Max Clingroth

1. **Number Systems and Digital Logic**

1.

a. 128 bytes

b. 256 bytes

c. 512 bytes

d. 1024 bytes

e. 2048 bytes

2.

a. MSB is the first bit, 1

LSB is the last bit, 0

b. MSB is first bit, 1

LSB is last bit, 0

3.

a. 01010

b. 11010

4.

a. 01000

b. 10010

5. The first 4 digits will be the same as the first 4 digits of the number being ANDed, and the last 4 digits will all be 0

6.

a. 0011101000100001

b. 0001000111110000

7.

a. 250

b. 16

8.

a. 0x67

b. 0xD2

sources used: <https://www.rapidtables.com/convert/number/decimal-to-hex.html>

1. **Programming Questions**

Q1-Q4 attached as python files

5.

a. 10 is the first value of i

b. 50 is the “end” value of the range function, meaning the last value of i is 49

c. 4 is the step value, meaning i takes every 4th value

d. The program prints the square of every fourth number from 10 to 49

6. The program would print 3, and then 12.42857. b is the modulus of 87 and 7, which is the remainder after division occurs, which in this case is 3, and c is just the result of regular division between 87 and 7.

Sources: notes from Python lectures

**3. Computer Organization**

1. 16 registers are provided for the architecture

2. There are 256 unique cells in main memory

3. Each instruction is 2 bytes long

4. The op-code is 4 bits, and the remaining 12 bits is the operand

5. 0x15B3 would cause the contents of the memory cell located at 0xB3 (in this case 12) to be placed in register 0x5

6. 0x25C3 would cause the value 0xC3 to be placed in register 0x5

7. 0x71B2 would cause the result of ORing the contents of registers 0xB and 0x2 to be placed in register 0x1

Sources: Appendix C of the textbook

**4. General Awareness**

Typically, my monitor is positioned properly, and my mouse and keyboard are both in good positions. My typing posture needs work, as I hold my hands somewhat down and tend to rest my elbows on my armrests or legs. Slouching is also something I need to work on. I have a tendency to get into somewhat bizarre positions when I use a computer for a large amount of time, which tends to put strain on my back. Overall, I really need to work on my posture while on the computer, and really focus on sitting properly.

**5. Feedback Questions**

1. At the start, I would rate myself around 5. Now, around 6. I already knew most of the Python we’ve learned, but learning more about the inner working of computers helps me make more efficient programs.

2. Overall, the labs seem to be appropriately challenging, although I wouldn’t mind slightly more challenging labs either.

3. I’m most looking forward to working with more algorithms and learning more about how to efficiently use programming.