Computational Problem Set 2 for Zero Sum Games

A game called "Three Finger Morra" is played as follows. Each player shows one, two or three fingers. Player 2 always pays to player 1 an amount equal to the number of fingers shown by player 1; but also, if player 1 shows exactly one more or two fewer figners than player 2 then player 1 pays player 2 an amount k (where k is fixed and doesn't depend on the number of fingers shown by either player).

1. Set up the pay-off matrix for player 1, for arbitrary k and make a matlab function of this matrix with k as input argument.

2. Show that, if $k = 1/2$, the game has a pure strategy saddle point. Find the value of the game and the optimum strategies of the two players (that is the pure strategy solution).

3. Formulated as a linear programming problem and solve it by using matlab: Determine the value of the game and the optimum strategies for lower game and upper game when k=6.

4. Repeat above computation with matlab for $k = 1/2$, show that the pure strategy in question 2 is a special case of statistical strategies.

5. Show (using matlab or simply by a brief inspection of the matrix) that, if $k = 2$, there exist optimum strategies in which R never shows one finger and C never shows three fingers.