IN1006 Systems Architecture (PRD1 A 2022/23)

Started on	Thursday, 10 November 2022, 4:30 PM
State	Finished
Completed on	Thursday, 10 November 2022, 4:43 PM
Time taken	12 mins 56 secs
Grade	**10.00** out of 10.00 (**100**%)

Question **1**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. 0 ... 255 ✔
- b. Don't know/no answer
- c. -127 ... 127
- d. 0...128
- e. -128 ... 127
- f. 0...7

We represent the values in the range 0 through 255 with an unsigned 8-bit byte.

The correct answer is: 0 ... 255

Question **2**

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

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 **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} - 94_{hex}

- a. 0001 1010 ✔ This is the correct answer.
- b. 0011 1010
- c. 0110 0100
- d. 0100 1010
- e. 0000 0101

Your answer is correct.

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

The binary form of 94_{hex} is: 1001 0100

Subtracting 94_{hex} from AE_{hex} can be carried out by additing the 2's complement of 94_{hex} to AE_{hex}.

To find the complement of 94_{hex} we first flip the bits of its binary representation. This gives us: 0110 1011 (flip bits)

And then we add 1, so we get:

0110 1011

\+ 1

This gives us:

0110 1100 (i.e., the 2's complement of 94_{hex})

Then we perform the addition:

1 0 1 0 1 1 1 0 AE_{hex}

0 1 1 0 1 1 0 0 (addition of 2's complement of 94_{hex})

The result of this addition is

0001 1010

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

The correct answer is:
0001 1010

Question **4**

Correct

Mark 1.00 out of 1.00

Which of the following numbers is the octal number representing number 42 in the decimal system (select one answer)?

- a. 44
- b. 40
- c. 52 ✔ Correct.
- d. 39
- e. 56

Your answer is correct.

The correct answer is:
52

Question **5**

Correct

Mark 1.00 out of 1.00

What is the numeric range of an 8-bit binary number in 2's complement arithmetic?

Select one:

- a. 0...7
- b. Don't know/no answer
- c. -127 ... 127
- d. 0...255
- e. -128 ...127 ✔
- f. -128 ... 128

We represent the negative values in the range -128 through -1 and the positive values in the range 0 through 127 with a single 8-bit byte, so -128 ... 127.

The correct answer is: -128 ...127

Question **6**

Correct

Mark 1.00 out of 1.00

Which of the following 8-bit binary numbers represents number 77 in the decimal system (select one answer)?

a. 1 1 0 0 1 1 0 1

b. None of the rest of the choices

c. 1 1 1 0 1 0 1 0

d. 0 1 0 0 1 1 0 1

✔ Correct answer.

e. 0 1 1 0 1 1 0 0

Your answer is correct.

The correct answer is:

0 1 0 0 1 1 0 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?

1 0 0 0 1 0 1 1

0 1 1 1 0 0 0 1

a. 0 "carried out" bits will be produced.

b. 4 "carried out" bits will be produced.

c. 1 "carried out" bits will be produced.

d. 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.

e. 3 "carried out" bits will be produced.

Your answer is correct.

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