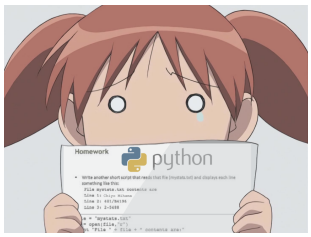
Gotta Make You Understand Encoding



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1 Encoding Strings to Integers

There are many algorithms for uniquely mapping a string to an integer. One of them is described below:

1. This encoding scheme is for mapping a string containing all the 26 lower case alphabets and 1 SPACE character to a decimal integer. (It can easily be extended to support upper case alphabets and special characters.)
2. We start by assigning each of the 27 characters a decimal integer.

$$\begin{aligned} \text{SPACE} &\rightarrow 0 \\ \text{a} &\rightarrow 1 \\ \text{b} &\rightarrow 2 \\ \text{c} &\rightarrow 3 \\ &\vdots \\ \text{y} &\rightarrow 25 \\ \text{z} &\rightarrow 26 \end{aligned}$$

3. Next we convert each of these decimal integers into binary integers.

$$\begin{aligned} 0 &\rightarrow 00000 \\ 1 &\rightarrow 00001 \\ 2 &\rightarrow 00010 \\ 3 &\rightarrow 00011 \\ &\vdots \\ 25 &\rightarrow 11001 \\ 26 &\rightarrow 11010 \end{aligned}$$

   Note: It is important to make sure that the binary integers have a length of 5, i.e., they are 5-bits long. This will be required during decoding.

4. Now we take the string that we want to encode, and replace each of its characters with the corresponding 5-bits long binary integers.
   For example, the string "abc xyz" gets converted to 00001000100001100000110001100111010.
5. Finally, we convert the binary integer, obtained from the string, into a decimal integer. And thus, we have successfully mapped our string to an integer.
   For example, the binary integer for "abc xyz" gets converted to the decimal integer 1144021818.

2 Problems

1. Implement a function (in any language) that converts a binary integer into a decimal integer.
2. Next, implement a function that does the opposite, i.e., converts a decimal integer into a binary integer. (The binary integer should be 5-bits long.)
3. Now, implement a function that encodes a string to a decimal integer according the algorithm explained above.
4. Finally, implement a function that decodes a decimal integer into a string, again, based on the algorithm explained above.

3 Test Cases

Verify that your program does the following encodings:

1. "skibidi toilet" → 713985243691942719668
2. "crabs eat their own kids" → 1480243134515876156032375410742816 19
3. "i do not wish to get suplexed please leave me alone" → 162911589280260961193177148537135172551216 821097552302603114584134845877610 93

And to conclude, decode the following decimal integer into a string:

106440853898179249156599755342667472518072159656499847144435980817097957614732025396866728584117125841505641632783294606893842227748116690492994223336683716130424058594843566478776113260668001303638081449130661471791966062796258472593068941005911583442888181