*Social*Networks*
QUIZ #11
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29 April 2014

Q1. [10] Two players play a repeated game where they take turns rolling a die. Player 1 wins if he rolls a 4 and player 2 wins if he rolls a 5. Once a player wins, the game ends. If Player 1 goes first, what is the probability that he wins?

SOLN.1 *Model this as a game in matrix form: For the entries $\langle x, y \rangle$, where $x \neq 4$ and $y \neq 5$, the payoff is $(0,0)$, and they play again. For the entries $\langle x, y \rangle$, where $x = 4$ and $y \neq 5$, the payoff is $(1,0)$; for the entries $\langle x, y \rangle$, where $x \neq 4$ and $y = 5$, the payoff is $(0,1)$. However, for the entries $\langle x, y \rangle$, where $x = 4$ and $y = 5$, the payoff is $(1,0)$, since, in this case, the player 1 gets a first-mover's advantage. Thus there are 11 entries, in which one of the players wins, out of which for 6 entries, player 1 wins and for 5 entries, player 2 wins. Thus the probability that the player 1 wins is $6/11$.*