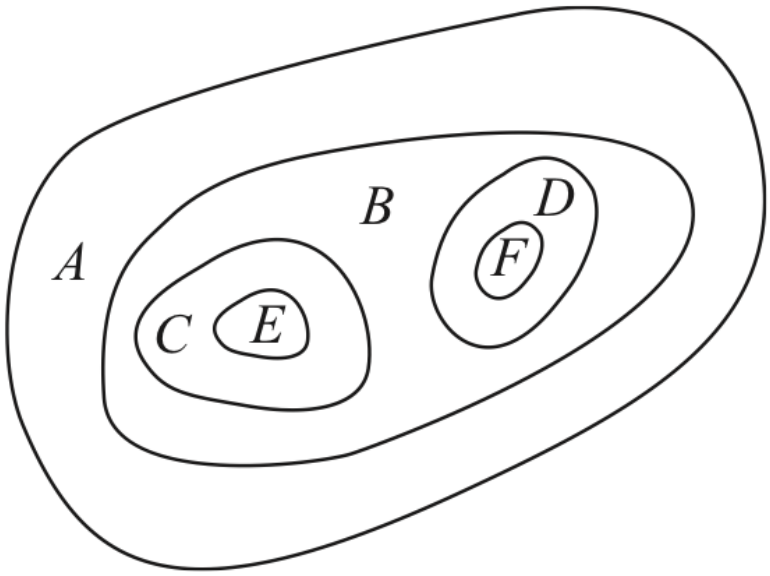
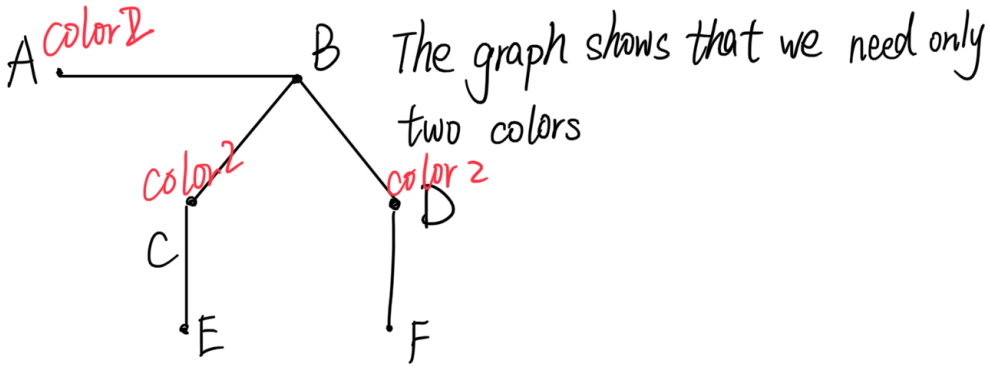
Homework07

In Exercises 1–4 construct the dual graph for the map shown. Then find the number of colors needed to color the map so that no two adjacent regions have the same color.

4.



10.8 Ex.4

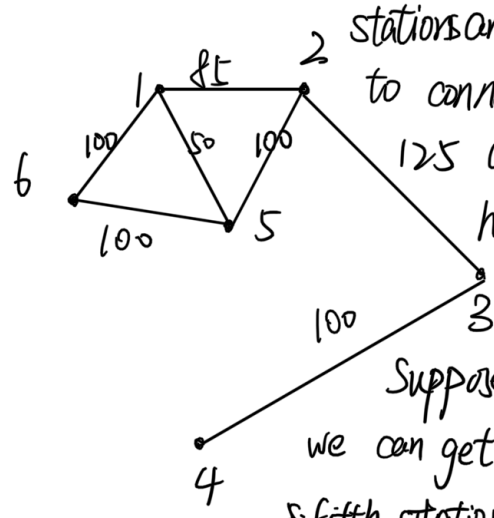


18. How many different channels are needed for six stations located at the distances shown in the table, if two stations cannot use the same channel when they are within 150 miles of each other?

	1	*2*	*3*	*4*	*5*	*6*
1	—	85	175	200	50	100
2	85	—	125	175	100	160
3	175	125	—	100	200	250
4	200	175	100	—	210	220
5	50	100	200	210	—	100
6	100	160	250	220	100	—

10.8 Ex.18

Draw the graph of this six station, when two stations are within 150 miles, we use a edge to connect them. And it is similar to 125 coloring the map, it means if two node have a edge, they must use different channels.



Suppose the sixth sitation use channel 1. we can get the first station channel 2, the fifth station channel 3. since 2 and 6 is not connected so 2 can use channel 1, 3 use the channel 2 and 4 use channel 3.

So we need 3 channels

18. How many vertices does a full 5-ary tree with 100 internal vertices have?

11.1 Ex.18

Since it is a full 5-ary tree

Suppose n is the number of vertices. i is the internal vertices.

so $n = 5 \times 100 + 1 = 501$

28. How many vertices and how many leaves does a complete m-ary tree of height h have?

11.1 Ex.28

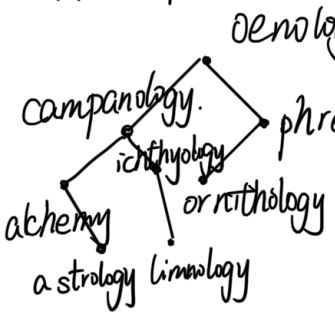
vertices. at least m^{h-1} (the last layer have one vertices)

at most $m^h - 1$ (a full m-ary tree)

leaves $l = m^h$ Since it is a complete tree

2. Build a binary search tree for the words *oenology, phrenology, campanology, ornithology, ichthyology*, *limnology, alchemy*, and *astrology* using alphabetical order.

11.2 Ex. 2



① p > o. insert right

② c < o

③ or > oe
o < p

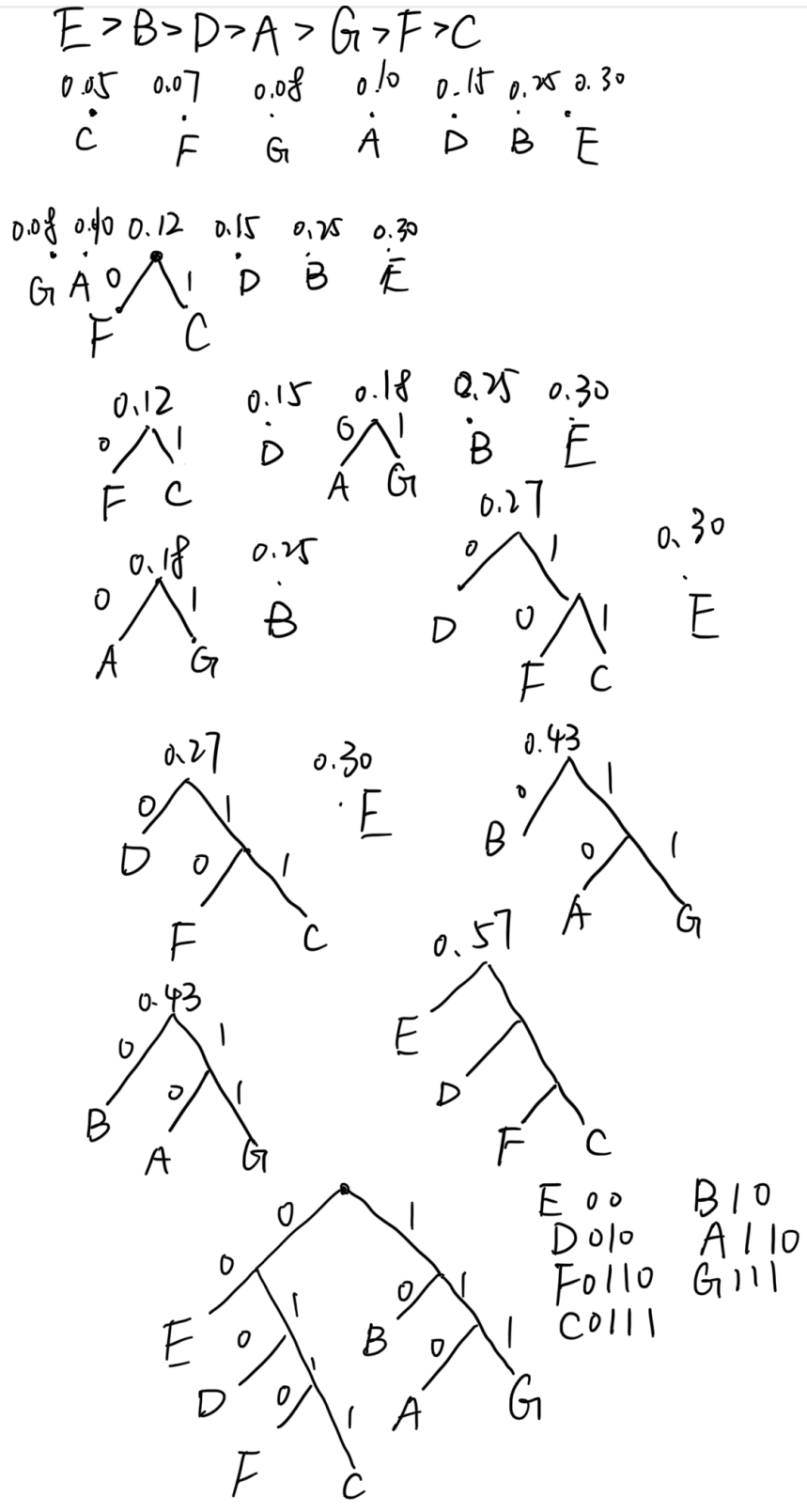
④ i < o i > c

⑤ l < o
l > c
l > i

⑥ a < o
a < c

⑦ a < o
a < c
as > al

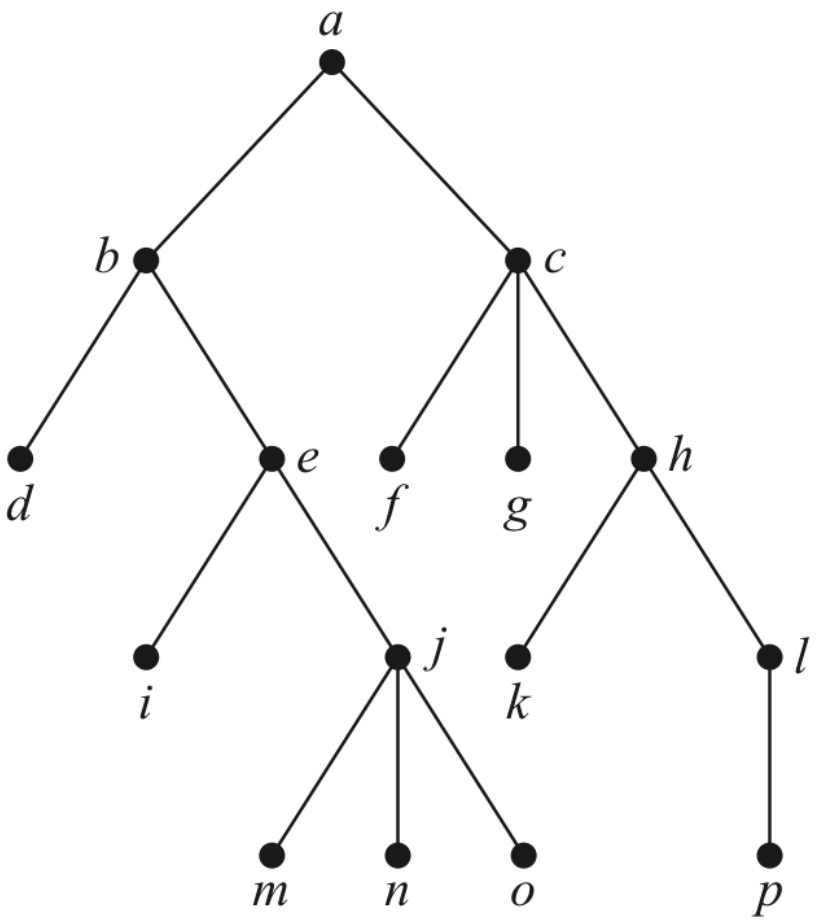
24. Use Huffman coding to encode these symbols with given frequencies: A: 0.10, B: 0.25, C: 0.05, D: 0.15, E: 0.30, F: 0.07, G: 0.08. What is the average number of bits required to encode a symbol?



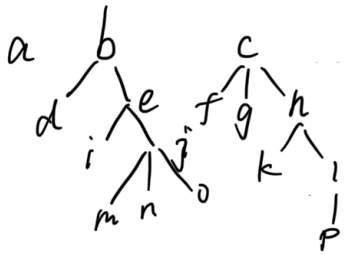
So the average number is $2\times0.30+3\times0.15+4\times0.07+4\times0.05+0.25\times2+0.10\times3+3\times0.08=2.57$

In Exercises 7–9 determine the order in which a preorder traversal visits the vertices of the given ordered rooted tree.

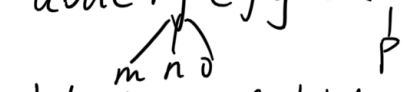
8.



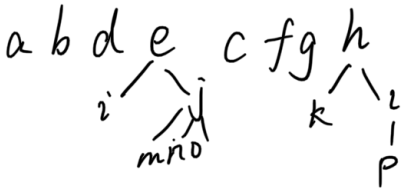
11.3 Ex. 8 abdeijmnocfghklp



abdeijcfghkl

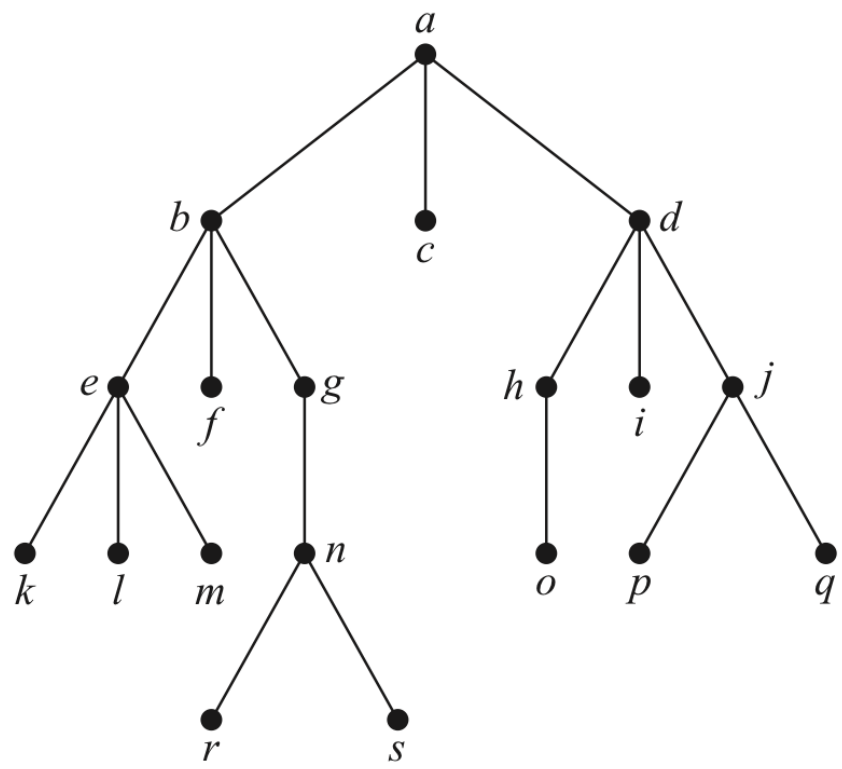


abdeijmnocfghklp

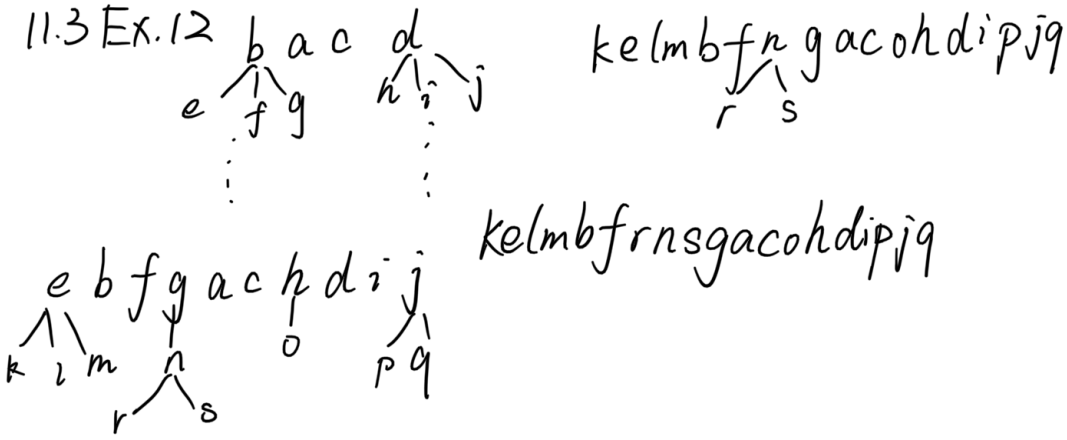


12. In which order are the vertices of the ordered rooted tree in Exercise 9 visited using an inorder traversal?

9.

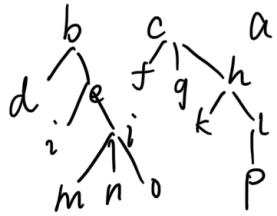


11.3 Ex. 12



14. In which order are the vertices of the ordered rooted tree in Exercise 8 visited using a postorder traversal?

11.3 Ex. 14.



d i m n o j e b f g k p l h c