

LE1.4.1: Convert Decimal Numbers To Binary

pontos 6 / 6 (sem classificação)

Convert the following decimal numbers to 6 bit 2's complement representation binary numbers. Provide the binary numbers using the format 0bXXXXXX.

15 = 0b ✓ Answer: 1111

-15 = 0b ✓ Answer: 110001

6 = 0b ✓ Answer: 110

-6 = 0b ✓ Answer: 111010

21 = 0b ✓ Answer: 010101

-21 = 0b ✓ Answer: 101011

Explanation

Binary numbers are represented in the same manner as decimal numbers with the least significant bit representing the 2^0 position, the next bit to the left being the 2^1 position, the next 2^2 and so on. So to represent the positive number 15 which is equal to $8 + 4 + 2 + 1 = 2^3 + 2^2 + 2^1 + 2^0 = 0b001111$. There are 1's in the 0, 1, 2, and 3 positions and 0's in

the 4, and 5 positions. Similarly, $6 = 4 + 2 = 2^2 + 2^1 = 0b000110$ indicating that the only positions that are non-zero are the 1 and 2 bits. Finally, $21 = 16 + 4 + 1 = 2^4 + 2^2 + 2^0 = 0b010101$ with 1's in the 0, 2, and 4 positions and 0's elsewhere.

In order to convert these numbers to a negative numbers, the way to do that in binary is to first flip all the bits and then add 1.

So $-15 = 0b110000 + 1 = 0b110001$.

$-6 = 0b111001 + 1 = 0b111010$.

Finally, $-21 = 0b101010 + 1 = 0b101011$.

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i Answers are displayed within the problem

LE1.4.2: Binary, Octal, and Hex Representations

6 pontos possíveis (sem classificação)

Binary representation:

Convert the following integers to 6-bit 2's complement binary numbers. Binary numbers are prefixed with the string `0b` to indicate that you are specifying a binary number.

• $5 = 0b$

• $23 = 0b$

• $-12 = 0b$

Octal and hexadecimal representation:

For the following problems, use 24 bit precision when answering the problems.

Convert the following integers to octal (base 8) representation using octal digits 0, 1, 2, 3, 4, 5, 6, and 7. Octal numbers should be prepended with the string `0` to indicate that you are specifying an octal number.

• $21 = 0$

Convert the following integers to hexadecimal representation. Hexadecimal numbers should be prepended with the string `0x` to indicate that you are specifying a hexadecimal number.

• 73 = 0x

• -7 = 0x

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LE1.4.3: Two's Complement Addition

5 pontos possíveis (sem classificação)

Perform the following addition problems using 6-bit 2's complement arithmetic. Provide your answer using the format **0bXXXXXX** if the problem can be solved using 6 bit 2's complement representation. Otherwise provide the answer "overflow".

0b001101
0b001010

0b

0b001111
0b101110

0b

0b011011
0b111010

0b

0b111010
0b110001

0b

0b011111
0b001100

0b

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Discussion


Ocultar discussão

Topic: 1. Basics of Information / LE1.4

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- 


Misleading info : they say using format 0bXXXXXX

They say you must provide your answer using format 0bXXXXXX, but actually, you get erros if y...

5
- ?


Can someone please explain better how to detect an overflow in binary addition?

Under section LE1.4.3: Two's Complement Addition how is the last question's answer an overflo...

3
- 


Easy to understand video on two's compliment (includes addition and subtraction)

<https://youtu.be/sJXTo3EZoxM>

3
- 


typo

LE1.4.1 Solution text: "Similary" should be "Similarly"

1
- 


Overflow

I get this error message "Overflow" at the Show Answer bit of the last question - and even thou...

5
- 


[typo]

in Solution of 1.4.3, "Ading" should be "Adding"

1
- 


LE 1.4.2 Hex value for -7

The exercise asks for us to "Convert the following integers to hexadecimal representation". Sho...

2
- 

Where should I learn the material needed to solve these problems?

I watched the presentation video and then went on to solve the problems in LE1.4 as supposedl...

4
- 


Prerequisite Course

Comment: A prerequisite class should be required to fully appreciate the knowledge gained her...

6
- ?


Question about the LE1.4.3

LE1.4.3 says that 'Perform the following addition problems using 6-bit 2's complement arithmeti...

2
- 

Negative hex representation

What does F stand for or why do we change is to F?

3
- 

Wrong answers in LE1.4.1

It seems the answers for the 2's complements of 6 and -6 in LE1.4.1 are incorrect.

5

☒ How to know that an overflow occurred on the negative side?

6