

Which of these expressions can bring to an overflow? Select all that apply.

$a + b$, with $a > 0$ and $b > 0$

$a + b$, with $a > 0$ and $b > 0$

$a + b$, with $a < 0$ and $b > 0$

$a - b$, with $a < 0$ and $b < 0$

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Question 21 pts

If you have this code:

```
add $a1, $t1, $zero  
addi $a2, $t2, 1
```

jal Procedure

```
addi $t1, $v0, 1
```

Which instruction will be in the \$ra register after the jal instruction is executed?

addi \$a2, \$t2, 1

add \$a1, \$t1, \$zero

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jal Procedure

addi \$t1, \$v0, 1

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Question 31 pts

Imagine that you have a branch instruction with an offset equal to $10_{10}(0000000000001010_2)$, and the PC contains the address 30000_{10}

If the branch is taken, which will be the new address stored in the PC?
30040

30024

30044

30014

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Question 41 pts

Which of these instructions could cause a Data Hazard? Select all that apply.

Remember: The instructions are intended "stand alone"; it's not a sequence of instructions from the same program.

sub

lw

add

jal

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Question 51 pts

Which of these instructions could cause a Control Hazard? Select all that apply

sub

lw

beq

bne

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Question 61 pts

If you have a "lw" instruction, which will be the first pipeline register to contain the retrieved information?

ID/EX

IF/ID

EX/MEM

MEM/WB

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Question 71 pts

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Do we have a Data Hazard in this situation?

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EX/MEM.RegisterRd = \$t1 (address of register t1)

ID/EX.RegisterRd = \$t2 (address of register t2)

ID/EX.RegisterRt = \$t3 (address of register t3)

MEM/WB.RegisterRd = \$t1 (address of register t1)

Yes

No

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Question 81 pts

Do we have a Data Hazard in this case?

EX/MEM.RegisterRd = ID/EX.RegisterRs

EX/MEM.RegisterRd = \$zero

Yes **Assignment Project Exam Help**

No **<https://powcoder.com>**

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Question 91 pts

For a 2-way set associative cache with a 32-bit address, the following bits of the address are used to access the cache:

Tag: 31-10

Index: 9-5

Block Offset: 4-0

What is the block size (in words)?

2

16

4

8

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Question 101 pts

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If a 16-way set-associative cache has 32 bit words, 2 words per block and 8192 sets, how big is the cache in bytes?

524,288 (2^{19})

1,048,576 (2^{20})

262,144 (2^{18})

2,097,152 (2^{21})

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Question 111 pts

A 256kiB (2^{18} bytes) cache has a block size of 32 bytes and is 32-way set-associative.

How many bits of a 32-bit address will be in the Tag, Index, and Block Offset?

Tag: 19; Index: 8; Offset: 5

Tag: 14; Index: 13; Offset: 5

Tag: 18; Index: 9; Offset: 5

Tag: 19; Index: 9; Offset: 4

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Question 121 pts

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For a 2-way set associative cache, the following number of bits for each field of the 32-bit address are used to access the cache:

Tag: 17 bits

Index: 9 bits

Block Offset: 6 bits

What is the block size (in words)?

8 words

4 words

16 words

32 words

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Question 131 pts

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For a 4-way set associative cache, the following number of bits for each field of the 32-bit address are used to access the cache:

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Tag: 17 bits

Index: 8 bits

Block Offset: 7 bits

How many sets are present in this cache?

256

32

128

64

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Question 141 pts

A 16kiB (2^{14} bytes) cache has a block size of 8 bytes and is 2-way set-associative.

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How many bits of a 32-bit address will be in the Tag, Index, and Block Offset?

Tag: 20; Index: 9; Block Offset: 3

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Tag: 19; Index: 10; Block Offset: 3

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Tag: 18; Index: 10; Block Offset: 4

Tag: 18; Index: 11; Block Offset: 3

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Question 151 pts

Given a 2-way set associative cache with this configuration:

Index: 10 bits

Block Offset: 6 bits

a. How many words are in a block?

b. How many bytes of data does this cache hold?

a) 16 words per block; b) 65536 bytes (2^{16})

a) 8 words per block; a) 65536 bytes (2^{16})

a) 16 words per block; b) 131072 bytes (2^{17})

a) 16 words per block; b) 32768 bytes (2^{15})

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Question 161 pts

If you have this list of actual prediction from the same branch instruction, that is, the actual outcome of the branch instruction:

T

T

T

NT

T

NT

T **Assignment Project Exam Help**

NT **<https://powcoder.com>**

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Where T is for Taken, and NT for Not Taken.

What is the prediction accuracy using 3-bit Dynamic Branch Prediction starting from NT (100)?

Key:

000 - Taken

001 - Taken

010 - Taken

011 - Taken

100 - Not Taken

101 - Not Taken

110 - Not Taken

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111 - Not Taken

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