

Gorgonea Quarta

It's not necessary to use purely non-negative digits to compose numerals. Indeed, the denizens of the planet Gorgonea Quarta IV, perhaps due to the rather unusual configuration of their "hands" use a number system (the GQ system) in which there are three digits (called *trits*) '0', '1' and '-', having values 0, 1 and -1 respectively. In this number system, each position has a value 3 times that of the position to its right. Thus, the GQ numeral '10-' represents the decimal number 8 (since $8 = 1*9 + 0*3 + -1*1$) and the GQ numeral '-1' represents the decimal number -2 (since $-2 = -1*3 + 1*1$).

You have been given the incomplete static class `GQ_Decimal_Converter`. You need to implement two static methods.

The first method, `toDecimal`, takes a `String` representing a GQ number and returns an `int`, the decimal equivalent.

The second method, `toGQ`, takes an `int` representing the decimal value and returns a `String` representing the GQ equivalent.

Example

```
GQ_Decimal_Converter.toDecimal("101") returns 10
GQ_Decimal_Converter.toDecimal("1-") returns 2
GQ_Decimal_Converter.toDecimal("-101") returns -17
GQ_Decimal_Converter.toDecimal("1---0") returns 42
GQ_Decimal_Converter.toDecimal("111-0-1") returns 1024
```

And conversely

```
GQ_Decimal_Converter.toGQ(10) returns "101"
GQ_Decimal_Converter.toGQ(2) returns "1-"
GQ_Decimal_Converter.toGQ(-17) returns "-101"
GQ_Decimal_Converter.toGQ(42) returns "1---0"
GQ_Decimal_Converter.toGQ(1024) returns "111-0-1"
```

Notes on the problem from previous students

1 2018.edu

GQ

Decimal	Base 3	GQ
-8		-01
-7		-1-
-6		-10
-5		-11
-4		0--
-3	...	0-0
-2		0-1
-1		00-
0	000	000
1	001	001
2	002	01-
3	010	010
4	011	011
5	012	1--
6	020	1-0
7	021	1-1
8	022	10-

Easily understood & codable version of GQ

GQ:

- Basically base 3 except:
- $\cdot x 2 \rightarrow (x+1) -$
- I.E.
- $2 \rightarrow 02 \rightarrow 1 -$
- $5 \rightarrow 012 \rightarrow 02 - \rightarrow 1 - -$
- $\cdot x 3 \rightarrow (x+1) 0$
- I.E.
- $03 \rightarrow 10$
- $013 \rightarrow 020 \rightarrow 1-0$

- If negative:

- convert absolute value to base 3
- Convert to positive GQ
- $1 \rightarrow - ; - \rightarrow 1$
- I.E.
- 8: Base 3 of 8 is 022

Get negative counterpart of 8:

$$\begin{array}{c}
 022 \\
 \downarrow \\
 03- \\
 \downarrow \\
 10- \\
 \downarrow \\
 -01
 \end{array}$$

And Christos added the following comment – do NOT ask me to translate!

TWO STON

(char array of possible { 1 - 0 1 - }
max final size 2, so make char[] 2 size
index variable 2
only argument interval $n = (2 - \text{arg} > 3) < 1$
until arg is 0,
add possible $\text{arg} \% 3 + 2$ to
your result
set num to $(\text{itself} + n) / 3$
return your result as string
faster and easier