

Quiz 1b 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 ever day base-10 numbers, and Binary numbers are base-2 numbers containing only 0's and 1's.

Decimal	8-bit Binary
154	10011010
209	11010001
46	00101110
97	01100001

10011010 to Decimal

$$2^1 + 2^3 + 2^4 + 2^7$$

$$2 + 8 + 16 + 128$$

$$154$$

11010001 to Decimal

$$2^1 + 2^4 + 2^6 + 2^7$$

$$1 + 16 + 64 + 128$$

$$209$$

46 to Binary

$$\begin{array}{rcl} 2 & \overline{)46} & r = 0 \\ & 23 & r = 1 \\ & 11 & r = 1 \\ & 5 & r = 1 \\ & 2 & r = 0 \\ & 1 & r = 1 \\ & 0 & r = 0 \end{array}$$

Reading from bottom to top: 0101110. And we insert an extra 0 in front to make it 8 bits, giving us: 00101110.

97 to Binary

2)97 r = 1
 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: 01100001.

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
B2	10110010
2E	00101110

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.

B2 to Binary

Separate each hex and use Table 1 to convert to Binary. So, B → 1011, 2 → 0010, therefore B2 → 10110010.

2E to Binary

Same as above, 2 → 0010, E → 1110, therefore 1F → 00101110.

3. (2 points) Given the 4-bit mask of 1110, mask the following 4-bit numbers (perform bitwise AND):

1111	0011	1010	1100
1110	0010	1010	1100

1111 AND 1110

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
 & 1110
 1110

0011 AND 1110

See above description.

0011

& 1110

0010

1010 AND 1110

See above description.

1010

& 1110

1010

1100 AND 1110

See above description.

1100

& 1110

1100

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