Binary to Decimal Conversion

This program converts binary numbers into decimal numbers. The key to the conversion is to note the following relationship between binary numbers and decimal numbers

Consider the binary number given by the digits b_4, b_3, b_2, b_1, and b_0. We can write its decimal equivalent as

$b_4 * 2^4 + b_3 * 2^3 + b_2 * 2^2 + b_1 * 2^1 + b_0 * 2^0$
$= b_4 * 16 + b_3 * 8 + b_2 * 4 + b_1 * 2 + b_0 *$

Thus, the binary number 0101 would be equal to:

$0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 =$

$0 \times 8 + 1 \times 4 + 0 \times 2 + 1 \times 1 =$

$0 + 4 + 0 + 1 = 5.$

In this program you will read in a binary number as a string. You can find the size of the string by using the *Length* property that is built into the string class. For example,

```
   string data;
   Console.Write("Please enter a binary
number, e.g. 1001: ");
   data = Console.ReadLine( );
   int dataSize = data.Length;
```

To get one of the characters out of the string containing the binary number, use the indexer *[i]* that is built into the string class. For example, to get the 3rd character, you would write

```
   char binaryDigit = data[ 2 ];
```

We use the index 2 because we start counting characters at zero.

Now use a loop that looks at each character in the string in turn to compute the value of the binary number.

In this program, we will also write a loop that controls whether or not the user wants to input another binary number and do another conversion.