Math 5750/6880-3, Assignment 8, Mar. 11, 2016

1. We briefly discussed in class the old French game of Le Her. Here are the rules: The game is a two-person zero-sum game played with a standard 52-card deck. Cards are ranked from lowest to highest in the order A, 2, 3, ..., 10, J, Q, K, and suits are ignored. A card is dealt face down to each player, and each player may look only at his own card. The object of the game is to have the higher-ranking card at the end of play. First, player I, if he is not satisfied with his card, can require that player II exchange cards with him. The only exception to this rule occurs when player II has a king (K), in which case the exchange is void. Second, player II, if he is not satisfied with his card, whether it be his original card or a new card obtained in exchange with player I, can exchange it for the next card in the deck. The only exception to this rule occurs when the next card is a king, in which case the exchange is void. This completes the game, and the winner is the player with the higher-ranked card, with player II winning in the case of a tie. If the amount bet is one unit, Player I wins 1 or loses 1.

Describe this game in extensive form (i.e., draw and label the game tree). Actually, there are too many branches because of the 13 distinguishable cards each player can have. So we modify the rules: Instead of a 52-card deck, assume a 12-card deck consisting of jacks, queens, and kings only.

2. Convert to strategic (or normal) form (here 0 denotes Nature):
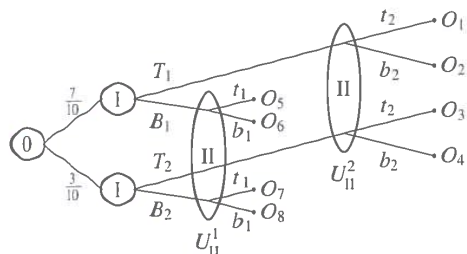
3. Find I's expected payoff for each of his pure strategies:

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