JIE MEI z5173405

Question 2

Construct a flow network as a directed bipartite graph with all the columns as vertices on the left hand side and all the rows as vertices on the right hand side. Then we add a super source S and a super sink T and connect S with all the columns vertices with edges of 1 capacity and similarly all the rows with T. Each square $S_{i,j}$ can now be represented by and edge from column **j** to row **i**. According to the question, black rooks cannot be in the same position as white rooks and cannot be in its diagonal position. So, we regard this condition as our judgment condition for connecting rows and columns, connecting all possible paths. Finally, we will apply the Ford - Fulkerson algorithm to get the largest number of black rooks we can place on the board.