Math 350
Spring, 2000

HOMEWORK #2

Do 50 points of the following problems (due 1/25/00).

15 pts. **1** Construct the following binary codes if possible, or explain why it is not possible. (see problem 1, p.27)

a. (6,32,2)

b. (k,3,k-1)

c. (6,15,3)

15 pts. **2** How many inequivalent binary (3,3,1) codes are there?

20 pts. **3** Write out the spheres of radius 1 are for the code listed at the bottom of page 23 (there are 128 elements of $(F_2)^7$, and each of these elements should be in a sphere around a codeword). Explain how this list illustrates the sphere packing bound.

35 pts., ⋆ **4** Let D be the design described as follows: let the points be the squares of the 4 x 4 square shown below, and let the blocks be made up of the 6 points on the same row or column as some square. Thus, there are 16 points and 16 blocks, and I claim that these points and blocks form a (16,16,6,6,2)-design: show this. Form the incidence matrix of this structure, and let the code be all of the rows of this matrix as well as all possible sums of the rows. Find M and d for this code.

	x		

x = point

	y		
	y		
y		y	y
	y		

y = points on block