IN1006 Systems Architecture (PRD1 A 2022/23)

Started on	Thursday, 1 December 2022, 3:24 PM
State	Finished
Completed on	Thursday, 1 December 2022, 3:31 PM
Time taken	6 mins 34 secs
Grade	**10.00** out of 10.00 (**100**%)

Question **1**

Correct

Mark 1.00 out of 1.00

What is the effect of a bitwise-NAND operation on the following two 12-bit words: 1000 1010 1101, 0110 1110 0101 ?

Select one:

- a. 1110 0100 1000
- b. 0001 0001 0010
- c. 1111 0101 1010 ✔
- d. 1110 1110 1101
- e. Don't know/no answer
- f. 0000 1100 0101

Your answer is correct.

The NAND operation is applied to each of the pairs of bits at the same position in each word, moving from left to right.

The correct answer is: 1111 0101 1010

Question **2**

Correct

Mark 1.00 out of 1.00

Consider the following MARIE code. What does this code do?

```
If,     Load X
        Subt Y
        Skipcond 400
        Jump Else
Then,   Load X
        Add X
        Output
        Jump Endif
Else,   Load Y
        Subt X
        Store Y
Endif,  Halt
X,      Dec 10
Y,      Dec 5
```

Select one:

- a. It will compute and store the decimal value 5.
- b. It will compute the decimal value -5, store it in Y and terminate. ✔
- c. It will store the hexadecimal value -5 in the memory address X and terminate.
- d. It will output the hexadecimal value -5 and terminate.
- e. It will store the octal value 5 and terminate.

This program executes an "If, then, else" statement using the Skipcond instruction. In this case, the condition in Skipcond is 01. So, PC will become PC+1 if AC=0 and the "Then" part of the code will be executed. If AC <> 0 then the "Else" part of the code will be executed. After the execution of the first two statements, AC will be 5, so the "Else" part of the code will be executed. So the program will compute Y-X=-5, store this value in Y and terminate.

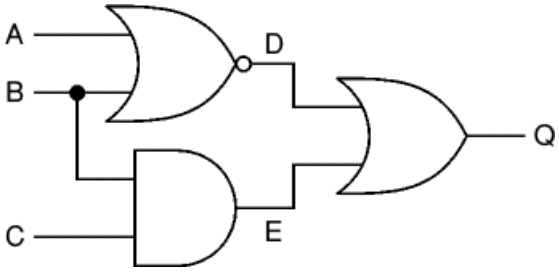
The correct answer is: It will compute the decimal value -5, store it in Y and terminate.

Question **3**

Correct

Mark 1.00 out of 1.00

Given the logic circuit and table below (with output Q), which line of the table does ***not*** correspond to the behaviour of the logic circuit?



Row	A	B	C	Q
1	0	0	0	1
2	0	0	1	1
3	0	1	0	1
4	0	1	1	1
5	1	0	0	0
6	1	0	1	0
7	1	1	0	0
8	1	1	1	1

Select one:

- a. Row 7
- b. All rows are correct
- c. Row 2
- d. Row 3 ✔
- e. Row 8
- f. Row 6
- g. Don't know/no answer
- h. Row 4
- i. Row 5
- j. Row 1

Row 3 is in error as the output of the NOR-gate (D) and AND-gate (E) are zero, leading to an output of the OR-gate (Q) of zero.

The correct answer is: Row 3

Question **4**

Correct

Mark 1.00 out of 1.00

Consider the MARIE instructions Skipcond and Clear. Which of the following CPU registers are not used in the execution of any these instructions?

Select one:

- a. InReg, OutReg
- b. MAR, MBR, InReg, OutReg and PC
- c. MAR, MBR, InReg, OutReg ✔
- d. Don't know/No answer
- e. MAR and MBR

The execution of the instruction Skipcond uses only the registers AC and PC. The execution of the instruction Clear uses only the register AC.

The correct answer is: MAR, MBR, InReg, OutReg

Question **5**

Correct

Mark 1.00 out of 1.00

What is the difference when executing instructions `ADD x` and `ADDI x` ?

Select one:

- a. ADD x loads the value of PC to the AC; ADDI loads the value found at x to the MBR and adds the value of MBR to the AC
- b. ADD x loads the value at address x to the AC; ADDI x loads the value x to the AC
- c. ADD x adds the value at address x to the AC; ADDI x adds the value found in the location addressed by the value in location x to the AC ✔
- d. There is no difference between the two instructions if x is the current value of MBR
- e. ADD x loads the value of MBR to AC; ADDI x adds the value of IR to AC.

ADD x adds the value of the memory word with address x to the AC, whereas ADDI x adds the value of the memory word whose address is the value of the memory word with address x to the AC.

The correct answer is: ADD x adds the value at address x to the AC; ADDI x adds the value found in the location addressed by the value in location x to the AC

Question **6**

Correct

Mark 1.00 out of 1.00

What is the effect of a bitwise-XOR operation on the following 12-bit words: 1000 1010 1101, 0110 1110 0101?

Select one:

- a. Don't know/no answer
- b. 1111 0011 1010
- c. 0001 0001 0010
- d. 0000 1100 0101
- e. 1110 1110 1101
- f. 1110 0100 1000 ✔

The XOR operation is applied to each of the pairs of bits at the same position in each word, moving from left to right.

The correct answer is: 1110 0100 1000

Question **7**

Correct

Mark 1.00 out of 1.00

Does the following sequence of microoperations or any subsequence of it correspond to any MARIE instruction and if so which?

$$MAR \leftarrow Y$$
$$MBR \leftarrow M[MAR]$$
$$MAR \leftarrow MBR$$
$$MBR \leftarrow M[MAR]$$
$$AC \leftarrow AC + MBR$$

Select one:

- a. ADD AC+Y
- b. ADDI Y ✔
- c. LOADI Y+Y
- d. There is no MARIE instruction that corresponds to the above sequence of micro operations or a subsequence of it.
- e. LOADI Y

The first microoperation assigns Y to MAR. The next 3 microoperations load the value of the memory word whose address is the value of the memory word with address Y to MBR. And the final microoperation adds the value of MBR to AC. Hence given microoperations correspond to the MARIE instruction ADDI Y.

The correct answer is: ADDI Y

Question **8**

Correct

Mark 1.00 out of 1.00

Which MARIE instruction is being carried out by the microoperations that follow?

$MAR \leftarrow X$
$MBR \leftarrow M[MAR]$
$AC \leftarrow AC + MBR$

Select one:

- a. Store X
- b. Add X ✔
- c. Jump X
- d. Load X
- e. Don't know/No answer

The correct answer is: Add X

Question **9**

Correct

Mark 1.00 out of 1.00

Which of the following statements is *the most accurate* description for the sum-of-products expression below?

F = A'BC + ABC' + AB'C'

Select one:

- a. Don't know/no answer.
- b. The truth table has three rows where F = 1 and B must be one to return one.
- c. The truth table has three rows where F = 1 and at least one zero must be in the inputs to return one. ✔
- d. The truth table has four rows where F = 1 and no zeros need to be in the inputs to return one.
- e. The truth table has three rows where F = 1 and no zeros need to be in the inputs to return one.
- f. The truth table has two rows where F = 1 and no zeros need to be in the inputs to return one.

Your answer is correct.

The number of OR-ed terms above specifies the number of input cases that lead to a true expression (rows of truth table that give F = 1). Each of the inverted variables shows where the input needs to be zero for that input case.

The correct answer is: The truth table has three rows where F = 1 and at least one zero must be in the inputs to return one.

Question **10**

Correct

Mark 1.00 out of 1.00

What is the effect of a bitwise-NAND operation on the following two 12-bit words: 1000 1010 1101, 0110 1110 0101 ?

Select one:

- a. 1110 0100 1000
- b. 1110 1110 1101
- c. 1111 0101 1010 ✔
- d. 0000 1100 0101
- e. Don't know/no answer
- f. 0001 0001 0010

The NAND operation is applied to each of the pairs of bits at the same position in each word, moving from left to right.

The correct answer is: 1111 0101 1010

◄ Quiz 4 _ Weekly Assessed Quiz 2022

Jump to...

Quiz 6 _ Weekly Assessed Quiz 2022 ►

Quiz navigation

1 2 3 4 5 6 7 8 9 10

Show one page at a time

Finish review