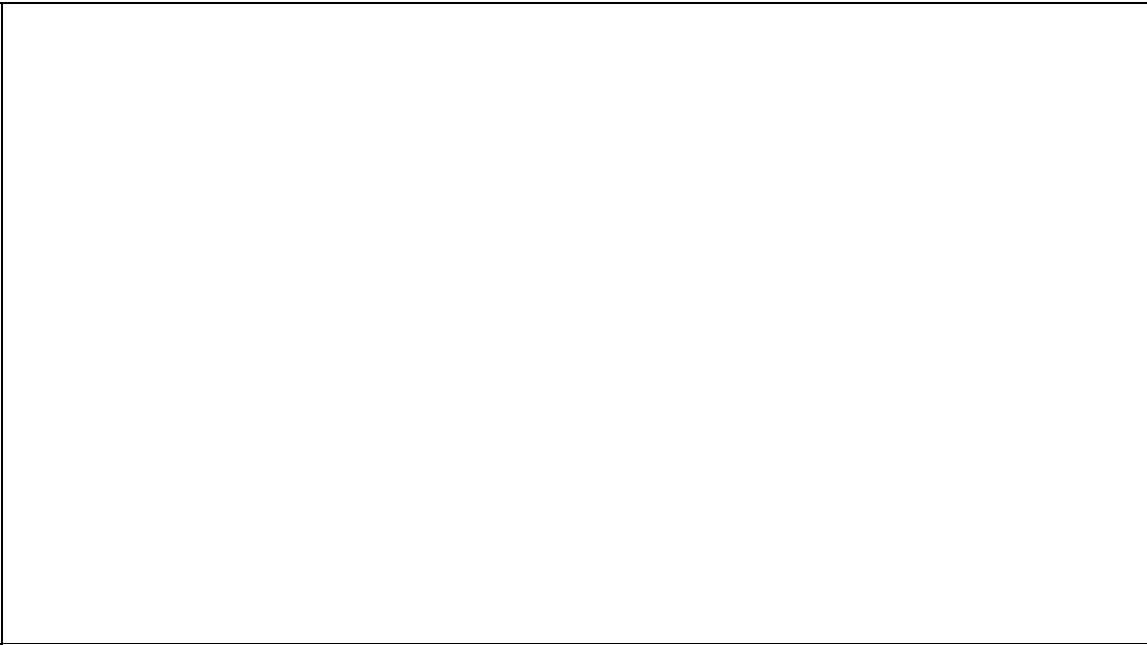


CONVERTING FROM DECIMAL TO BINARY AND BINARY TO DECIMAL

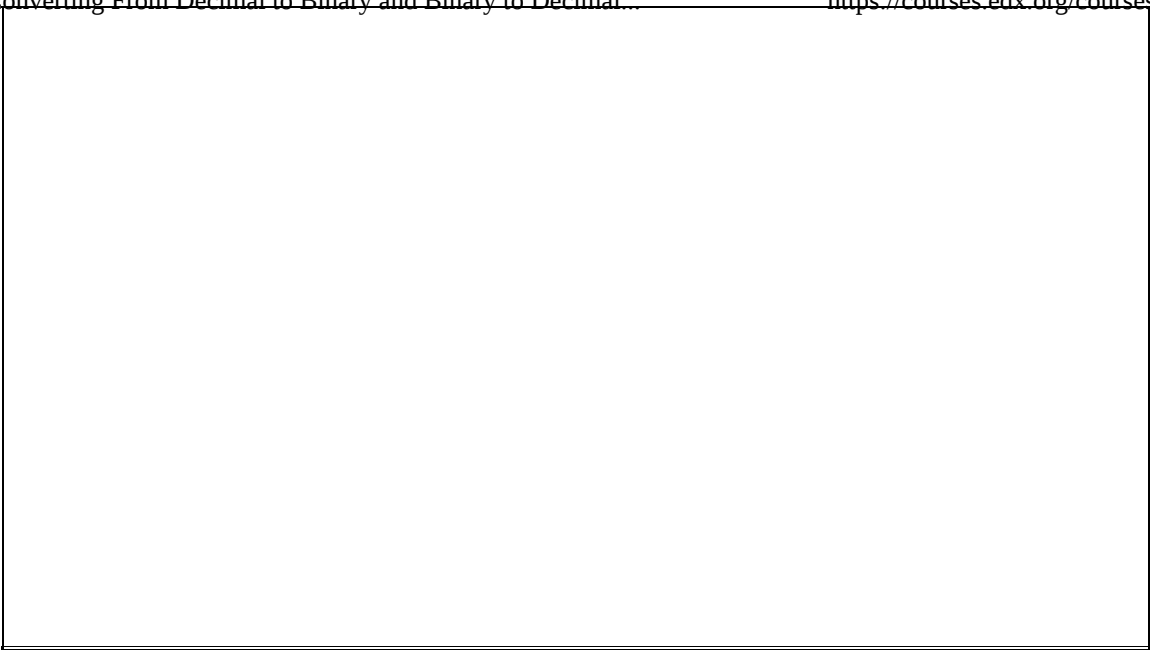


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HEXADECIMAL NOTATION



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Professor Albonesi described how we can write binary (base 2) numbers as hexadecimal (base 16) numbers, using the chart below:

Binary	Hex	Decimal		Binary	Hex	Decimal
0000	0	0		1000	8	8
0001	1	1		1001	9	9
0010	2	2		1010	A	10
0011	3	3		1011	B	11
0100	4	4		1100	C	12
0101	5	5		1101	D	13
0110	6	6		1110	E	14
0111	7	7		1111	F	15

Using this chart, we can now convert binary numbers to hexadecimal numbers. Looking at a string of binary numbers, each group of four numbers becomes a hexadecimal digit. Take the following example:

0011101010001111010011010111

Starting from the right-hand side, group these numbers into blocks of four.

0011	1010	1000	1111	0100	1101	0111
------	------	------	------	------	------	------

Once they are grouped, you can consult the chart above and assign the proper hexadecimal number for each group of 4 binary numbers.

0011	1010	1000	1111	0100	1101	0111
↓	↓	↓	↓	↓	↓	↓
3	A	8	F	4	D	7


Thus, this long string of binary digits can be written in hexadecimal notation as 3A8F4D7.

Remember that this hexadecimal notation is not a new machine representation. It is merely a convenient way to write the number.

Help

1. CHECK YOUR UNDERSTANDING (1/1 point)

What is the two's complement value of the decimal number 137?

- ☐ 10001001
- ☐ 10010001
- ☐ 010010001
- ☒ 010001001 

EXPLANATION

Using first method:

$$137/2 = 68 \text{ r1 bit 0}$$

$$68/2 = 34 \text{ r0 bit 1}$$

$$34/2 = 17 \text{ r0 bit 2}$$

$$17/2 = 8 \text{ r1 bit 3}$$

$$8/2 = 4 \text{ r0 bit 4}$$

$$4/2 = 2 \text{ r0 bit 5}$$

$$2/2 = 1 \text{ r0 bit 6}$$

$$1/2 = 0 \text{ r1 bit 7}$$

Append a 0 to the MSB since it's positive: 010001001

Final Check


Save

Hide Answer

You have used 1 of 2 submissions

2. CHECK YOUR UNDERSTANDING (1/1 point)

What is the two's complement value of the decimal number -67?

- ☐ 01000011
- ☐ 01111101
- ☐ 10111100
- ☒ 10111101 

EXPLANATION

Converting From Decimal to Binary and Binary to Decimal...
Start with positive 67. Using second method:

<https://courses.edx.org/courses/CornellX/ENGRI1210x/1...>

Help

$67 - 64 = 3$ bit 6

$3 - 2 = 1$ bit 1

$1 - 1 = 0$ bit 0

Append a 0 to the MSB since we are using a positive number:

01000011

Convert to two's complement:

10111101

Final Check

Save

Hide Answer

You have used 1 of 2 submissions

3. CHECK YOUR UNDERSTANDING (1/1 point)

Convert the hexadecimal number ABC to unsigned binary.

☐ 010101000011

☒ 101010111100



☐ 101011001101

☐ 110011001011

EXPLANATION

A = 1010, B = 1011, C = 1100

Number is 101010111100.

Final Check

Save

Hide Answer

You have used 1 of 2 submissions

4. CHECK YOUR UNDERSTANDING (1/1 point)

Convert the binary number 0100000001 to hexadecimal.

☒ 101



☐ 200

☐ 201

☐ 204

EXPLANATION

01 0000 0001
1 0 1

Final Check

Save

Hide Answer

You have used 1 of 2 submissions

Help



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