Pre-Lab 2

- Due Sep 5 at 11:55pm
- Points 5
- Questions 5
- Time Limit None
- Allowed Attempts 2

Instructions

Please complete this quiz on or before Thursday. It covers lectures 2 and 3.

Take the Quiz Again

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	17 minutes	5 out of 5

Answers will be shown after your last attempt

Score for this attempt: 5 out of 5
Submitted Sep 4 at 8:49pm
This attempt took 17 minutes.

Question 1
1 / 1 pts
Which describes an Instruction Set Architecture where data and instructions are stored in the same memory?

- Harvard Architecture
- von Neumann Architecture
- ISA
- No answer text provided.

von Neumann architecture: Data and instructions are stored in the same memory, programs (instructions) can be viewed as data

Harvard architecture: separate storage for instructions and data

ISA = instruction set architecture, both Harvard and von Neumann are ISAs

Question 2
1 / 1 pts
What were the steps of executing instructions shown for the von Neumann architecture?

- Fetch, Execute
- Fetch, Decode, Execute

- Execute
- Fetch, Decode, Speculate, Execute, Writeback

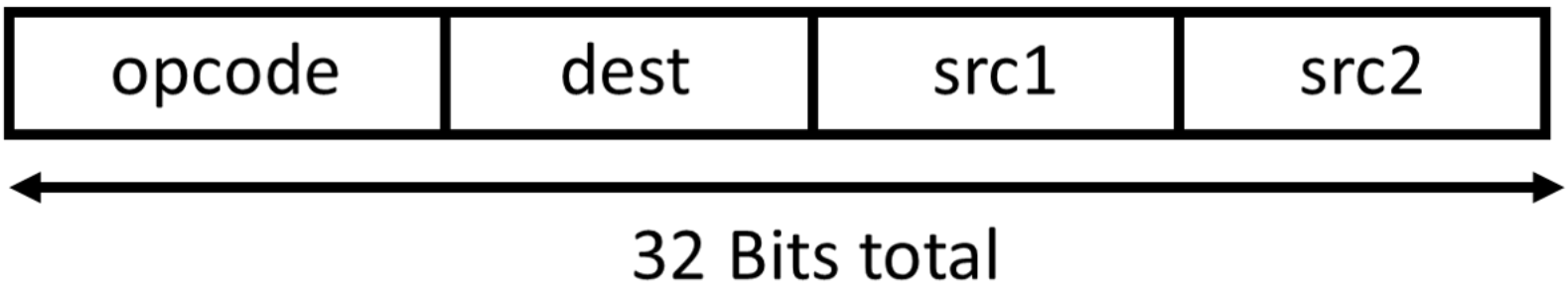
Fetch, Decode, Execute were highlighted in the slides.

When we discuss pipe-lining later in the semester we will see Fetch, Decode, Memory, Execute, Writeback.

Question 3
1 / 1 pts

What is the maximum number of registers that can be designed in a machine given:

- 32 bit instructions
  * Num. opcodes = **2,000**
  * All instructions are (reg, reg) -> reg (i.e., 2 source operands, 1 destination operand, all operands can access all registers)



- 8
- 64
- 128
- 32
- 16

2,000 opcodes = 11 bits (2,048 max opcodes supported)

32 - 11 = 21 bits. 21 / 3 = 7 bits for each of 3 operand fields.

2^7 = 128.

There can be up to 128 registers supported.

Question 4
1 / 1 pts

Given the following L2-2K program, what will be the offset value (in decimal) for the **second** beq instruction?

That is, what decimal integer value would replace the label "start" in the second beq instruction?

```
          lw 0 1 five    load reg1 with 5 (symbolic address)
          lw 1 2 3       load reg2 with -1 (numeric address)
   start  add 1 2 1      decrement reg1
```

```
        beq 0 1 2      goto end of program when reg1==0
        beq 0 0 start  go back to the beginning of the loop
        noop
done    halt           end of program
five    .fill 5
neg1    .fill -1
stAddr .fill start    will contain the address of start (2)
```

- 0
- 2
- -3
- -2

The label start is at address 2. The beq instruction will use register indirect + offset, using the program counter (PC)

target = PC + 1 + offset

offset = target - PC - 1 = 2 - 4 - 1 = 2 - 5 = -3

Question 5

1 / 1 pts

What is binary representation, in two's complement, for -10 if there are 8 bits?

- 0000 0110
- 1111 1010
- 0000 0000
- 0000 1010
- 1111 0110

Quiz Score: 5 out of 5