

Number base conversion and binary² arithmetic

Please try to do these problems yourself. Make note of what you don't understand how to do.

* This form will record your name, please fill your name.

Pituchai Mitpaladee

$$\begin{array}{r} 2 \overline{) 201} \quad 1 \\ 2 \overline{) 100} \quad 0 \\ 2 \overline{) 50} \quad 0 \\ 2 \overline{) 25} \quad 1 \\ 2 \overline{) 12} \quad 0 \\ 2 \overline{) 6} \quad 0 \\ 2 \overline{) 3} \quad 1 \\ 1 \end{array}$$

1. Convert 201 base10 to 8-bit binary
(1 Point)

11001001

2. Convert 201 base10 to base 3 using the division method (5-digit answer ddddd)
(1 Point)

$$\begin{array}{r} 3 \overline{) 201} \quad 2 \\ 3 \overline{) 64} \quad 1 \\ 3 \overline{) 22} \quad 1 \\ 3 \overline{) 7} \quad 1 \\ 2 \end{array}$$

21110

3. Convert 11 1110 0111 binary to hexadecimal
(1 Point)

3E7

$$\begin{array}{l} 0111 = 7 \\ 1110 = E \\ 11 = 3 \end{array} \left. \vphantom{\begin{array}{l} 0111 \\ 1110 \\ 11 \end{array}} \right\} 3E7$$

4. Convert C0FE base16 to binary (answer with space between 4 digits: dddd dddd dddd dddd)

(1 Point)

1100 0000 1111 1110

Handwritten conversion table for hexadecimal to binary:

A = 10	1110
B = 11	1011
C = 12	1100
D = 13	1101
E = 14	1110
F = 15	1111

Handwritten conversion of C0FE to binary:

C = 1100, 0 = 0000, F = 1111, E = 1110

Final binary result: 1100 0000 1111 1110

5. Compute 1011 0101 + 0101 1011 in regular binary (not sign-magnitude). Write your answer in 8-bit binary.

(1 Point)

1 0001 0000

Handwritten addition:

```

  1011 0101
+ 0101 1011
-----
 10001 0000
  
```

6. Is there overflow in the previous question?

(1 Point)

☒ Yes

☐ No

Handwritten subtraction:

```

  0010 1101
- 0001 0111
-----
 0100 0100
  
```

7. Compute 0010 1101 - 0001 0111 (regular binary) Write your answer in 8-bit binary.

(1 Point)

010110

Handwritten conversion of 105 to binary:

```

  2 | 105 | 1
    | 52  | 0
    | 26  | 0
    | 13  | 1
    | 6   | 0
    | 3   | 1
    | 1   | 1
  
```

8. Convert 105 base10 to 8-bit binary representation

(1 Point)

1001011

9. Convert -105 base10 to 8-bit signed magnitude representation
(1 Point)

-1101001

10. Convert -105 base10 to 8-bit 2's complement representation
(1 Point)

110101

2	105	1	1001011	
2	52	0	0110100	1's
2	26	0		
2	13	1	110101	2's
2	6	0		
2	3	1		
	1	1		

$$105 - 7 = 98$$

11. Convert 105 base10 to excess-M representation, (use the lowest possible M)
(1 Point)

lowest = -7?

110011

12. What areas do you think you need more practice on?
(1 Point)

- ☐ base conversion
- ☐ binary arithmetic
- ☒ 2's complement representation
- ☒ excess-M representation
- ☒ signed-magnitude representation

2	98	0
2	49	1
2	24	1
2	12	0
2	6	0
2	3	1
	1	1

