CS4410 Homework 1

To view and fill out this PDF, we recommend using Adobe Acrobat or Apple Preview. Other PDF browsers we tried do not always produce correctly filled PDF forms. Make sure you do not "flatten" the PDF (export to PDF, print to PDF), but submit a saved form that is still editable, otherwise our autograder will not be able to extract your answers.

=== Questions ===

Generated for *rvr*

Due Saturday, January 28th, 11:59pm

Question	**#Points**	**Percentage**
1. Tell Us About Yourself	6	11.1%
2. Practice Your Arithmetic	32	59.3%
3. Multiple Choice	16	29.6%
Total	54	100.0%

Question 1: Tell Us About Yourself (6 points)

(1.1) What is your NetID?

(1.2) What are your preferred pronouns?

(1.3) Tell us a bit more about yourself in a few lines?

Question 2: Practice Your Arithmetic (32 points)

Answer the following questions. Try to do them without a calculator—you won't have access to one at an exam.

Question 2.1: first exercise (16 points)

(2.1.1) What is $2^5 \times 2^1$? Only provide the exponent.

(2.1.2) What is the binary number 01010100000010 in hexadecimal?

(2.1.3) What is 2^{14} in hexadecimal?

(2.1.4) What is $2^{34} - 1$ in hexadecimal?

(2.1.5) If a computer has 45 address lines, what is the maximal byte address in hexadecimal?

(2.1.6) If the stack pointer is 0xFFF5BF78 and the computer pushes 2 4-byte words onto the stack (which is growing down), what is the resulting stack pointer in hexadecimal?

(2.1.7) How many 2048-byte blocks are there on a 2TB disk in 2^x notation? (Provide only the exponent.)

(2.1.8) What is 11000101 XOR 10000101 in binary?

Question 2.2: another exercise (16 points)

(2.2.1) What is $2^4 \times 2^2$? Only provide the exponent.

(2.2.2) What is the binary number 11101000001101 in hexadecimal?

(2.2.3) What is 2^{30} in hexadecimal?

(2.2.4) What is $2^{28} - 1$ in hexadecimal?

(2.2.5) If a computer has 34 address lines, what is the maximal byte address in hexadecimal?

(2.2.6) If the stack pointer is 0xFFF66FF0 and the computer pushes 3 4-byte words onto the stack (which is growing down), what is the resulting stack pointer in hexadecimal?

(2.2.7) How many 2048-byte blocks are there on a 16TB disk in 2^x notation? (Provide only the exponent.)

(2.2.8) What is 01111101 XOR 00101111 in binary?

Question 3: Multiple Choice (16 points)

Review the material in https://www.cs.cornell.edu/courses/cs4410/2022sp/resources/background.pdf. Then answer the following questions. For each question, check *one* of the boxes. These are randomized—do not be concerned if you see unlikely patterns.

(3.1) Which of the following statements is *correct*?

"Direct Memory Access" (DMA) means that devices can directly access the RAM of a computer.

Using a computer's LOAD and STORE machine instructions, it is possible to directly read and write words on a disk in much the same way as words in RAM.

A disk controller is a program that controls access to a disk.

(3.2) Which of the following statements is *wrong*?

There are 8 bits in a byte.

In 2's complement encoding of an 8-bit integer, -127 is the minimum value.

ASCII encoding uses 7 bits.

(3.3) Which of the following statements is *wrong*?

Each register of a CPU has its own memory address.

An interrupt causes the program counter to change.

The "stack" of a computer is important for keeping track of the control flow of a computer program.

(3.4) Which of the following statements is *correct*?

On an x86 processor, when you push a value onto the stack, the stack pointer is decremented.

For efficiency, different cores of the same CPU can share the same registers and their stack.

Divide-by-zero is an example of an asynchronous, maskable signal.