Homework 4: Data Manipulation

The following 3 questions using the simple machine language mention in slides

1. Explain instruction in English
   a. 368A   **b.** BADE   **c.** 803C   **d.** 40F4

2. Suppose the memory cells from addresses B0 to B8 contain the (hexadecimal) bit patterns given in the following table?

Address	Contents
B0	13
B1	B8
B2	A3
B3	02
B4	33
B5	B8
B6	C0
B7	00
B8	0F

   a. If the program counter starts at B0, what bit pattern is in register number 3 after the first instruction has been executed?
   b. What bit pattern is in memory cell B8 when the halt instruction is executed?

3. Translate the following instructions from English into the machine language
   a. LOAD register 6 with the hexadecimal value 77.
   b. LOAD register 7 with the contents of memory cell 77.
   c. JUMP to the instruction at memory location 24 if the contents of register 0 equals the value in register A.
   d. ROTATE register 4 three bits to the right.
   e. AND the contents of registers E and 2 leaving the result in register 1

4. Suppose the memory cells from addresses 00 to 0D contain the (hexadecimal) bit patterns given in the following table?

Address	Contents
00	20
01	04
02	21

03	01
04	40
05	12
06	51
07	12
08	B1
09	0C
0A	B0
0B	06
0C	C0
0D	00

Assume that the machine starts with its program counter containing 00.

     a. What bit pattern will be in register 0 when the machine halts?
     b. What bit pattern will be in register 1 when the machine halts?
     c. What bit pattern is in the program counter when the machine halts?

5. Using the machine language in the slides, write a program that places a 1 in the most significant bit of the memory cell whose address is A7 without modifying the remaining bits in the cell.

6. Using the machine language in the slides, write a program that copies the middle four bits from memory cell E0 into the least significant four bits of memory cell E1, while placing 0s in the most significant four bits of the cell at location E1.