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on Jump and Branch Instructions

Instructions: For each question, choose the single best answer. Make your choice by clicking on its button. You can change your answers at any time. When the quiz is graded, the correct answers will appear in the box after each question.

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1. What are the three steps in the machine cycle?

- ○ **A.** increment the PC; fetch the instruction; execute the instruction
- ○ **B.** fetch the instruction; execute the instruction; increment the PC
- ○ **C.** execute the instruction; fetch the instruction; increment the PC
- ◉ **D.** fetch the instruction; increment the PC; execute the instruction

D

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2. What are the four bytes immediately following a jump instruction called?

- ○ **A.** fetch delay slot
- ○ **B.** pipeline delay slot
- ◉ **C.** branch delay slot
- ○ **D.** PC advance slot

C

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3. What is a **pipeline**?

○ **A.** Several words of data from memory are moved into the processor before instructions need them.

◉ **B.** Several sequential instructions are simultaneously prepared for execution while one instruction finishes its execution.

○ **C.** A single instruction is divided into four phases and each phase is executed in one machine cycle.

○ **D.** Multiple items of data are sent down the system bus like water in a pipe.

B

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4. Say that a `sll` instruction is located in memory at address `0x400100`, and an `add` instruction is located in memory at address `0x400104`. After the `add` instruction executes, what value will be in the PC?

○ **A.** `0x400100`

○ **B.** `0x400104`

○ **C.** `0x400105`

◉ **D.** `0x400108`

D

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5. Say that a `j` (jump) instruction is located in memory at address `0x400100`, and a `sll` instruction is located in memory at address `0x400104`. After the `j` instruction executes, what value will be in the PC?

○ **A.** `0x400100`

○ **B.** `0x400101`

○ **C.** `0x400102`

◉ **D.** `0x400104`

D

6. Here is a schematic program loop.

Address	Instruction (details omitted)	PC just after this instruction has executed (at the bottom of the cycle)
.....	.....	00450008
00450008	add	0045000C
0045000C	store	00450010
00450010	jump 0x00450008	004500___
00450014	no-op	004500___

What numbers go into the two blanks?

A.

14
08

B.

14
00

C.

00
08

D.

14
18

A

7. Here is a 32-bit `j` instruction. The first 6 bits are the op-code.

```
000010 00 0001 0000 0000 0000 0000 1000
```

Here is the value of the PC while the target address is being constructed:

```
0000 1000 0001 0000 0000 1100 0110 1000
```

What address does the `j` put into the PC?

- (•) **A.** 0000 00 0001 0000 0000 0000 0000 1000 00
- ( ) **B.** 0000 1000 0001 0000 0000 1100 0110 1000
- ( ) **C.** 0000 10 0001 0000 0000 1100 0110 1000 00
- ( ) **D.** 1000 00 0001 0000 0000 0000 0000 1000 00

A

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8. Examine the following program fragment. The program is to add $5 and $6 together only if they are not equal.

```
        ori   $5,$0,8           # load $5 with 8
        ori   $6,$0,9           # load $6 with 9

        ____  $5,$6,spot

        ____  $0,$0,0           # branch delay slot

        addu  $8,$5,$6          # $8 = $5 + $6

spot:
```

Pick instructions to fill the blanks.

- ( ) **A.** beq ; addu
- ( ) **B.** bne ; sll
- ( ) **C.** bne ; addu
- (•) **D.** beq ; sll

D

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9. Here is an *if-then-else* structure. The code is to compare $10 and $11. If these registers contain the same bit pattern, set register $7 to 1. Otherwise set $7 to 0.

```
          ori   $10,$0,123
          ori   $11,$0,123

          ___   $10,$11,_____
          sll   $0,$0,0
          ori   $7,$0,0
          j     _____
          sll   $0,$0,0

equal:    ori   $7,$0,1

join:     .....
```

Which choices should fill the blanks?

- **A.** bne ; equal ; join
- **B.** beq ; join ; equal
- **C.** beq ; equal ; join
- **D.** bne ; join ; equal

C

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10. Say that registers $5 and $6 each contain an ASCII character in the low order byte. Can the `beq` instruction be used to compare the characters?

- **A.** Yes, because `beq` will recognize the character data and do a character comparison.
- **B.** No, because `beq` only works with two's complement integers.
- **C.** No, because `beq` only works with full 32-bit data.

◉ **D.** Yes, because `beq` compares bit patterns regardless of what they represent.

D

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grade quiz

The number you got right: 10 Percent Correct: 100 Letter Grade: A

If you have returned here from another page, or have re-loaded this page, you will need to click again on each of your choices for the grading program to work correctly. You may want to press the SHIFT KEY while clicking to clear the old answers.