

CISC 3220 Homework Chapter 16

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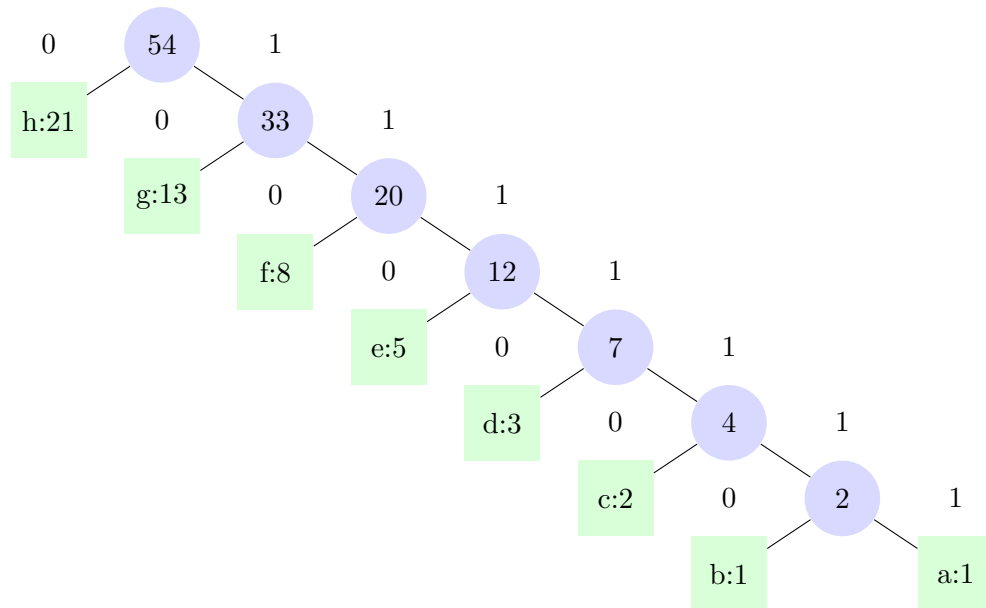
Exercises 16.3

Question 16.3-3

What is an 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

Generalize your answer to find the optimal code when the frequencies are the first n Fibonacci numbers.



a = 1111111
b = 1111110
c = 111110
d = 11110
e = 1110
f = 110
g = 10
h = 0

This generalizes to having the most frequent Fibonacci number having a code of 1 repeated $n-1$ times, and the n^{th} most frequent Fibonacci number having a code of 1 repeated $n-1$ times with the addition of ending with a zero. For instance, in the 8 Fibonacci numbers in this example, since b is the 7^{th} most frequent number, its code is six ones and one zero.