



IN1006 Systems Architecture (PRD1 A 2022/23)

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Grade	10.00 out of 10.00 (100 %)
Time taken	5 mins 23 secs
Completed on	Thursday, 10 November 2022, 4:05 PM
State	Finished
Started on	Thursday, 10 November 2022, 4:00 PM

Question **1**

Correct

Mark 1.00 out of 1.00

What are the binary and decimal representations of the hexadecimal number F4?

Select one:

- a. Binary: 11110100 Decimal: 244
- o b. Binary: 11110010 Decimal: 244
- oc. Binary: 11100100 Decimal: 244
- Od. Binary: 11110100 Decimal: 240
- e. Don't know/No answer

To convert from base 16, we remember that ${\sf F4}_h$ means

F x 16^1 + 4 x 16^0

15 x 16 + 4 x 1

240 + 4

24410

The correct answer is: Binary: 11110100 Decimal: 244



Which of the following binary numbers corresponds to the result of the following subtraction of hexadecimal numbers (hint: transform the hexadecimal numbers to binary and perform subtraction as addition of the 2's complement the number to be subtracted):

AEhex - 9Fhex

a. 0101 0101

b. 0110 0100

oc. 0000 1111

This is the correct answer.

d. 0000 0001

e. 0000 0101

Your answer is correct.

The binary form of AE_{hex} is: 1010 1110

The binary form of 9F_{hex} is: 1001 1111

Subtracting 9F from AE can be carried out by auditing the 2's complement of 9F_{hex} to AE_{hex}.

To find the complement of $9F_{hex}$ we first flip the bits of its binary representation. This gives us: 0110 0000 (flip bits)

And then we add 1, so we get:

0110 0000

+ 1

This gives us:

0110 0001 (i.e., the 2's complement of 9F_{hex})

Then we perform the addition:

10101110 AE_{hex}

 $0\,1\,1\,0\,0\,0\,0\,1\,$ (addition of 2's complement of $9F_{hex}$)

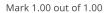
The result of this addition is

0000 1111

and as the left most bit is 0 the number is a positive one and therefore it constitutes the answer.

The correct answer is:

0000 1111





What is the correct result of the operation below? The initial numbers should be considered as unsigned integers. The result should be given in 2's complement. (Hint: use 2's complement arithmetic to perform the operation.)

00001111 - 00010101

Select one:

- a. 00000110
- b. 11111010
- o. 11101011
- d. Don't know/no answer
- e. 00000101
- of. 11101010

To perform the subtraction we find the negative of the subtrahend:

00010101 (subtrahend)

11101010 (1's complement, flip one bit)

00000001 (add 1)

11101011 (2's complement of the subtrahend)

perform the addition:

00001111

<u>11101011 +</u>

11111010 (this is the result in 2's complement or -6 in decimal

The correct answer is: 11111010



In performing a bit-wise addition of the following unsigned binary no	umbers, how many "carry out" bits will be generated?
10001011	
01110001	
a. 2 "carried out" bits will be produced.	Correct. The two carry out bits will be produced when adding two right most pairs of bits of the given numbers.
b. 0 "carried out" bits will be produced.	
c. 4 "carried out" bits will be produced.	
d. 1 "carried out" bits will be produced.	
e. 3 "carried out" bits will be produced.	
· · · · · · · · · · · · · · · · · · ·	
Your answer is correct.	
The correct answer is:	
2 "carried out" bits will be produced.	
Question 5	
Correct Mark 1.00 out of 1.00	
Wark 1.00 Out Of 1.00	
Which of the following numbers is the binary number representing 7	5 in the decimal system (select one answer)?
	(
a. 00011111	
b. 00001111	Correct.
o. 0000000	
Od. 11001111	
 e. None of the rest of the choices 	
Your answer is correct.	
The correct answer is: 0 0 0 0 1 1 1 1	

1





What is the correct hexadecimal representation for the binary number 01011101? All answers below are given in hexadecimal representation and we omit the (h) subscript.

Select one:

- a. D5
- b. 5C
- c. 5D
- Od. 5E
- e. Don't know/no answer
- f. 4D

The most straightforward approach is to consider the binary word four bits at a time as shown in the table.

Binary	0101	1101
Hexadecimal	5	D

The correct answer is: 5D

Question **7**

Correct

Mark 1.00 out of 1.00

In performing a bit-wise addition of the following unsigned binary numbers, how many "carry out" bits will be generated?

01001011

00101001

- a. 5 "carried out" bits will be produced.
- b. 3 "carried out" bits will be produced.
- Correct. The three carry out bits will be produced when adding first, second and fourth pairs of bits of the given numbers from the right.
- oc. 0 "carried out" bits will be produced.
- od. 1 "carried out" bits will be produced.
- e. 4 "carried out" bits will be produced.

Your answer is correct.

The correct answer is:

3 "carried out" bits will be produced.





What is the numeric range of an 4-bit signed magnitude binary number?

Select one:

- a. 0...255
- o b. 0...7
- c. -255...256
- od. -127...127
- e. -128 ... 127
- f. None of the listed options.

Your answer is correct.

The correct answer is: None of the listed options.

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