# Advanced Microeconomics

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Consider the $n+1$ points of $H = \{0, 1, \ldots, n\}$ on the real line, to be referred to as *vertices*. Two players simultaneously and independently choose a vertex. If player 1 chooses vertex $x_1$ and player 2 vertex $x_2$, then:

Case $w = 1$: the payoff of player $i$, $f_i(x_1, x_2)$, is the number of vertices that is the closest to his choice $x_i$; however, a vertex that has equal distance to both players contributes only 1/2.

General $w \in [0, 1]$: to $f_i(x_1, x_2)$ exactly the same vertices as in the above for $w = 1$ contribute. Take such a vertex. If it is at distance $d$ to $x_i$, then it contributes $w^d$ if it is not a shared vertex, and otherwise it contributes $w^d/2$.

1. Suppose $n$ is odd and $w = 1$.
   a. Determine the best reply correspondences.
   b. Determine the nash equilibria.
   c. Determine the weakly pareto-efficient strategy profiles.
2. Suppose $n = 2$ and $w = 1/2$.
   a. Determine the game by representing it as a $3 \times 3$-bi-matrix game with at the first row strategy 0, the second row strategy 1, etc.
   b. Determine the best reply correspondences.
   c. Determine the nash equilibria and the strongly pareto-efficient strategy profiles.
3. Consider again the sitution where $n = 2$ and $w = 1/2$. But now suppose that first player 1 makes his choice and then player 2 after having observed the choice of his opponent.
   a. Present the game tree.
   b. Determine the subgame perfect nash equilibria.

Please handle in before 3 October 2014.