1. ## Ramsey

   Show that every graph with six vertices has either a 3-clique or a 3-independent set.

   Solution:

2. ## Hamilton

   A mouse eats his way through a 3x3x3 cube of cheese by tunnelling through all of the 27 1x1x1 subcubes. If he starts at one corner and always moves on to an uneaten subcubes. If he starts at one corner and always moves on to an uneaten subcube, can he finish at the center of the cube?

   Solution:

3. ## Konig

   A *line* of a matrix is a row or a column of the matrix. Show that the minimum number of lines containing all of the 1's of a $(0,1)$-matrix i equal to the maximum number of 1's, no two of which are in the same line.

   Solution:

4. ## Hall

   A round-robin tournament among $2n$ teams lasted for $2n-1$ days. Each day, every team played one game against another team, with one team winning and one team losing in each of the n games. Over the course of the tournament, each team played every other team exactly once. Is it possible to choose one winning team from each day without choosing any team more than once?

   Solution: