Welcome to "Little Bits to Big Ideas"

Lab 1: Intros and Binary Numbers

TAs: Shivani, Ashish

CAs: Harry, Sherry

ILLINOIS

How Labs Work

Activities

- Interactive exploration
- Pair/small group
- No online resources

Late arrivals (Past 10 minutes)

- Lose 20% of lab points

Submission:

- Check off with staff in lab

Out of time:

- Staff will record your presence
- Check off in office hours during the coming week

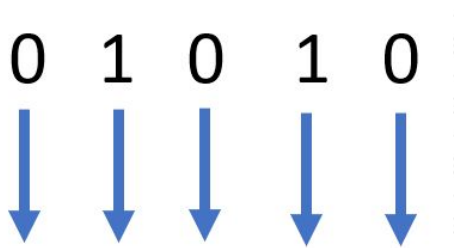
Introduce Yourselves!

- Nickname / Pronouns if you want / Major
- What do you hope to learn in the class?
- What's a time a computer frustrated you?
- Share with your neighbors about what you hope to learn and a time a computer frustrated them

Binary Numbers Recap

Overview:

- The language of computers
- Only 0s and 1s
- Place values: Powers of 2



Objectives for today:

- Convert between hex/binary/decimal

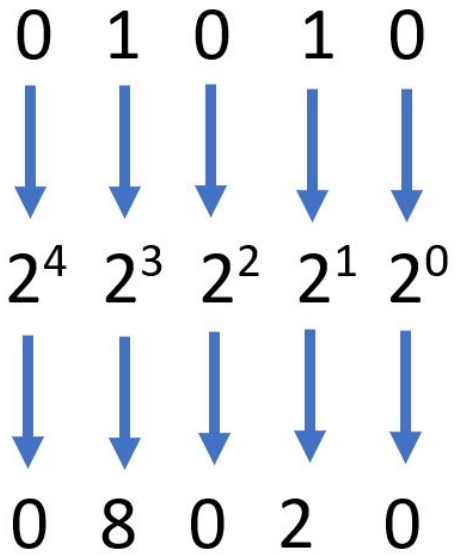
Binary Numbers Recap

(0 x 2^0) + (1 x 2^1) + (0 x 2^2) + (1 x 2^3) + (0 x 2^4)

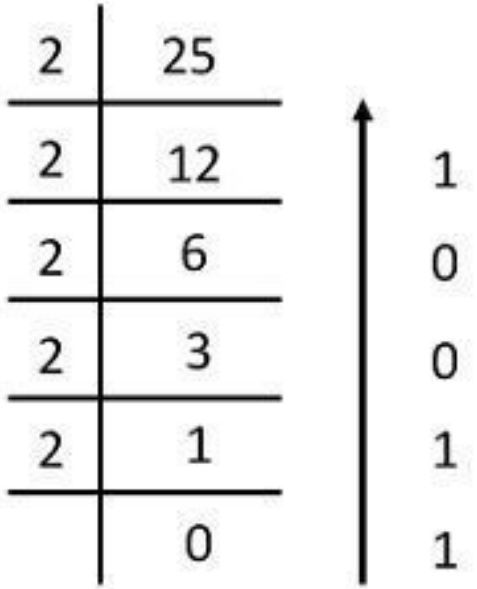
2^3 = 8

2^1 = 2

8 + 2 = 10



Large Decimal to Binary



Answer: Read Up

Max Value Representation

Max Value of a Nibble (4 bits):

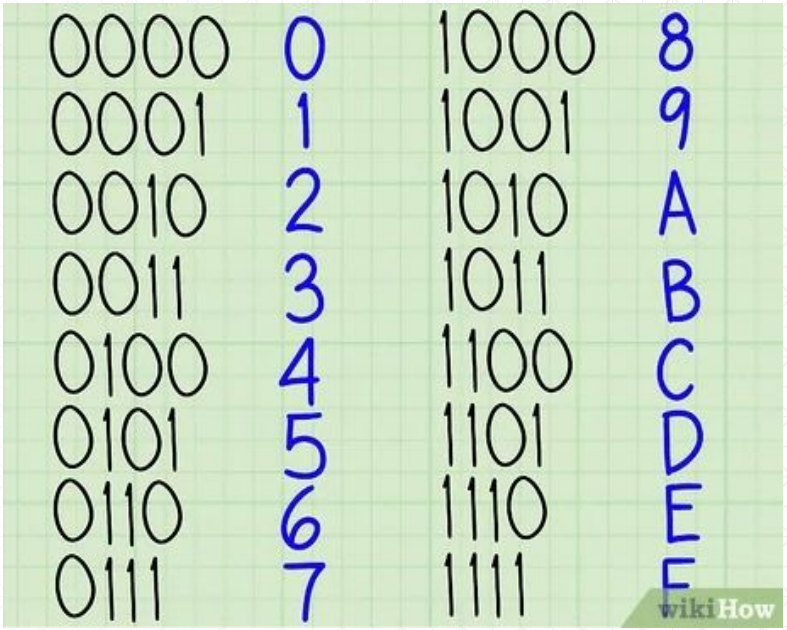
- Each place/bit can have either a 0 or a 1, so 2 possibilities for each bit.
- Since we have 4 places, we have 2 x 2 x 2 x 2 = 2^4 =
- 16 values (ranging 0-15)

Max Value of a Byte? (8 bits)

Hexadecimal Numbers Recap

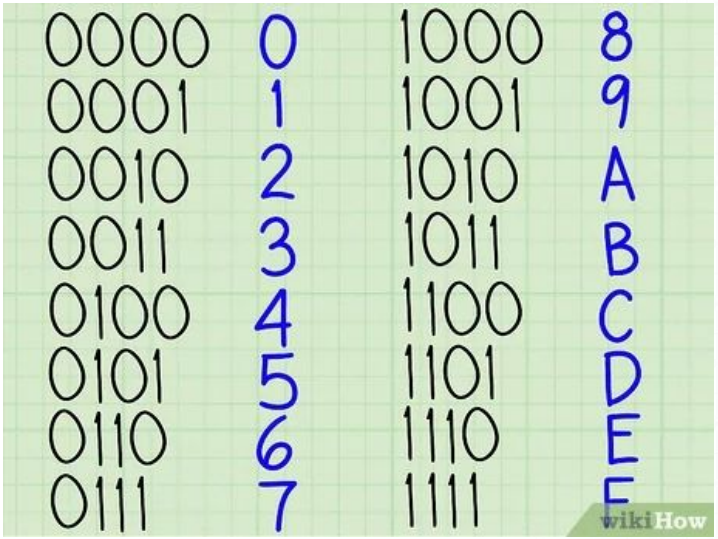
Overview:

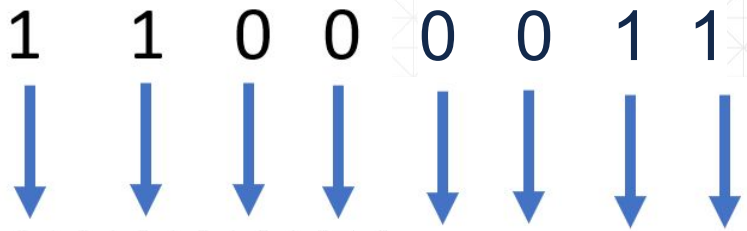
- Compact representation of decimal & binary
- Values 0-9 & a-f
- Place values: Powers of 16



Hexadecimal Numbers Recap

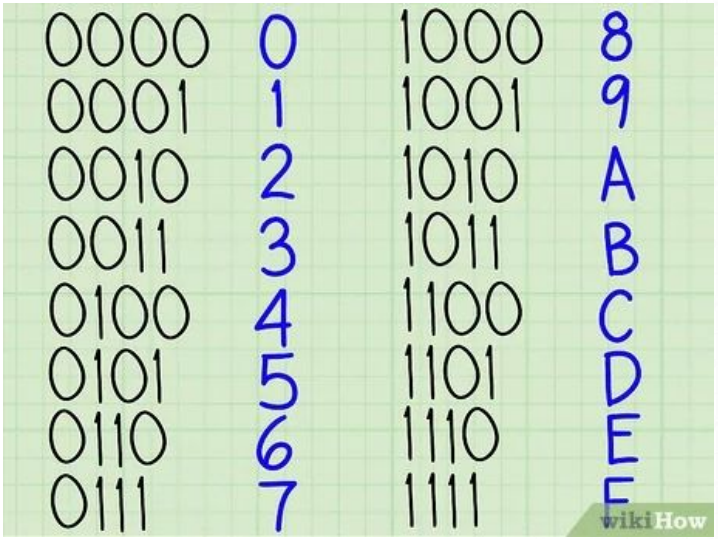
Converting Binary to Hexadecimal

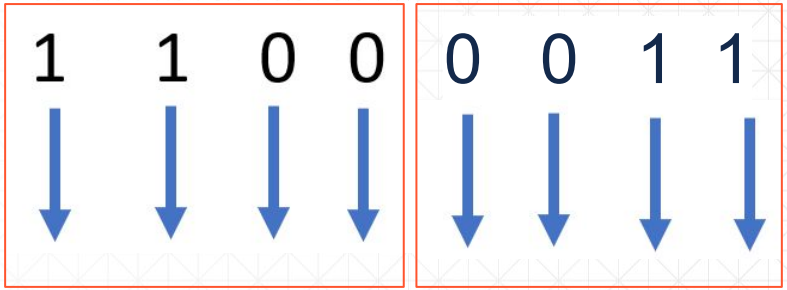




Hexadecimal Numbers Recap

Converting Binary to Hexadecimal

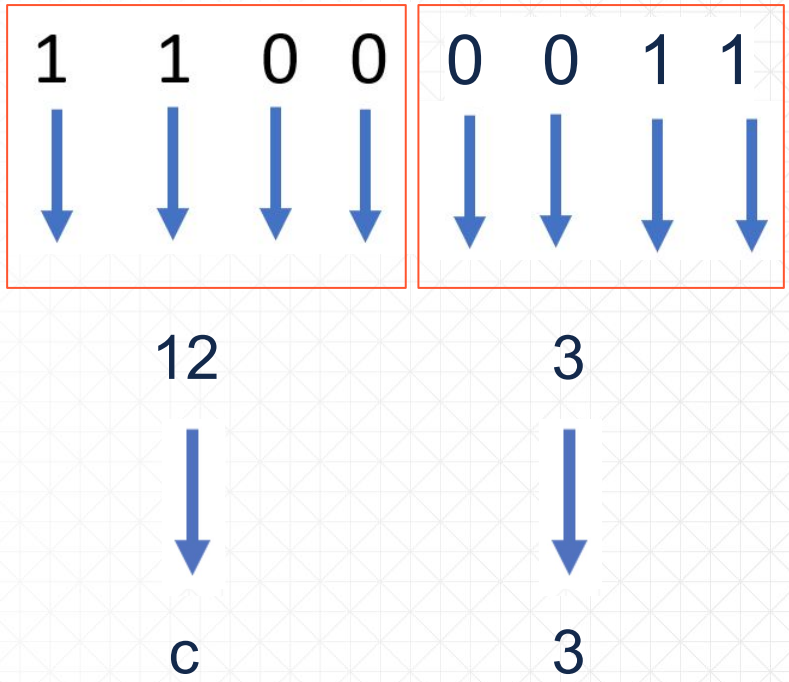




Hexadecimal Numbers Recap

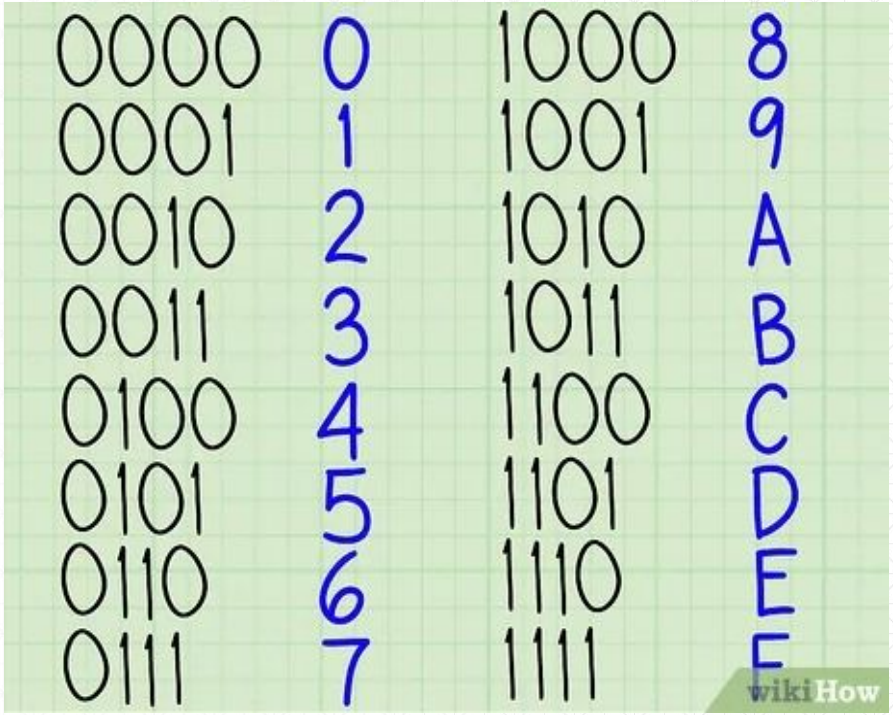
Answer:

- 0xc3



More Hexadecimal

Convert **0xBEEF** to binary



More Hexadecimal

	B	E	E	F
0xBEEF:	1011	1110	1110	1111

Online Answers / AI

Policy:

- Online assistance is not allowed in labs (points will be taken off)
- Ask a TA or CA for help 😀
- You will not have online tools available in exams

Worksheet!

Fun fact :

- 10 in decimal is 1010 in binary