

Quiz 1 Solutions

CE80n Fall 2014

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9 October, 2014

1. (4 points) Fill in the missing values in this table. Recall that Decimal numbers are just plain old every day base-10 numbers, and Binary numbers are base-2 numbers containing only 0's and 1's.

Decimal	8-bit Binary
153	10011001
208	11010000
47	00101111
96	01100000

10011001 to Decimal

$$2^0 + 2^3 + 2^4 + 2^7$$

$$1 + 8 + 16 + 128$$

$$153$$

11010000 to Decimal

$$2^4 + 2^6 + 2^7$$

$$16 + 64 + 128$$

$$208$$

47 to Binary

$$2 \overline{)47} \quad r = 1$$

$$23 \quad r = 1$$

$$11 \quad r = 1$$

$$5 \quad r = 1$$

$$2 \quad r = 0$$

$$1 \quad r = 1$$

$$0 \quad r = 0$$

Reading from bottom to top: 0101111. And we insert an extra 0 in front to make it 8 bits, giving us: 00101111.

96 to Binary

2)96 r = 0
 48 r = 0
 24 r = 0
 12 r = 0
 6 r = 0
 3 r = 1
 1 r = 1
 0 r = 0

Reading from bottom to top: 01100000.

2. (4 points) Fill in the missing values in this table. Recall that Hexadecimal Numbers are base-16 numbers that include A through P as digits.

2-digit Hexadecimal	8-bit Binary
21	00100001
4F	01001111
C3	11000011
1F	00011111

00100001 to Hexadecimal

Separate the 8 bits into two four bit numbers, 0010 0001. Then refer to Table 1 on the last page and convert to Hexadecimal. So 0010 → 2, 0001 → 1, therefore 00100001 → 21.

01001111 to Hexadecimal

Same as above, 0100 → 4, 1111 → F, therefore 01001111 → 4F.

C3 to Binary

Separate each hex and use Table 1 to convert to Binary. So, C → 1100, 3 → 0011, therefore C3 → 11000011.

1F to Binary

Same as above, 1 → 0001, F → 1111, therefore 1F → 00011111.

3. (2 points) Given the 4-bit mask of 0111, mask the following 4-bit numbers (perform bitwise AND):

1111	0011	1010	1100
0111	0011	0010	0100

1111 AND 0111

0 AND anything else will always be 0, only 1 AND 1 will be 1, so only if there is a 1 in the same position as the number and the mask will a 1 come through.

1111
 & 0111
 0111

0011 AND 0111

See above description.

0011

& 0111

0011

1010 AND 0111

See above description.

1010

& 0111

0010

1100 AND 0111

See above description.

1100

& 0111

0100

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

Table 1: Binary, Decimal, Hexadecimal Chart