

COMPUTER SCIENCE 20, SPRING 2012
DISCRETE MATHEMATICS FOR COMPUTER SCIENCE

Class #1 (Pigeonhole principle)

Homework, due in hard copy Wednesday 1/25/2012 at 10:10am

1. Show that in any group of people, at least two people have the same number of friends within the group. (Nobody is a friend of him- or herself, but friendship is *symmetrical*—I am your friend if and only if you are my friend.)
2. Given a 4x4 unit lattice (a grid of 16 points arranged 4×4 with a spacing of one between adjacent points), can you pick four points such that no two points are less than or equal to a distance of $\sqrt{2}$ apart (i.e., no two points are adjacent or diagonal)? How about 5 points? In each case, explain why or why not.