CS 145 Day 15 worksheet – representing values

Part A: binary

1. Write each binary number in decimal. Then check in Thonny, e.g., `int("10110", 2)`

	2^7 = 128	2^6 = 64	2^5 = 32	2^4 = 16	2^3 = 8	2^2 = 4	2^1 = 2	2^0 = 1
a. 10110								
b. 111000								
c. 1000001								

a. `10110` = _____

b. `111000` = _____

c. `1000001` = _____

2. Write each decimal number in binary. Then check in Thonny, e.g., `bin(37)`

	2^7 = 128	2^6 = 64	2^5 = 32	2^4 = 16	2^3 = 8	2^2 = 4	2^1 = 2	2^0 = 1
a. 37								
b. 100								

a. 37 = _____

b. 100 = _____

3. Add in binary. Write each carry in the top row. Then check in Thonny, e.g., `bin(0b1101 + 0b0111)`

	Binary					**Check in decimal**
carries						
		1	**1**	**0**	**1**	**=** _____
	+	**0**	**1**	**1**	**1**	**=** _____
sum						**=** _____

Part B: hexadecimal

4. Write each hex number in decimal.
   Then check in Thonny, e.g., `int("1F", 16)`

   a. `1F` = _____

   b. `C8` = _____

5. Convert between binary and hex, four bits at a time.
   Then check in Thonny, e.g., `hex(0b10110110)` or `bin(0x7E)`

   a. `10110110` in hex = _____

   b. `7E` in binary = _____

6. Colors.
   Then check in Thonny, e.g., `int("A5", 16)` or `hex(128)`

   a. `#FFA500` as a (red, green, blue) tuple

   (_____ , _____ , _____)

   b. `(0, 128, 128)` as a hex color code

   # _____

Dec	Binary	Hex	× 16
0	0000	**0**	0
1	0001	**1**	16
2	0010	**2**	32
3	0011	**3**	48
4	0100	**4**	64
5	0101	**5**	80
6	0110	**6**	96
7	0111	**7**	112
8	1000	**8**	128
9	1001	**9**	144
10	1010	**A**	160
11	1011	**B**	176
12	1100	**C**	192
13	1101	**D**	208
14	1110	**E**	224
15	1111	**F**	240