Chapter 4 - Bits, Bytes, and Binary\Base Converter\baseConverter.html

```
<!DOCTYPE html>
<html>

<head>
    <title>Base Converter</title>
    <style>
        body {
            padding: 15px 0;
            border: 5px double rgb(17, 0, 255);
            text-align: center;
            background: linear-gradient(45deg, rgb(2, 255, 107) 45%, rgb(0, 255, 98) 44%,
                    rgb(0, 217, 255) 100%);
            font-family: 'Trebuchet MS', 'Lucida Sans Unicode', 'Lucida Grande', 'Lucida
Sans', Arial, sans-serif;
            color: rgb(25, 0, 37)
        }
    </style>
    <script>
        // Description: Converts a binary number to decimal
        // Citation: None
        // Input/Parameters: Binary number
        // Output/Return: Converted decimal number
        function binToDec(binaryNumber) {
            // Split array into individual indices
            let binaryArray = binaryNumber.split("");

            // Reverse the array, store back in the same variable
            binaryArray = binaryArray.reverse();

            // Store our final answer (decimal)
            let decimalAnswer = 0;

            // Loop through each individual digit in the binary number
            for (let i = 0; i < binaryArray.length; i++) {
                // Grab the digit at index i, convert to a number
                let digit = Number(binaryArray[i]);
                // Multipliying the digit by its place value
                let digitValue = digit * (2 ** i);
                // Adding the digit value to the total
                decimalAnswer += digitValue;
            }
            return decimalAnswer;
        }
        // Description: Converts a octal number to decimal
        // Citation: None
        // Input/Parameters: Octal number
        // Output/Return: Converted decimal number
        function octToDec(octalNumber) {
            // Split array into individual indices
            let octalArray = octalNumber.split("");

            // Reverse the array, store back in the same variable
            octalArray = octalArray.reverse();
```

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53
54              // Store our final answer (decimal)
55              let decimalAnswer = 0;
56
57              // Loop through each individual digit in the octal number
58              for (let i = 0; i < octalArray.length; i++) {
59                  // Grab the digit at index i, convert to a number
60                  let digit = Number(octalArray[i]);
61                  // Multipliying the digit by its place value
62                  let digitValue = digit * (8 ** i);
63                  // Adding the digit value to the total
64                  decimalAnswer += digitValue;
65              }
66              return decimalAnswer;
67          }
68          // Description: Converts a hexadecimal number to decimal
69          // Citation: None
70          // Input/Parameters: Hexadecimal number
71          // Output/Return: Converted decimal number
72          function hexToDec(hexNumber) {
73              // Split array into individual indices
74              let hexArray = hexNumber.split("");
75
76              // Reverse the array, store back in the same variable
77              hexArray = hexArray.reverse();
78
79              // Store our final answer (decimal)
80              let decimalAnswer = 0;
81
82              // Loop through each individual digit in the hexadecimal number
83              for (let i = 0; i < hexArray.length; i++) {
84                  // Grab the digit at index i, convert to a number
85                  let digit = hexArray[i];
86                  // Check if the digit is a letter between A through F and applying the number
    value to it
87                  if (digit == "A" || digit == "a") {
88                      digit = 10;
89                  }
90                  else if (digit == "B" || digit == "b") {
91                      digit = 11;
92                  }
93                  else if (digit == "C" || digit == "c") {
94                      digit = 12;
95                  }
96                  else if (digit == "D" || digit == "d") {
97                      digit = 13;
98                  }
99                  else if (digit == "E" || digit == "e") {
100                     digit = 14;
101                 }
102                 else if (digit == "F" || digit == "f") {
103                     digit = 15;
104                 }
105                 // Else the digit is a number between 0 - 9 and apply that number value to it
106                 else {
107                     digit = Number(digit);
```

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                }
                // Multipliying the digit by its place value
                let digitValue = digit * (16 ** i);
                // Adding the digit value to the total
                decimalAnswer += digitValue;
            }
            return decimalAnswer;
        }
        // Description: Converts a decimal number to binary
        // Citation: None
        // Input/Parameters: Decimal number
        // Output/Return: Converted binary number
        function decToBin(decimalNumber) {
            let binaryAnswer = "";

            // While loop that run until we get the value of 0
            while (decimalNumber != 0) {
                // Find the remainder after dividing by 2
                let remainder = decimalNumber % 2;
                // Add the remainder to the binaryAnswer
                binaryAnswer += remainder;
                // Use integer division to create a new decimalNumber
                decimalNumber = Math.floor(decimalNumber / 2);
            }
            // Reverse our binaryAnswer
            let binaryArray = binaryAnswer.split("");
            binaryArray.reverse();
            binaryAnswer = binaryArray.join("");

            // Return the final binaryAnswer
            return binaryAnswer;
        }
        // Description: Converts a decimal number to octal
        // Citation: None
        // Input/Parameters: Decimal number
        // Output/Return: Converted octal number
        function decToOct(decimalNumber) {
            let octalAnswer = "";

            // While loop that run until we get the value of 0
            while (decimalNumber != 0) {
                // Find the remainder after dividing by 2
                let remainder = decimalNumber % 8;
                // Add the remainder to the octalAnswer
                octalAnswer += remainder;
                // Use integer division to create a new decimalNumber
                decimalNumber = Math.floor(decimalNumber / 8);
            }
            // Reverse our octalAnswer
            let octalArray = octalAnswer.split("");
            octalArray.reverse();
            octalAnswer = octalArray.join("");

            // Return the final octalAnswer
            return octalAnswer;
        }
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164         // Description: Converts a decimal number to hexadecimal
165         // Citation: None
166         // Input/Parameters: Decimal number
167         // Output/Return: Converted hexadecimal number
168         function decToHex(decimalNumber) {
169             let hexAnswer = "";
170 
171             // While loop that run until we get the value of 0
172             while (decimalNumber != 0) {
173                 // Find the remainder after dividing by 2
174                 let remainder = decimalNumber % 16;
175 
176                 if (remainder == 10) {
177                     remainder = "A";
178                 }
179                 else if (remainder == 11) {
180                     remainder = "B";
181                 }
182                 else if (remainder == 12) {
183                     remainder = "C";
184                 }
185                 else if (remainder == 13) {
186                     remainder = "D";
187                 }
188                 else if (remainder == 14) {
189                     remainder = "E";
190                 }
191                 else if (remainder == 15) {
192                     remainder = "F";
193                 }
194                 else {
195                     remainder = Number(remainder);
196                 }
197                 // Add the remainder to the hexAnswer
198                 hexAnswer += remainder;
199                 // Use integer division to create a new decimalNumber
200                 decimalNumber = Math.floor(decimalNumber / 16);
201             }
202             // Reverse our hexAnswer
203             let hexArray = hexAnswer.split("");
204             hexArray.reverse();
205             hexAnswer = hexArray.join("");
206 
207             // Return the final hexAnswer
208             return hexAnswer;
209         }
210         // Description: Applies the functions once a conversion is selected
211         // Citation: None
212         // Input/Parameters: None
213         // Output/Return: Final answer or converted value
214         function convert() {
215             let inputValue = idInputValue.value
216             let selected = idSelectConversion.value
217             let output = "";
218             if (selected == "Base 2 to Base 10") {
219                 output = binToDec(inputValue)
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            }
            else if (selected == "Base 8 to Base 10") {
                output = octToDec(inputValue)
            }
            else if (selected == "Base 16 to Base 10") {
                output = hexToDec(inputValue)
            }
            else if (selected == "Base 10 to Base 2") {
                output = decToBin(inputValue)
            }
            else if (selected == "Base 10 to Base 8") {
                output = decToOct(inputValue)
            }
            else if (selected == "Base 10 to Base 16") {
                output = decToHex(inputValue)
            }
            idConvertedValue.value = output
        }
    </script>
</head>

<body>
    <h1>Base 2, 8, 10, 16 Conversions</h1>
    <div><img src="number-systems.png"></div>
    <br>
    <input type="text" id="idInputValue" placeholder="Input Value">
    <input type="text" id="idConvertedValue" placeholder="Converted Value">
    <br>
    <br>
    <select id="idSelectConversion">
        <option>Base 2 to Base 10</option>
        <option>Base 8 to Base 10</option>
        <option>Base 16 to Base 10</option>
        <option>Base 10 to Base 2</option>
        <option>Base 10 to Base 8</option>
        <option>Base 10 to Base 16</option>
    </select>
    <br>
    <br>
    <input type="button" value="Convert Value" onclick="convert()">
</body>

</html>
```