

1. [12 marks] We will be implementing a python program that will perform conversions from base 2 (binary) to base 10. This program will prompt for a binary number as a string and then print out this binary number as a base 10 number. The program will then prompt for another binary number to convert. This will continue until the user presses the Enter key when prompted for a binary number (entering the empty string as input). If the user does this the first time they are prompted, then the program will do no conversion and complete running with no output. The program as a result will require a loop to get input. The process of binary to base 10 conversion also requires a loop. The result is that your program should have a nested loop structure.

As introduced in class, binary to base 10 conversion is the result of the summation of each digit of the binary number multiplied by the power of two for the digit's position. This is known as the positional method. Your program should use the positional method to do its conversion.

For example,  $1100_2 = 1*2^3 + 1*2^2 + 0*2^1 + 0*2^0 = 12_{10}$

A reminder, you can loop through the characters in a string from left to right using a **for** loop as shown in class. These single characters can be converted into numbers (digits) the same way a string form of a number is converted. You can also get the length of a string using the function `len`.

Ex. If `s = "1100"` then `len(s)==4` OR If `s = "110011"` then `len(s)==6`

To perform the positional method you will need a variable to store the summation, and a variable to track the position of the binary character currently being converted from the inputted string.

Your program should prompt for a binary number with a message such as "Enter binary number:" and print a message such as "The binary number 1100 in base 10 is 12." after each binary number is input. (It is possible to complete this code in as few as 9 lines) **You program should not do error checking. For example, DO NOT check if the input is a correctly formed binary number.)**

Sample Run #1:

Enter binary number:

Sample Run #2:

Enter binary number: 1100

The binary number 1100 in base 10 is 12.

Enter binary number:

Sample Run #3:

Enter binary number: 1100

The binary number 1100 in base 10 is 12.

Enter binary number: 1101

The binary number 1101 in base 10 is 13.

Enter binary number: