the web browser to consider the panels in which they are contained (lines 5-31 for the upper panel and lines 33-52 for the lower panel) to extend below the floating elements. We need to do one more thing to get this to work, we need to force these new div elements below the floating elements within the panel. We've given both these new div elements a class="endPanelDiv" so we can force them below the floating columns by adding this line to our stylesheet:

```

.endPanelDiv {
    clear: both;
}

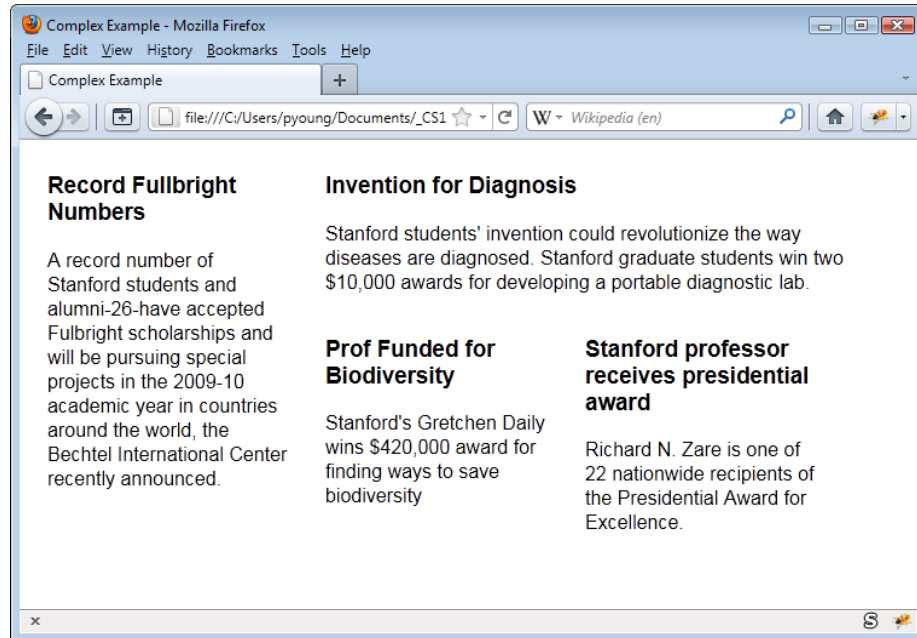
```

With these additions our border now appears correctly:



More Complex Layouts

Suppose we want to create a layout which looks something like this (original text from Stanford News Service):



The way to think of this is that the main page consists of a main left-column and a main right-column so it's basically a two-column layout, which we know how to do.

The main right-column can be further subdivided. It consists of a one-column panel on top of a two-column panel. You can work this problem by solving the inner elements (the right-hand main column consisting of the "Invention for Diagnosis," "Prof Funded for Biodiversity," and "Stanford Professor receives presidential award") and then placing it in the context of a two-column layout.

Let's start out by laying out the right-hand side. We'll create a div containing all three stories, a top panel div for the top story "Invention for Diagnosis" a bottom panel div for to contain the two bottom-right stories. The bottom panel div will contain two divs for each of the columns "Prof Funded" and "Stanford professor," and it will also need an end panel in case we want to add a border or background to it at a later point in time.

```

<div id="rightMainColumn">
<div id="rightTopPanel"><h3>Invention for Diagnosis</h3>
Stanford students' invention could revolutionize the way
diseases are diagnosed. Stanford graduate students win two
$10,000 awards for developing a portable diagnostic
lab.</div>
<div id="rightBottomPanel">
<div id="lowerLeftColumn"><h3>Prof Funded for
Biodiversity</h3>Stanford's Gretchen Daily wins $420,000
award for finding ways to save biodiversity</div>
<div id="lowerRightColumn"><h3>Stanford professor receives
presidential award</h3>
Richard N. Zare is one of 22 nationwide recipients of the
Presidential Award for Excellence.</div>
<div class="endPanelDiv"></div>
</div>
</div>

```

Here are our style rules:

```

.endPanelDiv {
    clear: both;
}

#rightMainColumn {
    margin: 0px 15px 15px 15px;
    width: 460px;
}

#rightTopPanel, #rightBottomPanel {
    clear: both;
}

#lowerLeftColumn {
    width: 200px;
    margin-top: 15px;
    float: left;
}

#lowerRightColumn {
    width: 200px;
    margin: 15px;
    float: left;
}

```

We set the entire right side to 460 pixels, and then set individual widths for the lowerLeft and lowerRight.

Since we want the rightTop and rightBottom to stack on top of each other, instead of floating next to each other, we set them clear: both. In contrast we want the lowerLeft and lowerRight to show up alongside each other so we float them left.

Now we place that whole thing in the context of the larger webpage:

```

<div id="main">
<div id="leftMainColumn">
<h3>Record Fullbright Numbers</h3>
A record number of Stanford students and alumni-26-have
accepted Fulbright scholarships and will be pursuing
special projects in the 2009-10 academic year in countries
around the world, the Bechtel International Center recently
announced.
</div>
<div id="rightMainColumn">

... <!-- rightMainColumn is what we just wrote above -->

</div>
<div class="endPanelDiv"></div>
</div>
</div>

```

To combine the leftMainColumn with the rightMainColumn we see that leftMainColumn and rightMainColumn appear next to each other, so we float them left and give them widths.

```

#leftMain {
    width: 200px;
    margin: 0px 15px 15px 15px;
    float: left;
}

#rightMain {
    margin: 0px 15px 15px 15px;
    width: 460px;
    float: left;
}

```

As the main div now contains columns, it needs an end panel div to ensure proper height for border and background purposes.

Here's my entire HTML file including the CSS:

```

<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8" />
<title>Complex Example</title>
<style>
#rightTopPanel, #rightBottomPanel {
    clear: both;
}

#leftMainColumn {
    width: 200px;
    margin: 0px 15px 15px 15px;
    float: left;
}

#rightMainColumn {
    margin: 0px 15px 15px 15px;
    width: 460px;
}

```

```

        float: left;
    }

    #lowerLeftColumn {
        width: 200px;
        margin-top: 15px;
        float: left;
    }

    #lowerRightColumn {
        width: 200px;
        margin: 15px;
        float: left;
    }

    #main {
        width: 720px;
        font-family: sans-serif;
    }

</style>
</head>

<body>
<div id="main">
<div id="leftMainColumn">
<h3>Record Fullbright Numbers</h3>
A record number of Stanford students and alumni-26-have
accepted Fulbright scholarships and will be pursuing
special projects in the 2009-10 academic year in countries
around the world, the Bechtel International Center recently
announced.
</div> <!-- end leftMainColumn -->

<div id="rightMainColumn">
<div id="rightTopPanel"><h3>Invention for Diagnosis</h3>
Stanford students' invention could revolutionize the way
diseases are diagnosed. Stanford graduate students win two
$10,000 awards for developing a portable diagnostic
lab.</div>
<div id="rightBottomPanel">
<div id="lowerLeftColumn"><h3>Prof Funded for
Biodiversity</h3>Stanford's Gretchen Daily wins $420,000
award for finding ways to save biodiversity</div>
<div id="lowerRightColumn"><h3>Stanford professor receives
presidential award</h3>
Richard N. Zare is one of 22 nationwide recipients of the
Presidential Award for Excellence.</div>
<div class="endPanelDiv"></div>
</div> <!-- end rightBottomPanel -->
</div> <!-- end rightMainColumn -->

<div class="endPanelDiv"></div>
</div> <!-- end main -->
</body>
</html>

```

Webpage Layout Summary

- Columns are a basic building block of most websites.
- In order to create a column, place the elements within the column into a div. Float the div element for each column to the left. Make sure each column has a specific width.
- Combine columns into panels which are themselves div elements. Each panel can have a different arrangements of columns. For example some panels may have three columns and others may contain only two columns.
- These panels will stack one on top of each other, as div elements will appear one on top of the next without any intervention on your part.
- Each panel containing floating columns must end with a special div whose purpose is to extend the panel below the columns for the purposes of border and background. This div does not float. It should have the CSS property clear: both.
- Place all your webpage elements into an overall containing div. Set a width on this div, otherwise your floating elements may collapse if the user narrows the web browser window.
- The overall containing div may also be used to put a border around your webpage. You may also center your webpage content by setting the CSS property margin: auto.