CS 303   Algorithms   ch 16 homework

16.1-1

10 pts

This problem is tricky because we have to determine what's in S_{ij}. If activity k is in S_{ij}, then we must have $i < k < j \Rightarrow j - i \geq 2$. But we must also have $f_i \leq S_k$ and $f_k \leq S_j$. If we start k at $j-1$ and determine k, we can stop once k reaches i, but we can also stop once we find out $f_k \leq f_i$. Since then activities $i+1$ through k cannot be compatible w/ activity i.

16.1-2

5 pts

this algorithm is basically the reverse of the original problem if we switch f w/ S and start from behind.
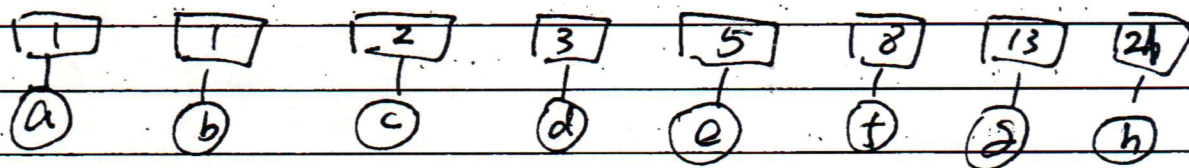
16.2-1

5 pts

If we allow fraction in knap-sack, then we'll pick the max weight of the most valuable item. It's clear that the max valuable item gives the best local option. This will lead to global optimal.
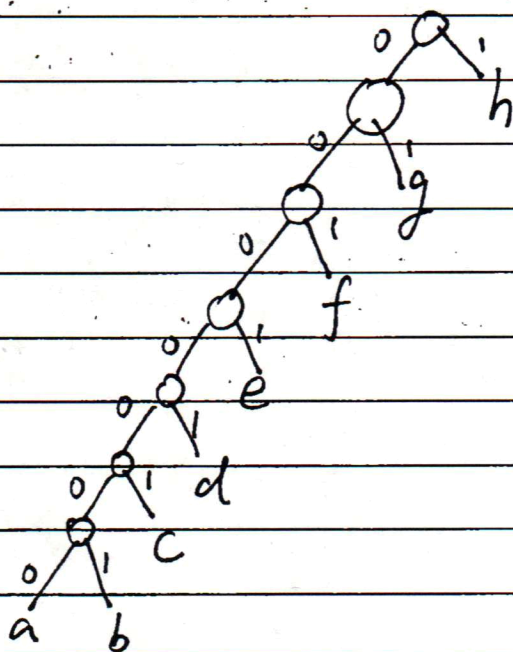
16.3-7 the optimal code for the given frequencies

1	1	2	3	5	8	13	21
ⓐ	ⓑ	ⓒ	ⓓ	ⓔ	ⓕ	ⓖ	ⓗ

by combining the left to the right due to the property of Fibonacci Sequence.

The generalization is the ith number w/ have a code of $i-1$ 0's and one 1 except the last one has just a 1.