

Consider the following game. A dealer produces a sequence  $s_1, s_2, \dots, s_n$  of cards face up. Each card  $s_i$  has value  $v_i$ . Then two players take turns picking a card from the sequence, but they can only pick the first or the last card of the (remaining) sequence. The goal is to collect the largest total value. (For example, you can think of the cards as bills of different denominations.) Assume that  $n$  is even.

1. Show a sequence of cards such that it is not optimal for the first player to start by picking up the available card of larger value. That is, the natural *greedy* strategy is suboptimal.

2. Give a dynamic programming algorithm to compute the optimal strategy for the first player.