COL351: Analysis and Design of Algorithms
Instructor: Ragesh Jaiswal

1. Problem 14 in Chapter 7 of Tardos-Kleinberg book.

2. Recall the minimum vertex problem defined in Homework-4. Design an algorithm that outputs a minimum vertex cover of a given bipartite graph $G = (L, R, E)$.

3. You are a war strategist and you are analyzing a war-zone which is viewed as a two dimensional $n \times n$ grid. There is enemy presence in some cells of this grid and your goal is to wipe out all enemies present in the grid. Firing a laser gun along any row (or column) of this grid wipes out all enemies in that row (or column). However, firing a laser gun is expensive. So, your goal is to minimize the number of times the laser gun is fired in order to wipe out all enemies. You have to design an algorithm that outputs the rows and columns along which the laser gun should be fired so that all enemies are wiped out while minimizing the number of gun fires. The input is an $n \times n$ array A such that $A[i, j] = 1$ iff there is enemy present in cell (i, j). Give pseudocode for your algorithm. Discuss correctness and running time.
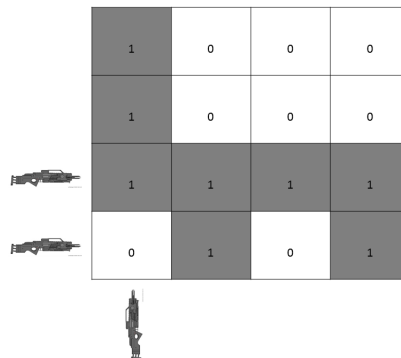

Figure 11.0.1: A simple 4×4 example grid with firing locations that minimizes the number of gun fires.