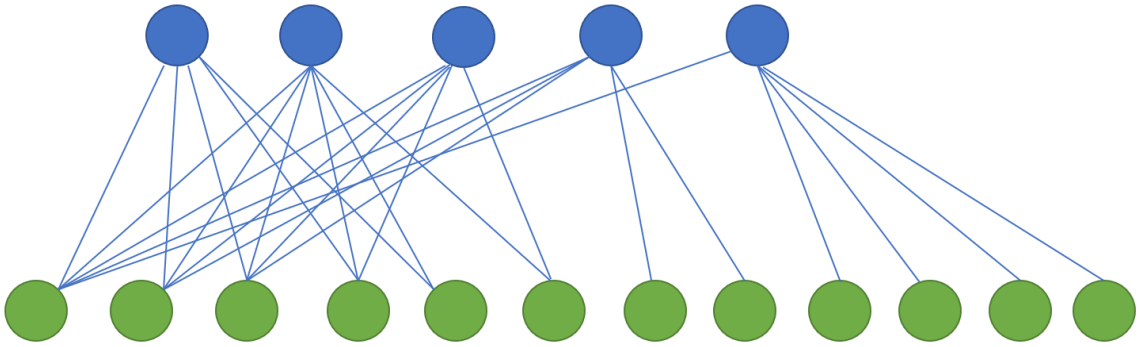
35.1-3

Consider a bibartite graph with top part L and bottom part R such that L has 5 vertices of degrees (5,5,5,5,5) and R has 11 vertices of degrees (5,4,4,3,2,2,1,1,1,1,1) below is the graph:



Clearly there exists a vertex-cover of size 5 (the top vertices). Best case we choose the top five nodes and worst case we choose bottom 11 nodes, resulting in the approximation ratio of 11/5 > 2. After choosing the first vertex in R, the degrees on L decrease to (4,4,4,4,4). After choosing the second vertex in R, the degrees on L decrease to (4,3,3,3,3). After choosing the third vertex in R, the degrees on L decrease to (3,3,2,2,2). After choosing the fourth vertex in R, the degrees on L decrease to (2,2,2,2,1). After choosing the fifth vertex in R, the degrees on L decrease to (2,2,1,1,1). After choosing the sixth vertex in R, the degrees on L decrease to (1,1,1,1,1). Now the algorithm still has to choose 5 more vertices. So, total the worst case you need to choose 11 nodes