

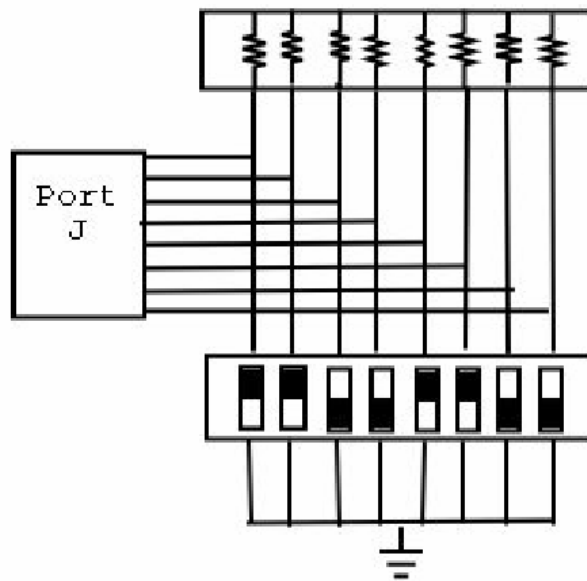
EECS 388: Computer Systems and Assembly Language

Homework 4

Due: Tuesday, April 1, 2008

- (30) Write a program to do matrix addition and subtraction of two 5×5 matrices M1 and M2 based on the position of an eight-position DIP switch. Use port J to read the switch positions. If the number of ones is even, do the addition operation $M1+M2$. Otherwise, do the subtraction operation $M1-M2$. The results of either operation will be stored in M3. Your program will assume that each matrix is stored as five consecutive column vectors (i.e., each vector is 5 by 1). Each matrix will be stored at the following locations:
M1: \$4500-\$4519
M2: \$4520-\$4539
M3: \$4540-\$4559

Your program must use a subroutine to do the arithmetic of two column vectors, and either return or store the result. Essentially, this function will add or subtract each 5 item "row" of the matrix. Arguments should be passed to the subroutine using the stack. The arguments should include a value to represent the arithmetic operator, and either the values for a length 5 vector, or a starting address for the vector. The function may then either return or store the result. The program must be well-commented. The DIP switch is pictured below:



2. (20) An eight-position DIP switch is connected to PORT A of the 68HC12. Provide the codes to read the position of the DIP switches when an IRQ interrupt occurs.
3. (30) Extend the battery backup supply example for one primary battery and two backup batteries. Show all initialization steps in the main code and the interrupt service routine. Use PORTG[4:5] for input signals (00: primary battery in use, 01: the first backup, 11: the second backup) and PORTG[0:1] for out signals (again 00-01-11 for primary-1st backup-2nd backup).
4. (10) Page 290, Fundamental #2
5. (10) Page 290, Fundamental #3