

Decoding Binary

Note: This assignment is composed of two parts.

Part 1: Introduction

Write a Java class **BinaryDecoder.java** that accepts a binary from the user and returns its decimal value. Explanations of how binary can be converted decimal can be found on https://www.electronics-tutorials.ws/binary/bin_2.html. You can also find many demos on YouTube.

The Problem

Given a binary String as input, composed of 0's and 1's, give the decimal value for the input.

Algorithm

Given a binary string, b , of size, n , indexed $0, 1, 2, \dots, n - 1$. Denote character's integer value of b as b_i such that $i = 0, 1, 2, \dots, n - 1$. The decimal value, $d = b_{n-1} \times 2^0 + b_{n-2} \times 2^1 + \dots + b_0 \times 2^{n-1}$.

Sample Output

```
Enter a binary:
120013
Error: Not a binary
Enter a binary:
1010w10
Error: Not a binary
Enter a binary:
100A11
Error: Not a binary
Enter a binary:
Ahmed
Error: Not a binary
Enter a binary:
10101010101111
-----
Binary size: 14
Value = 1*2^0 + 1*2^1 + 1*2^2 + 1*2^3 + 0*2^4 + 1*2^5 + 0*2^6 + 1*2^7 + 0*2^8 + 1*2^9 + 0*2^10 + 1*2^11 + 0*2^12 + 1*2^13
        = 10927
```

Other Requirements

- As shown in the sample output, a validation must be performed to check if the String is binary.

- Your class should have a method that (1) checks if a string is binary, and a (2) method that calculates the decimal value of the string.
- Add comments to your code to help make it more understandable.
- Aggregate codes using methods other than the main method.
- Add a comment at the top of the code that includes your name(s), date, and assignment number. *Note: names(s) in case you worked on your assignments in groups of two's.*

Part 2

Write a java class **BinaryToDecimalTester.java**. The class should have a method that reads a list of strings from a text file and writes their decimal values to the console. The class should call methods in `BinaryDecoder.java` to achieve its tasks. If a string is not a binary, the output should indicate this as well.

Submission

- Submit your **BinaryDecoder.java** and **BinaryToDecimalTester.java** through Blackboard before the deadline specified.
- If you worked on this assignment with someone else, you are required to submit the same work, and you are also required to include your names on each of the source codes.