Assignment for Laboratory 5
HW Computer
Instruction Set Architecture
and
Microarchitecture
Computer Science 240

Refer to lecture notes or to the lab notes listed on the lab page to answer the following questions about the **HW** computer we will be implementing in lab this week.

1.How many bits are there in each **HW** instruction?

2. Assuming an opcode is 4 bits, how many possible instructions could be encoded in the **HW** instruction set (note that this does not ask how many we have listed, it asks how many are possible)?

3. How many bits are used to encode a register used as an operand in an instruction?

4.. What assembly language instruction is represented by the hexadecimal value 0x5012 (each digit represents 4 bits). Describe what you expect the instruction to do.

5.. What assembly language instruction is represented by the hexadecimal value 0x0032 (each digit represents 4 bits). Describe what you expect the instruction to do.

6. What is the 16-bit binary form of the following instruction?

ADD R1, R1, R4

7. What are the contents of Register 1 and Register 4 after this instruction is executed?

8. Given the following instruction stored at address 8 in memory:

PC/Address	Instruction
8	BEQ R5 R6 0xC

Assume register 5 contains 0XFFFE, and register 6 contains 0XFFFE and that the offset is presented as a hexadecimal digit which represents a signed, 4-bit, two's complement value.

After this instruction is executed, what will be the address of the next instruction?

9. Repeat question 8, but assume that the original value of register 5 = 0003, and register 6 = 0002. What will be the address of the next instruction?

10. What will be the address of the next instruction if the following is executed?

PC/Address	Instruction
A	JMP 4