Q2

As the question mentioned, make a bipartite graph with n vertices on the left side representing number n row on the chessboard and n vertices on the right side representing number n column on the chessboard. So edges from left side r to right side c $(1 \leq r, c \leq n)$ corresponding to the cell $(r,\, c)$ on the chessboard. Introduce a super source S and a super sink T. And connect S to each vertices on the left sides by directed edge with capacity equal to 1, also, connect each vertices on the right side by directed edge to T with capacity equal to 1, because no two black rooks are in the same row or in the same column. For the white bishops (a_i, b_i), we have a set M which contains all possible points lies on the diagonal of $(a_i,\, b_i)$, $(1 \leq a_i, b_i \leq n,\, 1 \leq i \leq k)$. If there exists a cell $(r, c) \notin M$, connect r to c by directed edge. After that, just use max flow algorithm and find the max flow in such a network, that is the largest number of black rooks we can place on the chessboard.