Formatting Text

1. Compare and contrast div and span tags.

   Similarities: *Div and span tags are both used to help separate and format text. Neither comes with any preformatting.*

   Differences: *Div tags are block level tags, which mean that they have a built in line break at the end. Span tags are not block level tags and can be used inline to format text without forcing a line break. Also, the default width of a div tag is the width of the page and the default width of a span tag is the width of the content it contains. So, using text-align in a span does not do anything*

2. What is a serif font?

   A serif font is a font with feet to create the illusion of a line that the text is on. Fonts without feet are called sans-serif fonts.

3. Show "Text 1" centered on the page in the font Georgia or Arial. The text should also be underlined.

```
<div style='font-family:Georgia, Arial; text-align:center; text-decoration:underline'>
      Text 1
</div>
```

4. Show the word rainbow on a page where each letter of the word is a different color of the rainbow in order (ROYGBIV). Also, the entire word should be bold.

```
<div style='font-weight:bold'>
      <span style='color:red'>R</span>
      <span style='color:orange'>A</span>
      <span style='color:yellow'>I</span>
      <span style='color:green'>N</span>
      <span style='color:blue'>B</span>
      <span style='color:indigo'>O</span>
      <span style='color:violet'>W</span>
</div>
```

5. Show "Text 2" right aligned on the page and in italics.

```
<div style='text-align:right; font-style:italic'> Text 2 </div>
```

6. Show "Left Aligned" in a div that is left aligned on the page. On the same page,show "Right Aligned" in a div that is right aligned on the page. Use styles to make both words appear on the same line.

```
<div style='float:left'>Left Aligned</div>
<div style='text-align:right'>Right Aligned</div>
```

Lists & Tables

1. What is the difference between an ordered list and unordered list?

   An ordered list shows each item with an ordered letter (A or a) or number (1, I, or i). The unordered list shows each item with a bullet. The ordered list uses the <ol> tag and the unordered list uses the <li> tag.

2. What is the difference between a <th> and <td> tag?

   Both tags are used to delimit the information in a row into columns. However, the <td> tag provides no formatting while the <th> tag make the included text bold and centered.

3. Make an unordered list of three activities that you do.

```
<ul>
    <li>Spring Musical</li>
    <li>Senior Awards</li>
    <li>Computer Science Club</li>
</ul>
```

4. Make an ordered list of the first four months of the year.

```
<ol>
    <li>January</li>
    <li>February</li>
    <li>March</li>
    <li>April</li>
</ol>
```

5. Make a table that shows your class schedule. The first column should be the course name, the second column should be the teacher, and the third column your expected grade in the course.

```
<table>
    <tr><th>Course</th><th>Teacher</th><th>Expected Grade</th></tr>
    <tr><td>Shark Tank</td><td>M. Engel</td><td>A</td></tr>
    <tr><td>AP Computer Science</td><td>M. Engel</td><td>A+</td></tr>
    <tr>
      <td>CS 1</td>
      <td>M. Engel</td>
      <td>A++</td>
    </tr>
</table>
```

**Note: the final row is shown in an alternate form. Any of the rows can be written either way.*

Internal Styles

1. What is the difference between an id attribute and a class attribute on an html element? How are each denoted in CSS?

   An id is used to denote a unique item on a page. In other words, an id should appear once and only once per page. A class is used for a variety of element that have a common theme or marker. It can be applied to multiple items per page. In CSS, a class is denoted using a period (.) and an id is denoted using a pound sign/hashtag (#).

2. Create an internal style to be applied to all h1 tags that makes them red on a black background with a border of 5 pixels that is yellow and dotted.

```
h1 {
        color:red;
        background-color: black;
        border: 5px dotted yellow;
    }
```

3. Create an internal style to be applied to all members of the blueLarge class that makes the color of the item blue and twice the size of the normal page text.

```
.blueLarge    {
                    color:blue;
                    font-size: 2em;
              }
```

4. Create an internal style to be applied to an element with the id currentPage. The current page should have a background color of green with yellow, underlined text on it.

```
#currentPage  {
                    background-color:green;
                    color:yellow;
                    text-decoration:underline;
              }
```

5. If an html element is assigned to be yellow in an internal style and green in an inline style, which will it appear as and why?

   If will appear as green because in CSS, the closest style takes precedence. This allows programmers/designers to have a general rule, but still be able to apply local exceptions when necessary.

Structure Tags

1. Identify what each of the following tags should be used for:
   a. <header> - *the header of a page including title, logo and navigation*
   b. <footer> - *the footer of a page typically including contact and copyright information*
   c. <nav> - *used in the header for main navigation buttons*
   d. <article> - *a page divider used for content that can stand alone outside of the site*
   e. <section> - *a non formatting page divider to break the page content into parts*
   f. <aside> - *a page divider used for content related to the main content on the page. Typically floated to the right.*

2. When should a div tag be used?

   A tag should be used to break up content in a block level container when it is not any of the above situations. For example, each of the nav items in the nav tag could be denoted using div tags.

JavaScript IO

1. Write a web page that takes a users email and displays it in a pop up window as “Email: user@whatever.com”.

```
<script>
      var email=window.prompt(“Enter your email.”);
      window.alert(“Email”+email);
</script>
```

2. Write a web page that takes a users favorite web site and displays it on the web page as a functioning link for the text “See My Fav Site”.

```
<script>
      var webPage=window.prompt(“Enter your favorite web page address.”);
      document.write(“<a href=’”+webPage+”’>See my Fav Site</a>”);
```

```
</script>
```

3. Write a web page that takes a number from a user and shows them the result of that number when 10 is added to it.

```
<script>
	var number=parseInt(window.prompt("Enter a number"));
	document.write("The sum of your number and 10 is "+ (number+10));
</script>
```

4. Write a web page that asks a user if they like Computer Science in a confirm box. Write output on the page that is a full sentence describing their answer.

```
<script>
	var likesCS = window.confirm ("Do you like CS?");
	document.write("It is "+likesCS+" that you like Computer Science.");
</script>
```

5. Write a web page that asks a user for their street address, city, state and zip. Then, format the address for display in an alert box.

```
<script>
	var street = window.prompt("Please enter your street address:");
	var city = window.prompt("Please enter your city:");
	var state = window.prompt("Please enter your state:");
	var zip = window.prompt("Please enter your zip:");
	window.alert(street +"\n"+ city+", "+state+"\t"+zip);
</script>
```

JavaScript Functions/Events

1. Write an image tag that shows a picture called pic.jpg and calls a function called replaceImage on mouseover.

```
<img src='pic.jpg' id='pic1' onmouseover='replaceImage()' />
```

2. Write the html to create a button that says "click me" and calls a function called doSomething when it is clicked.

```
<input type='button' value='click me' id='button1' onclick='doSomething' />
```

3. Write the html code to call a function called startup when the page finishes loading.

```
<body onload='startup()'>
```

4. Write the function replaceImage, from question 1, that is designed to change the image source to be pic2.jpg.

```
function replaceImage(){
   var pic=document.getElementById('pic1');
   pic.src="pic2.jpg";
}
```

5. Write the function doSomething, from question 2, that is designed to change the text on the button to be "well done".

```
function doSomething(){
   var btn=document.getElementById('button1');
   btn.value="well done";
}
```

6. Write the function startup, from question 3, that is designed to find the item with id='title' and alter its appearance to have a red, outset, 3px border and make the color of the text red as well.

```
function startup(){
    var title=document.getElementById('title);
    title.style.border="3px outset red";
    title.style.color="red";
}
```

Functions & Parameters

1. What is a parameter and how is it used?

   A parameter is a variable/value that is sent into a function. This enables programmers to create functions that work with a variety of different information. When writing the function header, the number of variables needed are placed in the parenthesis, separated by commas. These variables can then be freely used within the method and will take on the value that are sent in when the function is called.

2. Write a function called time. The function should take two parameters, hours and minutes. The time function should create an alert that shows the values in the format hours:minutes.

```
function time(hours, minutes){
    alert(hours+":"+minutes);
}
```

3. Write the code that asks a user for the current hour and minutes and then calls the time function written in question #2.

```
var h=window.prompt("What is the current hour?");
var m=window.prompt("What is the current minute?");
time(h, m);
```

4. Write a function called getSum that calculates the sum of three monetary values. Each of the values should be accepted by the method as a parameter. Once calculated, the method should change the display value of the input element with id total.

```
function getSum(money1, money2, money3){
    var sum=money1+money2+money3;
    document.getElementById('total').value=sum;
}
```

5. Write the code that calls getSum. The three monetary values can be gathered from the input elements with ids item1, item2 and item3.

```
var amt1 = parseFloat(document.getElementById('item1'));
var amt2 = parseFloat(document.getElementById('item2'));
var amt3 = parseFloat(document.getElementById('item3'));
getSum(amt1, amt2, amt3);
```

Logical Operators and Truth Tables

1. Write a condition that tests if the int variable num is greater than or equal to the value 5.

```
num>=5
```

2. Write the condition that tests of the String variable fav is equal to the word JavaScript.
   `fav==”JavaScript”`

3. Write the condition that tests if the character variable continue is equal to the letters Y or y.
   `continue==’Y’ || continue==’y’`

4. Given a boolean statement with 5 variables, how many rows would a truth table need? Describe how to arrange the values of each column.
   The truth table would need 2^5 or 32 rows. The first column would be 16T/16F. The second column would be 8T/8F/8T/8F. The third column would be 4T/4F/4T/4F…. The fourth column would be 2T/2F… and the last column would alternate T/F/T/F…

5. Given the following statement: (A || B) && (C || A), complete the truth table.

A	B	C	(A || B) && (C || A)
T	T	T	T **T** T
T	T	F	T **T** T
T	F	T	T **T** T
T	F	F	T **T** T
F	T	T	T **T** T
F	T	F	T **F** F
F	F	T	F **F** T
F	F	F	F **F** F

6. Given the statement A && (B || C), find all sets that make the statement true.

A	B	C	A && (B || C))
T	T	T	**T** T
T	T	F	**T** T
T	F	T	**T** T
T	F	F	**F** F
F	T	T	**F** T
F	T	F	**F** T
F	F	T	**F** T
F	F	F	**F** F

   So, the sets that make the statement true are (T,T,T), (T, T, F) and (T, F, T).

7. Using the statement A && (B || C), if A stands for class==”CS1”, B stands for block==4 and C stands for type=”indep. study”, generate test data for the sets of data found in question 6.
   `T,T,T - class=”CS1”, block=4, type=”indep. study”`
   `T,T,F - class=”CS1”, block=4, type=”none”`
   `T,F,T - class=”CS1”, block=1, type=”indep. study”`

Conditions

1. Write the condition that compares a users gpa to 3.5. If it is 3.5 or bigger, alert that they will graduate “Cum Laude”, which means “With Honors”.
   `if(gpa>=3.5){`

```
    window.alert("CumLaude");
}
```

2. Given the variables total (a monetary value) and paymentType (a string), write the code that will add a $10.00 charge to the total if the paymentType is credit and the total is less than $15.00.

```
if(paymentType=="credit" && total<150.00){
    total=total+10.00;  //or total+=10.00;
    window.alert(total);
}
```

3. When graduating from college, "Cum Laude" is the lowest of the honors. Above that is "Magna Cum Laude", which means "With Great Honor" and "Summa Cum Laude" which means "With Highest Praise". Cum Laude begins at 3.5, Magna at 3.8 and Summa at 4.0. Write a program that asks a user for their gpa and outputs the appropriate honors that they are graduating with. If they are not graduating with any honors, simply congratulate them on graduating. The output can be done as an alert.

```
if(gpa<3.5){
      window.alert("Graduating");
}
else if(gpa<3.8){
      window.alert("Cum Laude");
}
else if(gpa<4.){
      window.alert("Magna Cum Laude");
}
else{
      window.alert("Summa Cum Laude");
}
```

OR

```
var honors;
if(gpa>=4.0){
      honors="Summa Cum Laude";
}
else if(gpa>=3.8){
      honors="Magna Cum Laude";
}
else if(gpa>=3.5){
      honors="Cum Laude";
}
else{
      honors="Graduating";
}
window.alert(honors);
```

4. A website banner, with id banner, has 5 images that it cycles through: ad1, ad2, ad3, ad4 and ad5. There exists a variable called count, which is a number, signifying the number of the image. If the number is less than 5, add one to it and reset the image source to the new picture. If count is equal to 5, reset it to 1.

```
if(count<5){
    count=count+1;  //or count++
}
else{
    count=1;
}
imgsrc="ad"+count;
document.getElementById('banner').src=imgsrc;
```

Math and String Methods

1. Write the code to find the minimum value of the variables num1, num2 and num3.

```
var min=Math.min(num1, num2, num3);
```

2. Write the code to round the value total up to the nearest dollar.

```
var cost=Math.ceil(total);
```

3. Write the code to find the absolute value of the number stored in the variable distance.

```
var dist=Math.abs(distance);
```

4. Write the code to find the hypotenuse (c) of a right triangle given the two legs (a and b). The pythagorean formula ($a^2 + b^2 = c^2$) and will be helpful in this calculation.

```
var c=Math.sqrt(Math.pow(a,2)+Math.pow(b,2));
```

5. Write the code to find the first occurrence of the "@" symbol in a variable called email.

```
var at=email.indexOf("@");
```

6. Write the code to find the length of the string stored in password.

```
var length=password.length();
```

7. Write the code to find the first three characters of the string, cellNumber. Store them in a variable called areaCode.

```
var areaCode=cellNumber.substring(0,3);
```

8. Write the code to find the last three characters of the string email. Store them in a variable called extension. If the extension is .com or .net, alert the word popular.

```
var extension = email.substring(email.length()-3);
if(extension=="com" || extension=="net"){
      window.alert("popular");
}
```

Number Systems

1. Convert 543 to binary. **10 0001 1111**
2. Convert 126 to binary. **111 1110**
3. Convert 1010111_2 to base 10. **87**
4. Convert 11101110101_2 to base 10. **1909**
5. Convert 782 to hex. **30E**
6. Convert 1576 to hex. **628**
7. Convert $A3F_{16}$ to base 10. **2623**
8. Convert $ABCD_{16}$ to decimal. **43981**
9. Convert 10101101101_2 to hex. **56D**
10. Convert $F3D_{16}$ to binary. **1111 0011 1101**

Computer History

1. Who was the creator of the Difference Engine and Analytical Engine. Which one was more similar to our modern computers?

Charles Babbage. The Analytical Engine had a mill, like the current CPU, and a store, like the current storage device.

2. Explain what Herman Hollerith's machine did? What did his company, the Tabulating Machine Company, become in 1924?
   Hollerith's machine helped tabulate the over 62 million people in the 1890 census in 6 weeks. His compnay later became Internation Business Machines (IBM).

3. If the first generation of computers were characterized by vaccum tubes, what were the following generations characterized by:
   a. 2nd Generation: *Transistors*
   b. 3rd Generation: *Integrated Circuits*
   c. 4th Generation: *Microprocessors*

4. Where was the ENIAC created and what was its purpose?
   The ENIAC was created in Philadelphia at the University of Pennsylvania. Its purpose was to calculate firing tables for long range guns in the war.

5. What company first created a computer with a graphical user interface?
   The first company to create a computer with a graphical user interface was Xerox. However, they were not in the computer business and instead showed the technology to Apple (used for the Macintosh) and to Microsoft (used for Windows).

Web Page Design

1. Explain the difference between serif and sans-serif fonts.
   Serif fonts have feet and other markings used to create a virtual line on which the text is placed. Serif fonts typically have more formal feeling and include fonts like Times New Roman and Georgia. Sans-serif fonts are perceived as more casual and do not have the feet and other markings. These fonts include Arial and Verdana.

2. What is active whitespace and how is it used in web design?
   Active whitespace is planned whitespace as opposed to passive whitespace which is the result of blank space accidentally left by content. Active whitespace is any blank area intentionally placed to help break up content. For example, in a table, we can place space between the cells so that they are slightly separated, making the information more readable for users.

3. Why are most grids based on 960px? How does a grid help you layout a web page?
   Grids are typically based on 960px because it is divisible by so many numbers (2,3,4,5,6,8,10,12,15,16,20,24,30,32,40,48,60,64,80,96,120,160,192,240,320 and 480) and because it is slightly less than the typical users monitor width. The flexibility of this number allows you to create a variety of equal sized columns with appropriate white space between. These columns can then be merged when needed to create modular, well designed web pages.

4. Explain the F shape reading pattern and how it affects page layout.
   The F shape reading pattern is how most users view a web page. This means that they take a quick sweep across the top of the page, then move down a little and sweep again. This is followed by a

vertical sweep of the left side. This tells us many things about desired page layout. First, our logo/title should be in the upper left corner as this is the hottest/most visited area. Second, navigation, important announcements and important advertising should appear across the top of the page as this area gets two sweeps. Third, the left side of the page should be reserved for navigation or section headings. Finally, this same pattern is applied to text on a web page, so it is important to get the message/information out fast in the beginning of an article and that articles should be thin in width, not spanning the entire page.

5. Explain the general feeling/mood associated with each of the following colors:
    a. purple - *royalty, wealth*
    b. green - *nature and relaxing*
    c. yellow - *cheerful, enhances concentration, can be overpowering*
    d. blue - *peaceful, tranquil, loyal*

Site Organization

1. Write the code to link an external stylesheet, called navStyle.css, to a web page.
   `<link type='text/css' rel='stylesheet' href='navStyle.css' />`

2. ~~Write the code to link an external javascript, called navScript.js, to a web page.~~
   ~~`<script src='navScript.js'></script>`~~

3. Explain when developers should use of each of the different types of styles (inline, internal, external) and why.
   External styles are used to control entire websites. External styles allow a developer to create a set of rules and classes that can be easily applied to all of the pages in a site. They also allow for site wide style editing by changing a single line of code. Internal styles can be used to create rules that apply to all of the elements on a single web page. They are also useful when creating styles for a site, that can later be converted to external styles. Internal styles also allow a developer to create page level exceptions to the rules stated by any existing external styles. Finally, inline styles are used to alter an individual element. They can be used to create exceptions to rules specified in either internal or external style files.

4. What folders should always be a part of your site?
   styles, images, scripts

5. Why do we always call the home page of our site index.html?
   This is because web servers are created to automatically look for a file called index.html inside a folder. This allows users to access the page using www.yoursite.com *instead of having to type www.yoursite.com/index.html.*

~~Web Development~~

1. ~~Compare and contrast the three basic types of web hosts (free, shared and dedicated).~~
   ~~*Free hosts typically offer limited support, space and utilize ads on the site. Shared servers cost a few dollars a month and offer better support, but have some security concerns as the server hosts several sites. Dedicated servers are very expensive and require knowledge, but are very secure.*~~

2. ~~What information should be in a proposal?~~

~~*A proposal should discuss the purpose of the site, include a mockup of the home page, and contain information about technical requirements, a timeline and cost/payment information.*~~

3. ~~What is a directory structure and how is it used?~~
   ~~*A directory structure shows the folders/files contained in a website and how they are organized. This can be used for developers to link to files that may not yet exist, but will be the correct path.*~~

4. ~~What type of information should be on a web page storyboard?~~
   ~~*A page storyboard should have all the information needed for a developer to create the page. This includes links (internal and external), a sketch/mockup of the page, media files, specific style information, the page name and location and any other pertinent notes.*~~

Canvas Gradients and Images

For each problem, assume that the canvas and context have been created and stored in variables named canvas and context.

1. Write the code to create a linear gradient that fills a square that is 100 x 100. The gradient should be 4 colors(white/pink/red/black), evenly split across the gradient. The gradient should spread vertically over the span of 100 pixels.

```
var gradient = context.createLinearGradient(0, 0, 0, 100);
gradient.addColorStop(0, "white");
gradient.addColorStop(.33, "pink");
gradient.addColorStop(.67, "red");
gradient.addColorStop(1, “black”);
context.fillStyle = gradient;
context.rect(0, 0, 100, 100);
context.fill();
```

2. Write the code to create a radial gradient that fills a circle with radius 100 and center at 50, 50. The gradient should be 3 colors (blue, yellow, green), evenly split across the gradient.

```
var gradient = context.createRadialGradient(50,50,10,50,50,100);
gradient.addColorStop(0, "blue");
gradient.addColorStop(.50, "yellow");
gradient.addColorStop(1, “green”);
context.fillStyle = gradient;
context.arc(50,50,100,0, 2*Math.PI, true);
context.fill();
```

3. Write the code to add an image called pic.jpg into a canvas. The image is stored in a folder called images.

```
var img = new Image();
img.src = 'images/pic.jpg';
img.onload = function(){
        context.drawImage(img, 20, 50);
}
```