



Хэрэглээний шинжлэх ухаан, Инженерчлэлийн сургууль
Мэдээлэл, компьютерийн ухааны тэнхим

Лекц 5. Cascading Style Sheets (CSS) 2-р хэсэг

Интернэт технологийн үндэс
2021 оны хавар

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Vendor Prefix

- Some CSS rules won't work without the vendor prefix.

- Mozilla Browsers (Firefox)

-moz

- Webkit Browsers (Safari, Chrome)

-webkit

- Opera

-o

- Internet Explorer

-ms

<!--[if IE]> <![endif]-->

- Not all CSS rules work with all browsers:

- <http://www.caniuse.com/>
- <http://www.css3.info/selectors-test/>
- <http://quirksmode.org/css/contents.html>

New Effects in CSS3



I have rounded corners!!!

The diagram consists of four overlapping shapes on a light gray background. At the top left is an orange rounded rectangle with the text 'I have rounded corners!!!'. To its right is a semi-transparent blue rectangle with the text 'I'm 50% transparent!'. Below the orange rectangle is a dark blue rectangle with a gray drop shadow and the text 'I have a shadow!'. To the right of the dark blue rectangle is a purple circle with the text 'I'm animated!'.

I'm 50% transparent!

I have a shadow!

I'm animated!

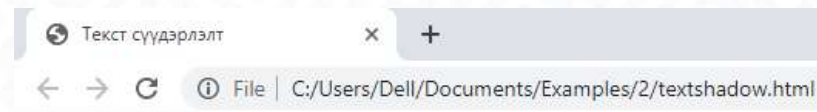
- New additions in CSS3 allow you to create a more engaging experience for users
- 2D and 3D animations and transformations make moving from page to page more fun
- Drop shadows and rounded corners make text and graphics more visually appealing

Текст сүүдэрлэлт

text-shadow шинж чанарын авах утгууд:

- **Сүүдрийн хэвтээ offset:** утга нь пиксэлээр өгөгдөх бөгөөд эерэг утгатай үед баруун тийш, сөрөг утгатай үед зүүн тийш сүүдэрлэлт үүснэ. Жишээний утга -4px гэсэн учир сүүдэрлэлт баруун тийш гарсан байна.
- **Сүүдрийн босоо offset:** утга нь пиксэлээр өгөгдөх бөгөөд эерэг утгатай үед доош, сөрөг утгатай үед дээшээ сүүдэрлэлт үүснэ. Жишээний утга 4px гэсэн учир сүүдэрлэлт доош үүссэн байна.
- **Blur radius:** Сүүдэрлэлтийн сарнилтыг пиксэлээр өгнө. 0px үед сарнилттай, тэгээс их утга авах тусам сарнилт нэмэгдэнэ.
- **Өнгө:** Сүүдэрлэлтийн өнгийг тодорхойлно.

```
1  <!DOCTYPE html>
2
3  <!-- Зурал 5.1: textshadow.html -->
4  <!-- CSS3 дахь текст сүүдэрлэлт -->
5  <html>
6  <head>
7      <meta charset="utf-8">
8      <title>Текст сүүдэрлэлт</title>
9      <style type="text/css">
10
11         h1{
12             text-shadow: -4px 4px 6px grey; /*Сүүдэр нэмж байна*/
13             font-size: 400%; /*Фонтын хэмжээг томруулж байна*/
14         }
15     </style>
16 </head>
17 <body>
18     <h1>Текст сүүдэрлэлт</h1>
19 </body>
20 </html>
```

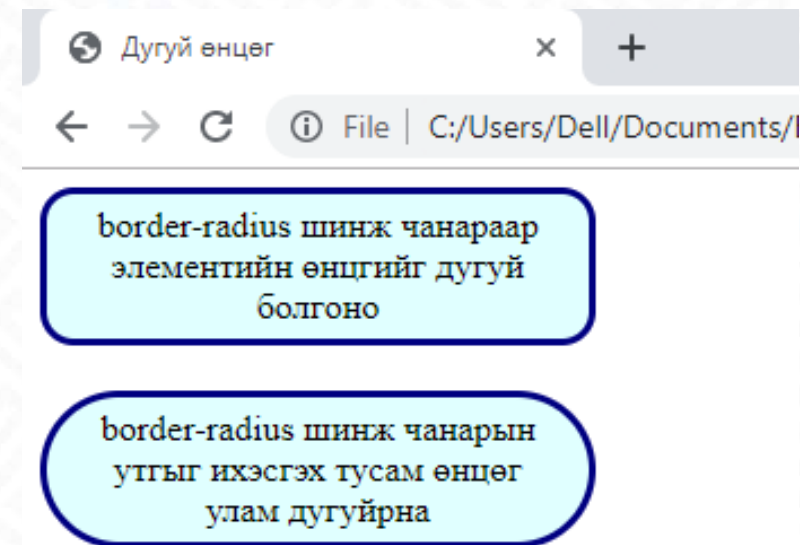


Текст сүүдэрлэлт

Дугуйрсан булан

```
1  <!DOCTYPE html>
2
3  <!-- Зурал 5.2: roundedcorners.html -->
4  <!-- border-radius өшиглан элементийн өнцгийг дугуй болгоно -->
5  <html>
6  <head>
7      <meta charset="utf-8">
8      <title>Дугуй өнцөг</title>
9      <style type="text/css">
10         div{
11             border: 3px solid navy;
12             padding: 5px 20px;
13             background: lightcyan;
14             width: 200px;
15             text-align: center;
16             border-radius: 15px; /*Дугуй өнцөг үүсгэж байна*/
17             margin-bottom: 20px;
18         }
19         #round{
20             border: 3px solid navy;
21             padding: 5px 20px;
22             background: lightcyan;
23             width: 200px;
24             text-align: center;
25             border-radius: 50px; /*Дугуй өнцөг үүсгэж байна*/
26         }
27     </style>
28 </head>
29 <body>
30     <div>border-radius шинж чанараар элементийн өнцгийг дугуй
31         болгоно</div>
32     <div id="round">border-radius шинж чанарын утгыг ихэсгэх
33         тусам өнцөг улам дугуйрна</div>
34 </body>
35 </html>
```

- border-top-left-radius
- border-top-right-radius
- border-bottom-left-radius
- border-bottom-right-radius



Creating Rounded Corners

In CSS3, you can now add rounded corners to layout elements, including headers, footers, sidebars, and images

Use the `border-radius` property along with a length value, such as pixels, ems, or a percentage

- the higher the value, the more rounded a corner will be
- some browsers have problems rendering a percentage value

You can round individual corners with the following properties:

- `border-top-left-radius`
- `border-top-right-radius`
- `border-bottom-right-radius`
- `border-bottom-left-radius`

```
.rounded {  
    border-radius: 20px 20px 20px 20px;  
}
```

I have rounded corners!!!

Өнгө

Өнгийг тодорхойлох аргууд

- Нэрээр (140 нэртэй)
- HEX кодоор (Жишээ нь #000015)
- RGB (red, green, blue)
- RGBA (red, green, blue, alpha)
- HSL (hue, saturation, lightness)
- HSLA (hue, saturation, lightness, alpha)



`background: rgba(255, 0, 0, 0.5);`

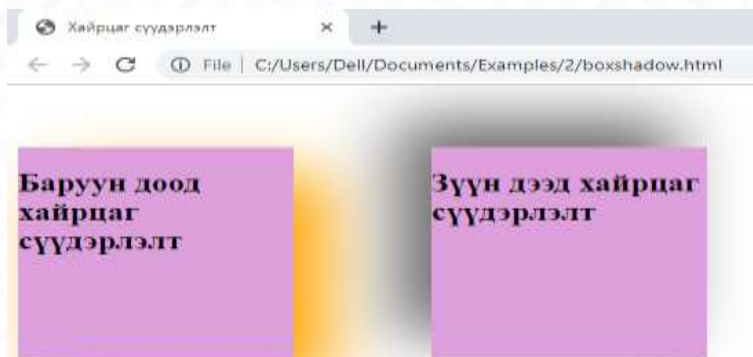


`background: hsla(120, 100%, 50%, 0.5);`

Хайрцаг сүүдэрлэлт

box-shadow шинж чанар дараах дөрвөн утга авна.

- **Сүүдрийн хэвтээ offset:** утга нь пиксэлээр өгөгдөх бөгөөд эерэг утгатай үед баруун тийш, сөрөг утгатай үед зүүн тийш сүүдэрлэлт үүснэ.
- **Сүүдрийн босоо offset:** утга нь пиксэлээр өгөгдөх бөгөөд эерэг утгатай үед доош, сөрөг утгатай үед дээшээ сүүдэрлэлт үүснэ.
- **Blur radius:** Сүүдэрлэлтийн сарнилтыг пиксэлээр өгнө. 0px үед сарнилттай, тэгээс их утга авах тусам сарнилт нэмэгдэнэ.
- **Өнгө:** Сүүдэрлэлтийн өнгийг тодорхойлно.



```

1  <!DOCTYPE html>
2
3  <!--Зурал 5.3 boxshadow.html -->
4  <!-- Хайрцаг сүүдэрлэлт -->
5  <html>
6  <head>
7      <meta charset="utf-8">
8      <title>Хайрцаг сүүдэрлэлт</title>
9      <style type="text/css">
10         div{
11             width: 200px;
12             height: 200px;
13             background-color: plum;
14             box-shadow: 25px 25px 50px orange;
15             float: left;
16             margin-right: 100px;
17             margin-top: 50px;
18         }
19         #box2{
20             width: 200px;
21             height: 200px;
22             background-color: plum;
23             box-shadow: -25px -25px 50px dimgrey;
24         }
25     </style>
26 </head>
27 <body>
28     <div><h2>Баруун доод хайрцаг сүүдэрлэлт</h2></div>
29     <div id="box2"><h2>Зүүн дээд хайрцаг сүүдэрлэлт</h2></div>
30 </body>
31 </html>

```

Creating Shadows

- Add drop shadows to elements using the `box-shadow` property
 - a drop shadow is a visual effect that makes an object appear like it is floating above other objects on a document
- There are six attributes that can be modified when using the `box-shadow` property: **h-shadow**, **v-shadow**, **blur**, **spread**, **color**, and **inset**
- The **h-shadow** and **v-shadow** attributes must be included, while the others are optional

`box-shadow: 10px 10px 8px #808080;`

h-shadow v-shadow blur color

Шугаман градиент

Градентийг дэвсгэр зураг авдаг бүхий л шинж чанарт өгөх боломжтой.

Градентийн хамгийн эхний утганд чиглэлийг, дараачаар нь өнгүүд эхлэх дарааллаараа бичигдэнэ.



```

1 <!DOCTYPE html>
2
3 <!-- Зурал 5.4: lineargradient.html -->
4 <!-- Шугаман градиент үүсгэх нь -->
5 <html>
6 <head>
7     <meta charset="utf-8">
8     <title>Шугаман градиент</title>
9     <style type="text/css">
10         div{
11             width: 200px;
12             height: 200px;
13             border: 3px solid navy;
14             padding: 5px 20px;
15             text-align: center;
16             background: linear-gradient(to bottom, white 15%,
17                                     lightsteelblue 50%, navy 75%);
18             float: left;
19             margin-right: 15px;
20         }
21         #horizontal{
22             border: 3px solid orange;
23             background: linear-gradient(
24                 90deg, white 15%, yellow 50%, orange 75% );
25         }
26         #angle{
27             border: 3px solid purple;
28             background: linear-gradient(
29                 45deg, white 15%, plum 50%, purple 75% );
30         }
31     </style>
32 </head>
33 <body>
34     <div><h2>Vertical Linear Gradient</h2></div>
35     <div id = "horizontal"><h2>Horizontal Linear Gradient</h2></div>
36     <div id = "angle"><h2>Diagonal Linear Gradient</h2></div>
37 </body>
38 </html>

```

Цацраг градиент

Цацраг градиент нь шугаман градиенттай төстэй боловч төв цэгээс гадагшаа тойрог хэлбэрээр өнгөө уусгадаг. Авах утгууд нь хэлбэр болон color-stop утгууд байна.

Цацраг градиент circle, ellipse гэсэн хоёр утгууд авах ба ellipse нь анхны утга байна.



```

1  <!DOCTYPE html>
2
3  <!-- Зурал 5.6: radialgradient.html -->
4  <!-- Цацраг градиент. -->
5  <html>
6  <head>
7      <meta charset = "utf-8">
8      <title>Radial Gradient</title>
9      <style type = "text/css">
10         div{
11             width: 300px;
12             height: 200px;
13             padding: 5px;
14             text-align: center;
15             background: radial-gradient(blue, yellow, red);
16             display: inline-block;
17         }
18         #box2{
19             background: radial-gradient(circle, blue, yellow, red);
20         }
21         #box3{
22             background: radial-gradient(red 5%, yellow 15%, green 60%);
23         }
24     </style>
25 </head>
26 <body>
27     <div><h3>Ellipse Radial Gradient</h3></div>
28     <div id="box2"><h3>Circle Radial Gradient</h3></div>
29     <div id="box3"><h3>Radial Gradient</h3></div>
30 </body>
31 </html>

```


Олон дэвсгэр зургууд



```

1  <!DOCTYPE html>
2
3  <!-- Зурар 5.5: multiplebackgrounds.html -->
4  <!-- Давхар дэвсгэр зургууд -->
5  <html>
6  <head>
7      <meta charset = "utf-8">
8      <title>Давхар дэвсгэр зургууд</title>
9      <style type = "text/css">
10         div.background{
11             background-image: url(logo.png), url(ocean.png);
12             background-position: bottom right, 100% center;
13             background-origin: border-box, content-box;
14             background-repeat: no-repeat, repeat;
15         }
16         div.content{
17             padding: 10px 15px;
18             color: white;
19             font-size: 150%;
20         }
21     </style>
22 </head>
23 <body>
24     <div class = "background">
25         <div class = "content">
26             <p>Манай онлайн сургалтаар C++, Visual C++<sup>&reg;</sup>,
27             C, Java<sup>&reg;</sup>, C#<sup>&reg;</sup>, Visual Basic<sup>&reg;</sup>,
28             Objective-C<sup>&reg;</sup>, XML<sup>&reg;</sup>, Python<sup>&reg;</sup>, JavaScript, Объект технологи,
29             Интернет технологи, Андроид, iPhone апп хичээлүүдийг
30             суралцах боломжтой.</p>
31         </div>
32     </div>
33 </body>
34 </html>

```

Зурган хүрээ

```

1  <!DOCTYPE html>
2
3  <!-- Зургаг 5.6: imageborder.html -->
4  <!-- Зурган хүрээ үүсгэх нь. -->
5  <html>
6  <head>
7      <meta charset = "utf-8">
8      <title>Зурган хүрээ</title>
9      <style type = "text/css">
10         div{
11             border: 30px solid transparent;
12             width: 234px;
13             padding: 20px 20px;
14             text-align: center
15         }
16         #stretch{
17             border-image: url(border.png) 50 50 50 50 stretch;
18         }
19         #repeat{
20             border-image: url(border.png) 32% repeat;
21         }
22     </style>
23 </head>
24 <body>
25     <h2>Image Borders</h2>
26     <img src = "border.png" alt = "image used to demonstrate borders">
27     <p><div id="stretch">Хүрээний зургийг сунгах</div></p>
28     <p><div id="repeat">Хүрээний зургийг давтах</div></p>
29 </body>
30 </html>

```

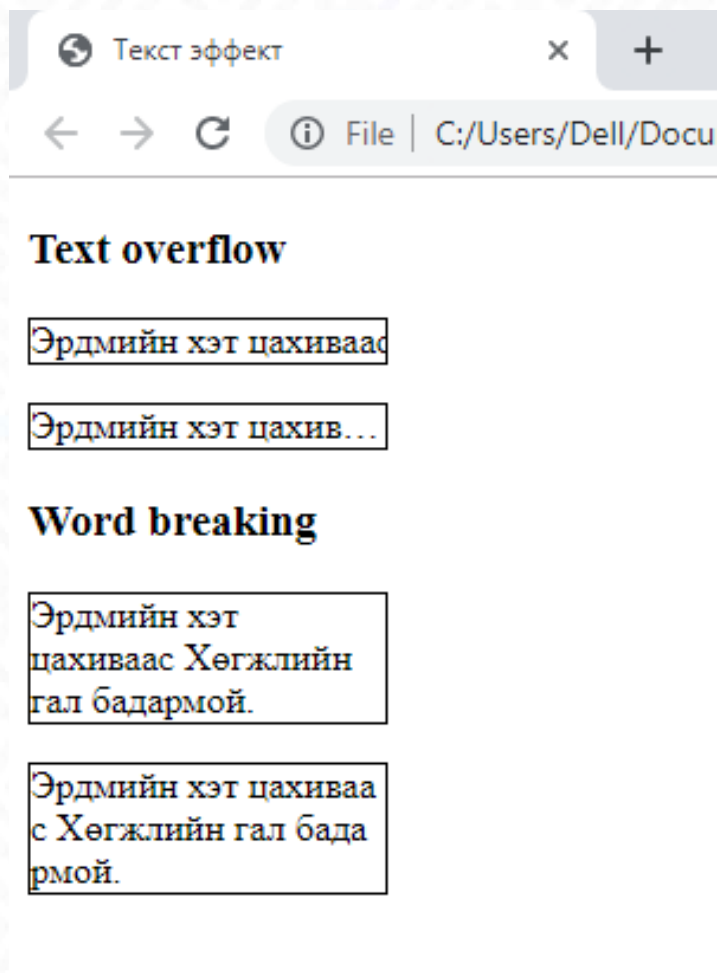
Зурган хүрээ

File | C:/Users/Dell/Documents/Examp

Зурган хүрээ



Текст эффект

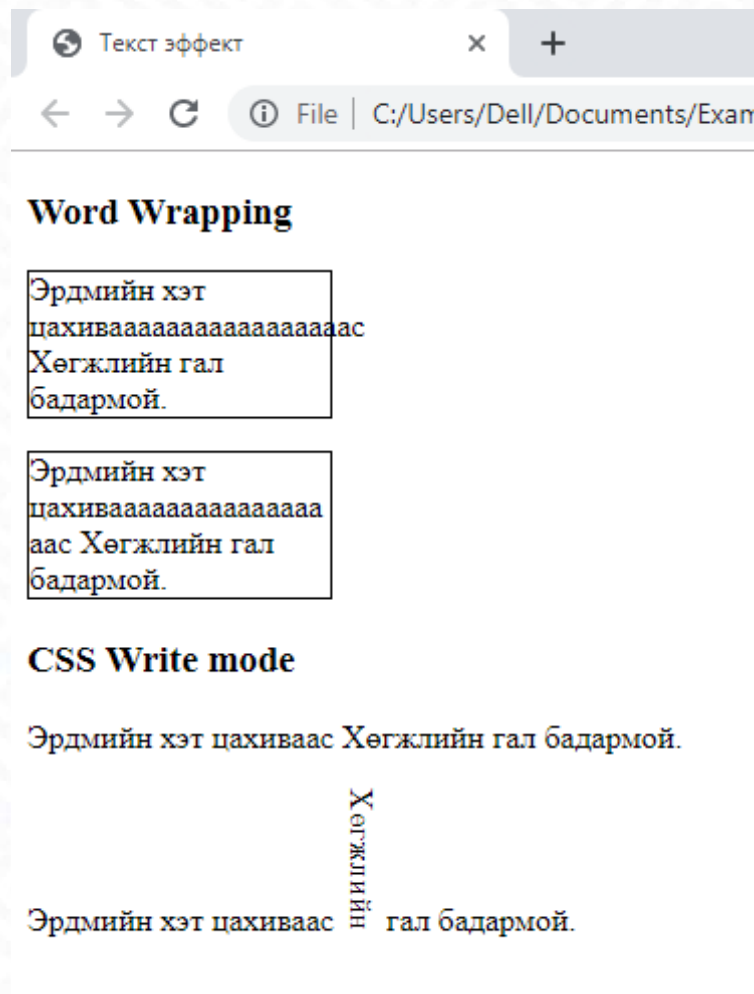


```

1  <!DOCTYPE html>
2
3  <!-- Зурар 5.7: texteffect1.html -->
4  <!-- Текст эффект -->
5  <html>
6  <head>
7      <meta charset="utf-8">
8      <title>Текст эффект</title>
9      <style type="text/css">
10         p{
11             width: 150px;
12             border: 1px solid #000;
13         }
14         .text1{
15             overflow: hidden;
16             white-space: nowrap;
17             text-overflow: clip;
18         }
19         .text2{
20             overflow: hidden;
21             white-space: nowrap;
22             text-overflow: ellipsis;
23         }
24         .text3{
25             word-break: keep-all;
26         }
27         .text4{
28             word-break: break-all;
29         }
30     </style>
31 </head>
32 <body>
33     <h3>Text overflow</h3>
34     <p class="text1">Эрдмийн хэт цахиваас Хөгжлийн гал бадармой.</p>
35     <p class="text2">Эрдмийн хэт цахиваас Хөгжлийн гал бадармой.</p>
36     <h3>Word breaking</h3>
37     <p class="text3">Эрдмийн хэт цахиваас Хөгжлийн гал бадармой.</p>
38     <p class="text4">Эрдмийн хэт цахиваас Хөгжлийн гал бадармой.</p>
39 </body>
40 </html>

```

Текст эффект

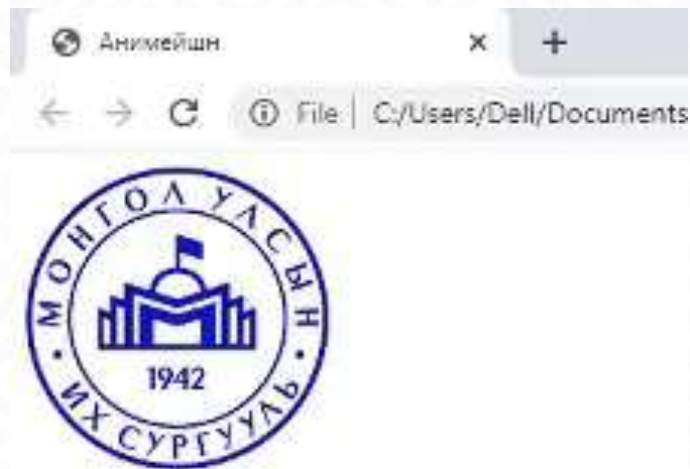


```

1  <!DOCTYPE html>
2
3  <!-- Зурар 5.7: texteffect2.html -->
4  <!-- Текст эффект -->
5  <html>
6  <head>
7      <meta charset="utf-8">
8      <title>Текст эффект</title>
9      <style type="text/css">
10         .text1{
11             width: 150px;
12             border: 1px solid #000;
13         }
14         .text2{
15             width: 150px;
16             border: 1px solid #000;
17             word-wrap: break-word;
18         }
19         .text3{
20             writing-mode: horizontal-tb;
21         }
22         .text4{
23             writing-mode: vertical-lr;
24         }
25     </style>
26 </head>
27 <body>
28     <h3>Word Wrapping</h3>
29     <p class="text1">Эрдмийн хэт цахивааааааааааааааааас Хөгжлийн гал бадармой.</p>
30     <p class="text2">Эрдмийн хэт цахивааааааааааааааааас Хөгжлийн гал бадармой.</p>
31     <h3>CSS Write mode</h3>
32     <p class="text3">Эрдмийн хэт цахиваас Хөгжлийн гал бадармой.</p>
33     <p>Эрдмийн хэт цахиваас <span class="text4">Хөгжлийн</span> гал бадармой.</p>
34 </body>
35 </html>

```


Анимейшн



```

1  <!DOCTYPE html>
2
3  <!-- Fig. 5.11: animation.html -->
4  <!-- Анимейшн -->
5  <html>
6  ▼ <head>
7      <meta charset = "utf-8">
8      <title>Анимейшн</title>
9  ▼   <style type = "text/css">
10  ▼       img{
11           position: relative;
12           animation: movingImage linear 10s 2 1s alternate;
13       }
14  ▼   @keyframes movingImage{
15       0% {opacity: 0; left: 50px; top: 0px;}
16       25% {opacity: 1; left: 0px; top: 50px;}
17       50% {opacity: 0; left: 50px; top: 100px;}
18       75% {opacity: 1; left: 100px; top: 50px;}
19       100% {opacity: 0; left: 50px; top: 0px;}
20   }
21   </style>
22   </head>
23  ▼ <body>
24       <img src = "logo.png" width = "150" height = "150"
25           alt = "Монгол улсын их сургууль">
26       <div></div>
27   </body>
28   </html>

```

Анимейшн

animation-name: movingImage;
 animation-timing-function: linear;
 animation-duration: 10s;
 animation-delay: 1s;
 animation-iteration-count: 2;
 animation-direction: alternative;

```
@keyframes example {
  from {background-color: red;}
  to {background-color: yellow;}
}
```

```

1  <!DOCTYPE html>
2
3  <!-- Fig. 5.11: animation.html -->
4  <!-- Анимейшн -->
5  <html>
6  ▼ <head>
7      <meta charset = "utf-8">
8      <title>Анимейшн</title>
9  ▼      <style type = "text/css">
10 ▼          img{
11              position: relative;
12              animation: movingImage linear 10s 2 1s alternate;
13          }
14 ▼          @keyframes movingImage{
15              0% {opacity: 0; left: 50px; top: 0px;}
16              25% {opacity: 1; left: 0px; top: 50px;}
17              50% {opacity: 0; left: 50px; top: 100px;}
18              75% {opacity: 1; left: 100px; top: 50px;}
19              100% {opacity: 0; left: 50px; top: 0px;}
20          }
21      </style>
22  </head>
23 ▼ <body>
24      <img src = "logo.png" width = "150" height = "150"
25          alt = "Монгол улсын их сургууль">
26      <div></div>
27  </body>
28  </html>
  
```

Methods for the Transform Property, pt. 1

VALUE	DESCRIPTION
<code>matrix (n,n,n,n,n,n)</code>	Specifies a 2D transformation using a six-value matrix
<code>matrix3d (n,n,n,n,n,n,n,n,n,n,n,n,n,n,n,n)</code>	Specifies a 2D transformation using a sixteen-value matrix
<code>perspective(n)</code>	Specifies a perspective view for a 3D element that's been transformed
<code>rotate (angle)</code>	Rotates an element in 2D
<code>rotate3d (x,y,z,angle)</code>	Rotates an element in 3D

VALUE	DESCRIPTION
<code>rotateY (angle)</code>	Rotates an element in 3D along the y-axis
<code>rotateZ (angle)</code>	Rotates an element in 3D along the z-axis
<code>scale (x,y)</code>	Scales an element in 2D (width and height)
<code>scale3d (x,y,z)</code>	Scales an element in 3D (width, height, and an arbitrary vector in 3D space)
<code>scaleX (x)</code>	Scales an element in 3D along the x-axis
<code>scaleY (y)</code>	Scales an element in 3D along the y-axis

Methods for the Transform Property, pt. 2

VALUE	DESCRIPTION
scaleZ (z)	Scales an element in 3D along the z-axis (a vector in 3D space)
skew (x-angle, y-angle)	Skews an element in 2D along the x-axis and the y-axis
skewX (angle)	Skews an element in 3D along the x-axis
skewY (angle)	Skews an element in 3D along the y-axis
translate (x,y)	Translates (moves) an element in 2D
translate3d (x,y,z)	Translates (moves) an element in 3D
VALUE	DESCRIPTION
translateX (x)	Translates an element in 3D using the x-axis
translateY (y)	Translates an element in 3D using the y-axis
translateZ (z)	Translates an element in 3D using the z-axis

Transition, Transformation

```
1  <!DOCTYPE html>
2
3  <!-- Fig. 5.12: transitions.html -->
4  <!-- Transitions in CSS3. -->
5  <html>
6  <head>
7      <meta charset = "utf-8">
8      <title>Transitions</title>
9      <style type = "text/css">
10         img{
11             margin: 80px;
12             transition: transform 4s;
13         }
14         img:hover{
15             transform: rotate(360deg) scale(2, 2);
16         }
17     </style>
18 </head>
19 <body>
20     <img src = "logo.png" width = "100" height = "100" alt = "MYMC">
21 </body>
22 </html>
--
```





LINK element usage

- If you define different alternative style sheets, you have to assign a title to each style sheet

```
<link rel="stylesheet"  
href="style.css" type="text/css"  
media="screen" title="Style 1" />
```



LINK element usage [3]

- **media:**

Tells the browser the type of device the style sheet is for:

- screen: Computer display
- print: Printer
- projection: Projector
- aural: Speechsynthetizer – aural: Speech syntetizer
- braille: Braille line
- tty: Console (text) display
- tv: Television
- all: All devices (default value)



LINK element usage [3]

- **media:**

Tells the browser the type of device the style sheet is for:

- screen: Computer display
- print: Printer
- projection: Projector
- aural: Speech synthesizer – aural: Speech synthesizer
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- tty: Console (text) display
- tv: Television
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INTRODUCTIONS



- What is Responsive Design
- What it contains?
- What tools or frameworks are best for responsive web design?
- More



ОРЧИН ҮЕИЙН ВЭБ САЙТЫН №1 ШААРДЛАГА



Source: <http://bradfrostweb.com/>



2.7 BILLION OF POPULATION WILL HAVE SMARTPHONES BY 2020

Source: <http://www.pcmag.com/article2/0,2817,2485277,00.asp>



“Anyone who slaps a ‘This page is best viewed with browser X’ label on a web page appears to be yearning for the bad old days, before the web, when you had very little chance of reading a document written on another computer, another word processor, or another network.”

Tim Berners-Lee in Technology Review, July 1996



What is Responsive Web Design?

Вэб дизайн нь бүх төрлийн
төхөөрөмжүүдээр үзэхэд хамгийн
тохиромжтой байдлаар өөрчлөгдөж
байгааг хэлнэ.

An approach to web design that provides
an optimal viewing experience across a
wide range of devices.

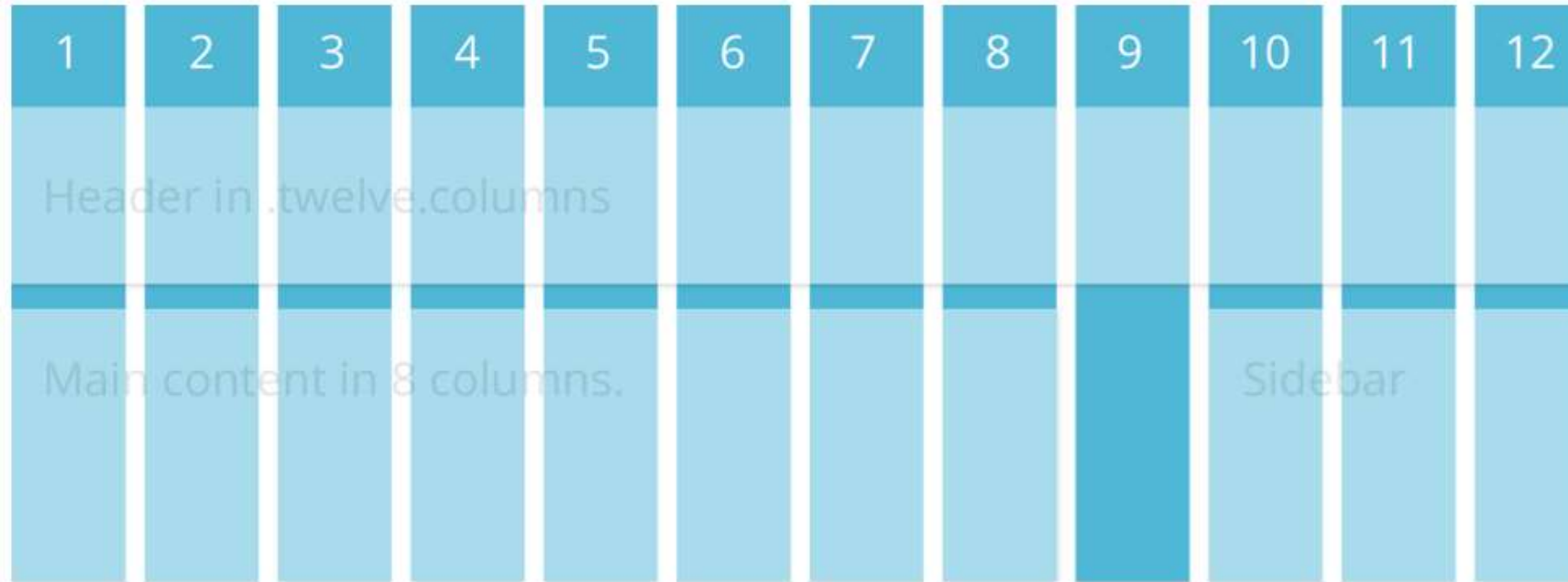


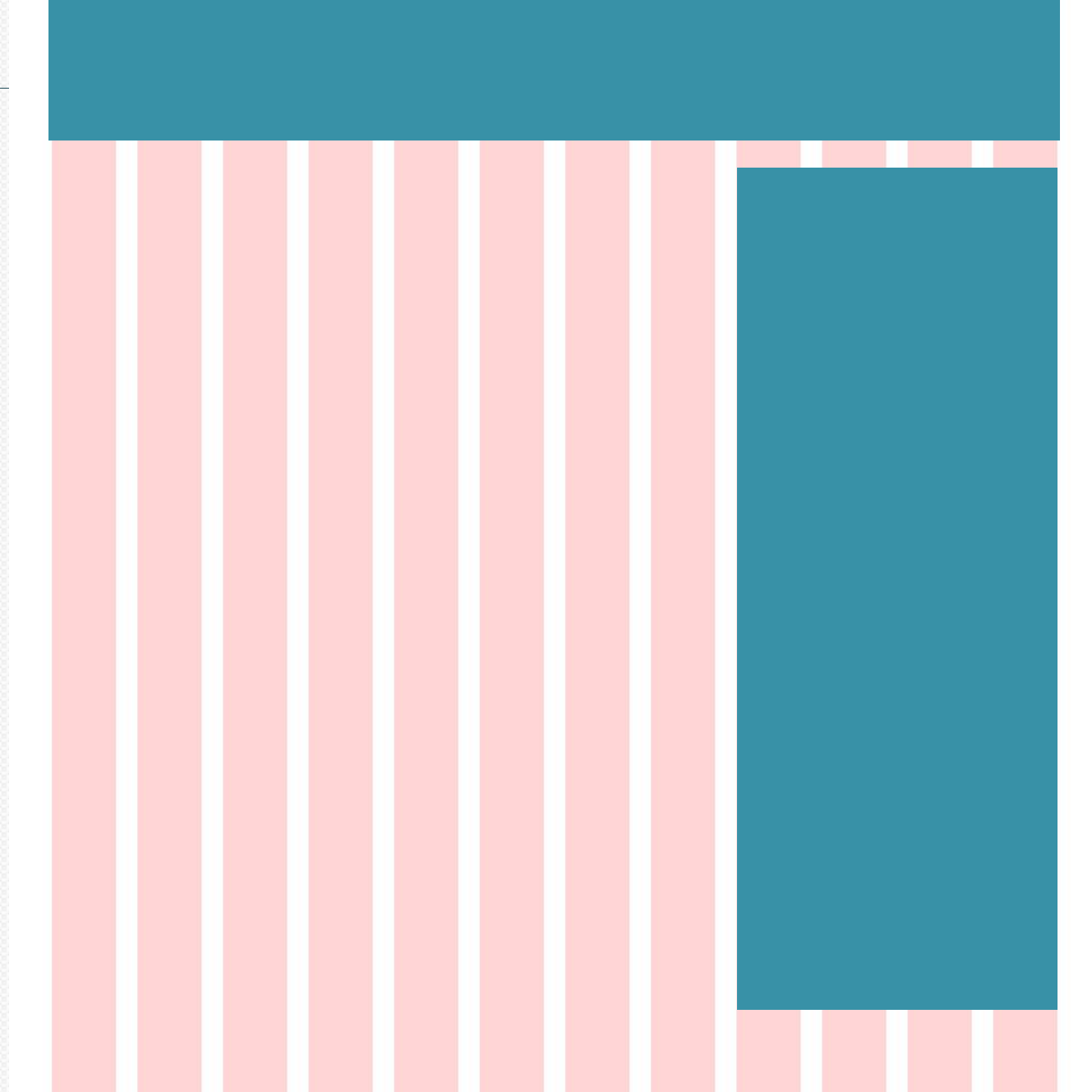
Elements of Responsive Web Design

- Fluid Grid
- Resizable Images
- Media Queries



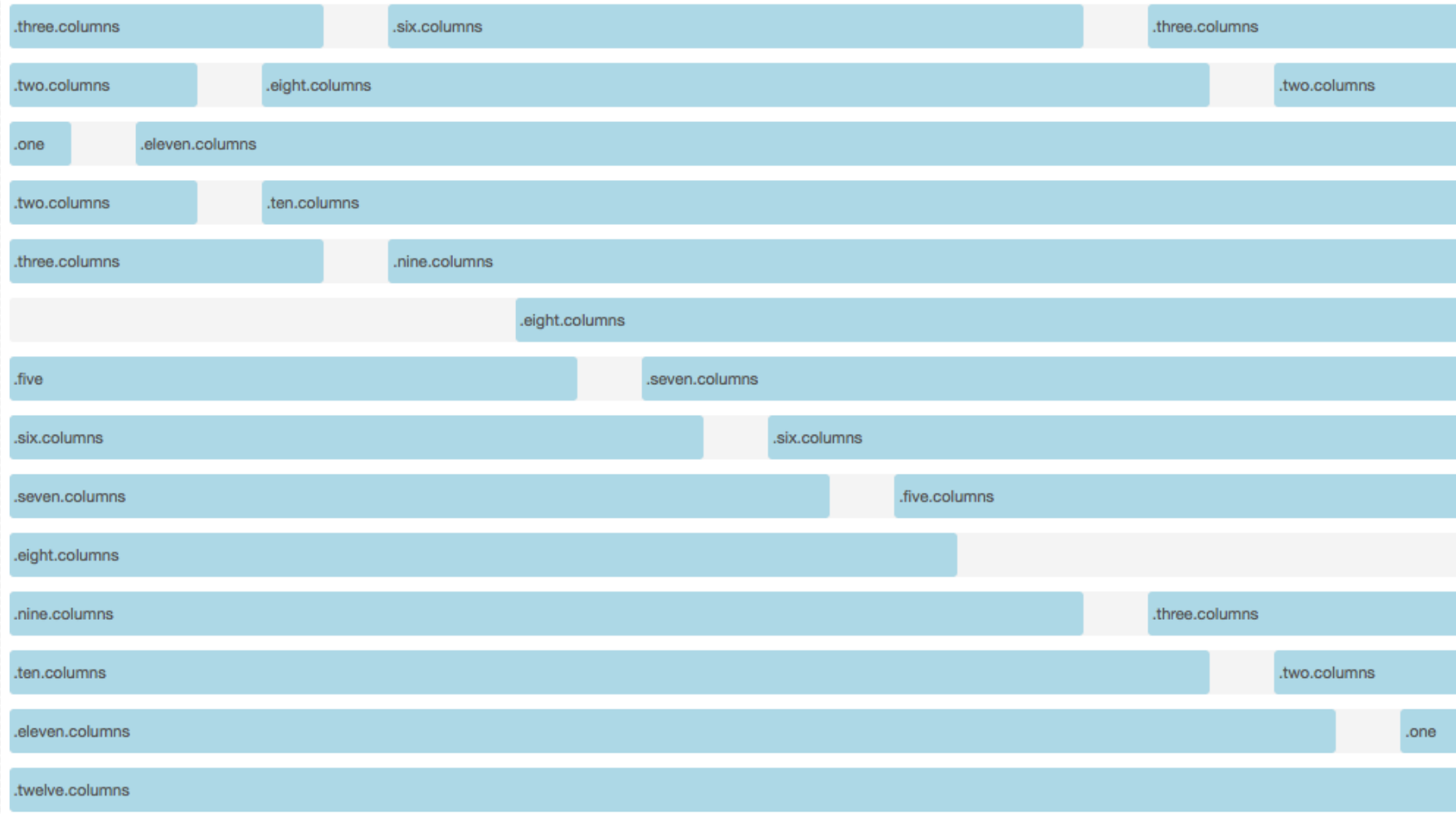
Grids







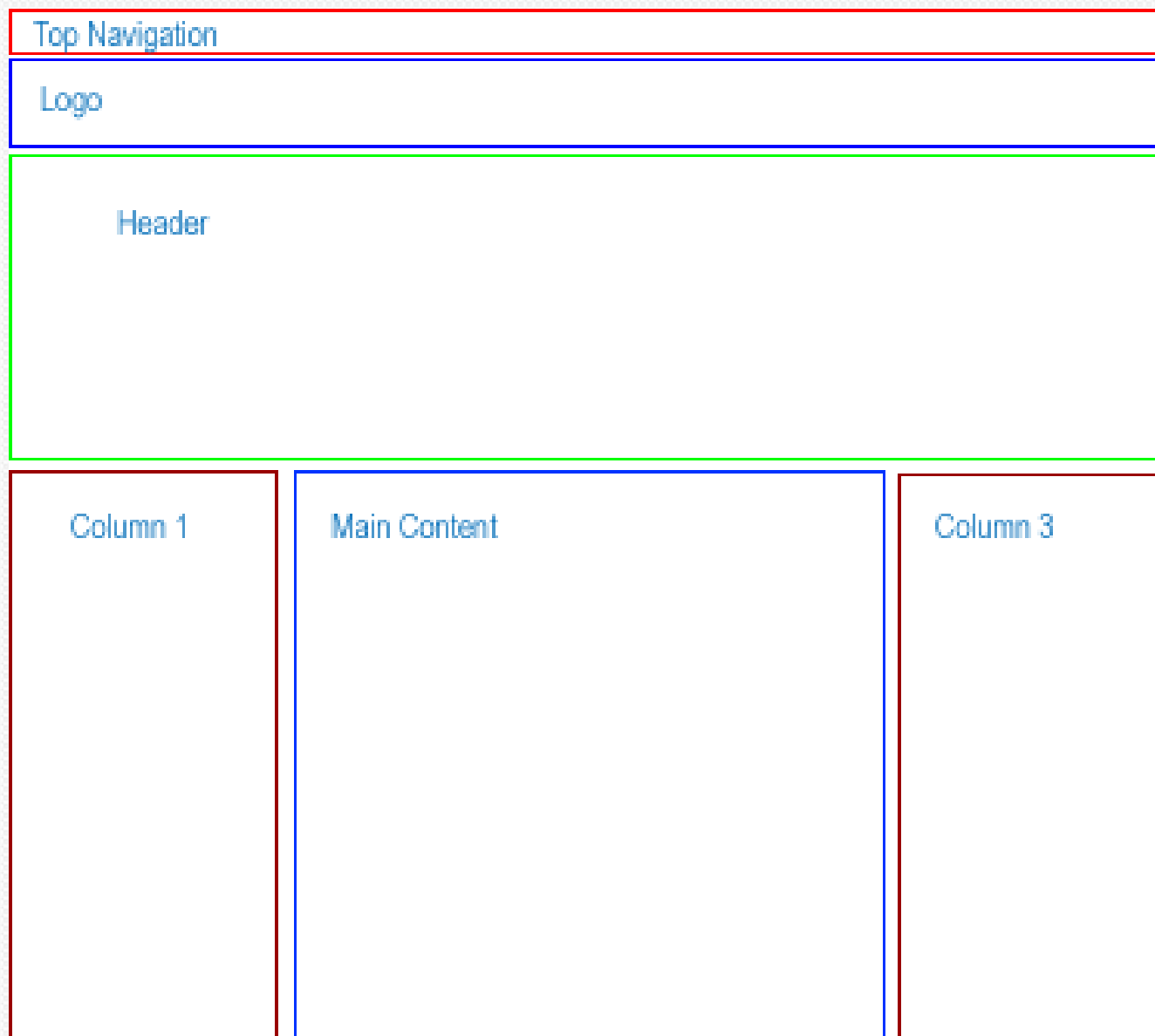
How do grid systems work?



Example based on Foundation Zurb Framework (<http://foundation.zurb.com>). A 12 column grid system



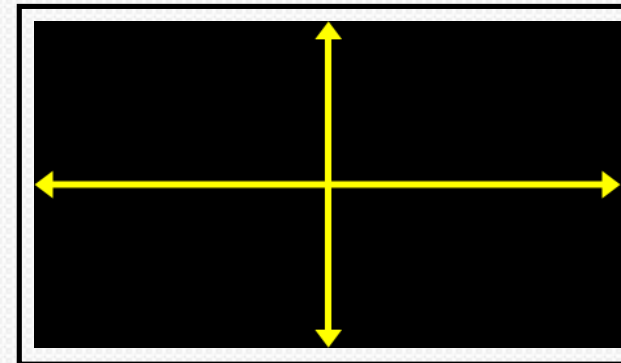
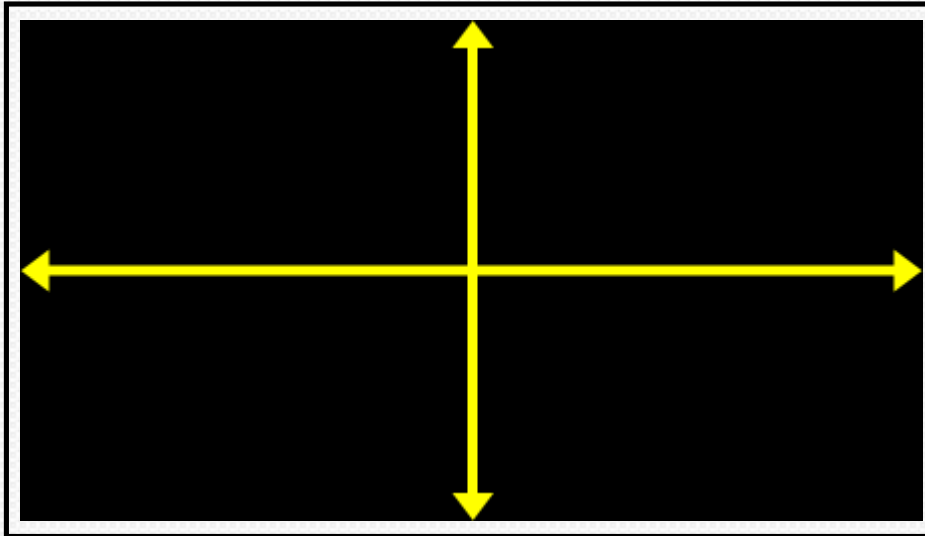
BONUS (USE HTML5 AND RESPONSIVE SYNTAX TO CREATE FOLLOWING LAYOUT)





Resizable Images

```
img {  
  max-width: 100%;height: auto;  
}
```





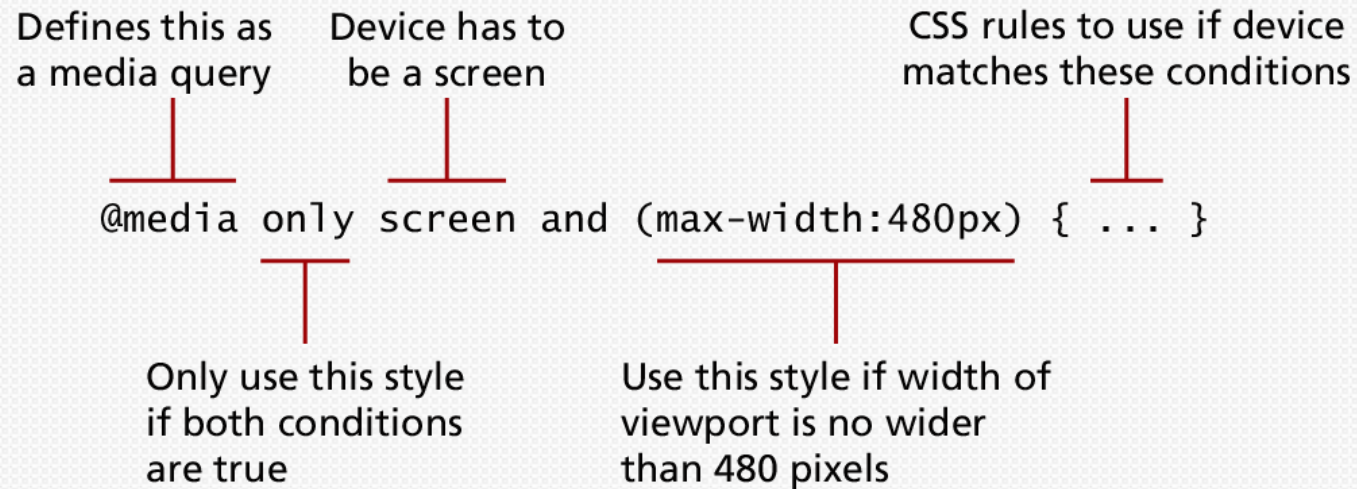
Media Queries

- A CSS3 module that renders web pages based on conditions such as screen resolution
- Drafted in 2001 by the W3C
- Became a recommended standard in June 2012



MEDIA QUERIES

- The other key component of responsive designs is **CSS media queries**.
- A media query is a way to apply style rules based on the medium that is displaying the file. You can use these queries to look at the capabilities of the device, and then define CSS rules to target that device.





MEDIA QUERIES

- Contemporary responsive sites will typically provide CSS rules for phone displays first, then tablets, then desktop monitors, an approach called **progressive enhancement**, in which a design is adapted to progressively more advanced devices
 - Browser features you can Examine with Media Queries

Feature	Description
width	Width of the viewport
height	Height of the viewport
device-width	Width of the device
device-height	Height of the device
orientation	Whether the device is portrait or landscape
color	The number of bits per color



MEDIA QUERIES IN ACTION



styles.css

```
/* rules for phones */
@media only screen and (max-width:480px)
{
  #slider-image { max-width: 100%; }
  #flash-ad { display: none; }
  ...
}

/* CSS rules for tablets */
@media only screen and (min-width: 481px)
and (max-width: 768px)
{
  ...
}

/* CSS rules for desktops */
@media only screen and (min-width: 769px)
{
  ...
}
```

Instead of having all the rules in a single file, we can put them in separate files and add media queries to <link> elements.

```
<link rel="stylesheet" href="mobile.css" media="screen and (max-width:480px)" />
<link rel="stylesheet" href="tablet.css" media="screen and (min-width:481px)
and (max-width:768px)" />
<link rel="stylesheet" href="desktop.css" media="screen and (min-width:769px)" />
```

```
<!--[if lt IE 9]>
<link rel="stylesheet" media="all" href="style-ie.css"/>
<![endif]-->
```

Handles Internet Explorer 8 and earlier using IE conditional comments.



Common Breakpoints

Label	Layout Width
Smartphones	480px and below
Portrait Tables	480px to 768px
Landscape Tablets	768px to 940px
Default	940px and up
Large Screens	1210px and up



WHY WE NEED CSS FRAMEWORKS

- Project requirements determine the framework
- Fluid Grid System
- Responsiveness
- Offer more than just a grid (pre-defined styles for typography, tables, buttons, navigation, forms elements, etc.)

Also...

- Great documentation
- Maintained regularly by the community or creator
- Open Source (free)