Chapter 16 Homework

Deadline: 2021/11/17

10:10 a.m

1. The frog begins at position 0 in the river. Its goal is to get to position n. The frog can only stand on a lily pad, and there are lily pads at various positions. The frog can jump at most r units at a time. Prove that by always maximizing the jump distance, the frog can minimize the number of jumps. (There is always a lily pad at position 0 and position n)

   a. Prove the greedy-choice property.

   b. Prove the optimal-substructure property.

2. a. What is the optimal Huffman code for the following set of frequencies, based on the first 8 Fibonacci numbers? a:1 b:1 c:2 d:3 e:5 f:8 g:13 h:21.

   b. Can you generalize your answer to find the optimal code when the frequencies are the first n Fibonacci numbers?

3. Show how to solve the fractional knapsack problem in O(n) time.