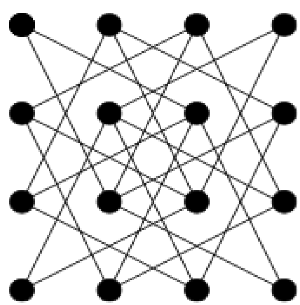
1.(2 points) Prove that if A and B are independent, so are:

(a) A and B^c.

(b) A^c and B^c.

2.(3 points) Give an example of 3 events which are pairwise independent but not collection-wise independent and show that the events that you choose do, indeed, have these properties.

Bonus (+2 points) Consider a knight moving around on a 4×4 chessboard. We can choose any square as a starting point for the knight. Suppose that we want the knight to stop on every square exactly once (i.e. without any repeat visits). If this were possible, it would take 15 moves since the knight starts on one square and, after fifteen moves, should have visited each of the 16 squares on the 4×4 chessboard. Prove that this is impossible, regardless of knight's starting point. Your proof should take no more than 2 or 3 sentences.



Graph of knight moves on a 4×4 chessboard.