IN1006 Systems Architecture (PRD1 A 2022/23)

Started on	Thursday, 10 November 2022, 4:39 PM
State	Finished
Completed on	Thursday, 10 November 2022, 4:46 PM
Time taken	6 mins 46 secs
Grade	**8.90** out of 10.00 (**89**%)

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: 11100100 Decimal: 244
- b. Don't know/No answer
- c. Binary: 11110100 Decimal: 240
- d. Binary: 11110010 Decimal: 244
- e. Binary: 11110100 Decimal: 244 ✔

Your answer is correct.

To convert from base 16, we remember that $F4_h$ means

F x 16^1 + 4 x 16^0

15 x 16 + 4 x 1

240 + 4

244_{10}

The correct answer is: Binary: 11110100 Decimal: 244

Question **2**

Incorrect

Mark -0.10 out of 1.00

What is the numeric range of an 8-bit signed magnitude binary number?

Select one:

- a. -255...256
- b. 0...7
- c. -128 ... 127 ✖ This is wrong
- d. -127...127
- e. Don't know/no answer
- f. 0...255

We represent the negative values in the range -127 through -1 and the positive values in the range 0 through 127 with a single 8-bit byte.

The correct answer is: -127...127

Question **3**

Correct

Mark 3.00 out of 3.00

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):

AE_{hex} - $9F_{hex}$

- a. 0101 0101
- b. 0000 0001
- c. 0110 0100
- d. 0000 0101
- e. 0000 1111 ✔ This is the correct answer.

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:

1 0 1 0 1 1 1 0 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

Question **4**

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?

1 0 0 0 1 0 1 1

0 1 1 1 0 0 0 1

- a. 3 "carried out" bits will be produced.
- b. 1 "carried out" bits will be produced.
- c. 0 "carried out" bits will be produced.
- d. 4 "carried out" bits will be produced.
- e. 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.

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

What is the correct hexadecimal representation for the binary number 11110110? You do not need to give the subscript (h). All possible answers below are in hexadecimal representation.

Select one:

- a. 87
- b. F1
- c. F6 ✔
- d. D6
- e. E6
- f. Don't know/no answer

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

Binary	1111	0110
Hexadecimal	F	6

The correct answer is: F6

Question **6**

Correct

Mark 1.00 out of 1.00

What is the equivalent decimal number of the binary number 10000001 which is written in signed magnitude?

Select one:

- a. Don't know/no answer
- b. -1 ✔
- c. 1
- d. -127
- e. 129
- f. -128

The MSB is "1" so this is a negative number.

The next 7 bits correspond to the magnitude: 1

So, -1

The correct answer is: -1

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?

0 1 0 0 1 0 1 1

0 0 1 0 1 0 0 1

- a. 0 "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.
- c. 4 "carried out" bits will be produced.
- d. 5 "carried out" bits will be produced.
- e. 1 "carried out" bits will be produced.

Your answer is correct.

The correct answer is:
3 "carried out" bits will be produced.

Question **8**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. Binary: 11100100 Decimal: 244
- b. Binary: 11110010 Decimal: 244
- c. Don't know/No answer
- d. Binary: 11110100 Decimal: 240
- e. Binary: 11110100 Decimal: 244 ✔

To convert from base 16, we remember that $F4_h$ means

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244_{10}

The correct answer is: Binary: 11110100 Decimal: 244

◄ Quiz 1 _ Weekly Assessed Quiz 2022

Jump to...

Quiz 3 _ Weekly Assessed Quiz 2022 ►

Quiz navigation

1 2 3 4 5 6 7 8

Show one page at a time

Finish review