

- 
1. (4 points) Let  $p_1, p_2, \dots, p_n$  be  $n$  pieces of wooden rod of lengths  $L_1, L_2, \dots, L_n$  respectively. Consider the problem of joining (gluing) them together in such a way that the piece  $p_i$  is to the left of  $p_{i+1}$  for  $1 \leq i \leq n - 1$ . Let the cost of joining together two pieces of lengths  $L_i$  and  $L_j$  be  $L_i + L_j$ . Derive a recurrence for the minimum cost of joining all the  $n$  pieces together two at a time. Using this give a dynamic programming algorithm to compute the minimum cost. Then give an algorithm to compute the order in which the pieces have to be glued.
  2. (2 points) Show that if there were a coin worth 12 cents, the greedy Change algorithm (presented in class) using quarters, 12-cent coins, dimes, nickels and pennies would not always produce change using the fewest coins possible.