homework 4 - dependence analysis
due date: Sun., 10/7

1. **[10 pts.]** Describe all data dependencies in the following code segment:

    S1:   a++

    S2:   b = a + b

    S3:   c = a + d

    S4:   d = c^2

    S5:   a - -

2. **[10 pts.]** What are the data dependencies, distance vectors and direction vectors for S1 and S2 in the following code segment?

    for (i = 0; i < MAX; i++)

        for (j = 0; j < MAX; j++)

    S1:   A[i][j] = A[i+1][j-1]

    S2:   B[i][j] = A[i][j]

    Can these loops be re-ordered? Why or why not?

3. Given the following loop nest, for each value of BODY, which loop re-orderings are valid?

                                                                    BODY

    for (i = 0; i < MAX; i++)   (a.) **[10 pts.]**   A[i, j, k, m] = B[i-1, j-1, k-1, m-1]

        for (j = 0; j < MAX; j++)   (b.) **[10 pts.]**   A[i, j, k, m] = A[i-1, j, k, m]

            for (k = 0; k < MAX; k++)   (c.) **[10 pts.]**   A[i, j, k, m+1] = A[i, j, k+1, m] + B[i]

                for (m = 0; m < MAX; m++)

                    BODY(i, j, k, m)