

## Episode 7.03 - Coding Bitwise Operations

(Transcript URL: <https://intermation.com/episode-7-03-coding-bitwise-operations/>)

**Show Description:** Discussing how to use bitwise operations to manipulate the bits of an integer would be academic if we couldn't perform the operations in our code. The good news is that we can!

### Try it Yourself

All of the code presented in this worksheet can be executed in a JavaScript-enabled browser. No compiler or other software development tool is needed. There are two ways to do this:

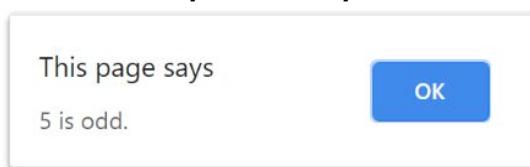
- Type the code into a text editor such as Notepad (Windows) orTextEdit (Mac), and save the file with the extension `.htm`. Locate the file on your computer and open it in a browser. Some tablets and smartphones allow you to store a text file to the file system and open it in a browser, but the process is more complicated.
- Alternatively, you can use a web-based tutorial service such as [https://www.w3schools.com/js/tryit.asp?filename=tryjs\\_myfirst](https://www.w3schools.com/js/tryit.asp?filename=tryjs_myfirst). Copy and paste the code into their editor window and run the code.

For example, copying the code shown below to an editor and running it should reveal a pop-up window with the text string, "5 is odd." Actual code is in **bold**. Go ahead and try it! (Note: The output for most of these examples is through an alert window.)

Once you feel comfortable executing this code, modify the line `var value = 5;` to assign an odd integer to value. Something like `var value = 6;` should work.

```
<!DOCTYPE html>
<html>
<head>
    <title>Example of Checking the Parity of 5 using
        JavaScript - intermation.com</title>
</head>
<body>
<script>
var value = 5;          // <-- Change to an even number to see
if((value % 2) == 1) //      what happens
    alert(value + " is odd.");
else
    alert(value + " is even.");
</script>
</body>
</html>
```

### Expected Output



Podcast Timestamp	Supporting Details
3:46	<p style="text-align: center;"><b>Using a Bitwise-AND to Identify an Odd Value</b></p> <p>The code above uses the modulus or remainder function. Replace the code in bold above with the if-statement shown below that uses a bitwise AND to distinguish odd and even numbers. Aside from the alert() function, the code is similar in most programming languages.</p> <pre> <b>var value = 5;</b> if(value &amp; 1)      // This code is executed for odd values     alert(value + " is odd."); else              // This code is executed for even values     alert(value + " is even."); </pre>
4:39	<p style="text-align: center;"><b>Using Right Shifts and Bitwise-ANDs to Separate Colors in a 24-Bit RGB Value</b></p> <p>The script below will separate the RGB color 0xf2d53c into its red, green, and blue components, then output those colors in <b>decimal</b>. The “0x” is used to define the color in hexadecimal.</p> <pre> &lt;!DOCTYPE html&gt; &lt;html&gt; &lt;head&gt;     &lt;title&gt;Separating an RGB Color into Red, Green, and Blue         - intermation.com&lt;/title&gt; &lt;/head&gt; &lt;body&gt; &lt;script&gt; <b>var color = 0xf2d53c;</b> <b>var blue = color &amp; 0xff;</b> <b>var green = (color &gt;&gt;&gt; 8) &amp; 0xff;</b> <b>var red = (color &gt;&gt;&gt; 16) &amp; 0xff;</b> <b>alert("The RGB color is " + red + " red, "</b> <b>+ green + " green, and " + blue + " blue.");</b> &lt;/script&gt; &lt;/body&gt; &lt;/html&gt; </pre>
7:55	<p style="text-align: center;"><b>Using a Bitwise-AND to Identify an IPv4 Subnet</b></p> <p>The script below uses an IPv4 subnet to clear the host ID bits from an IPv4 address.</p> <pre> var subnetMask = 0xffffffff; var ipAddress = (192 &lt;&lt; 24) + (168 &lt;&lt; 16) + (15 &lt;&lt; 8) + 230; var subnet = subnetMask &amp; ipAddress; alert("The subnet " + (subnet &gt;&gt; 24 &amp; 0xff) + "."     + (subnet &gt;&gt; 16 &amp; 0xff) + "."     + (subnet &gt;&gt; 8 &amp; 0xff) + "." + (subnet &amp; 0xff)); </pre>