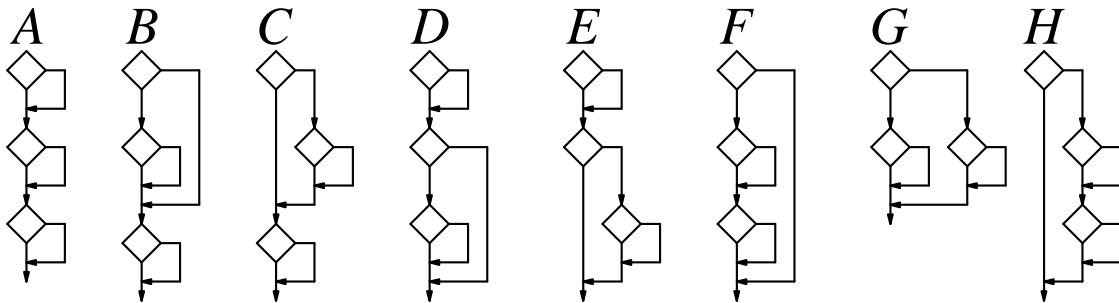


FLOWCHARTS WITH THREE IF-THEN-ELSE NODES

A Partial List:

- Not shown are the begin-node and end-node.
- Flowchart *A* has no nested if-then-else.
- Flowcharts *B* – *E* have one nested if-then-else each.
- Flowcharts *F* – *H* have two nested if-then-else each, with each of them nested only one level deep.

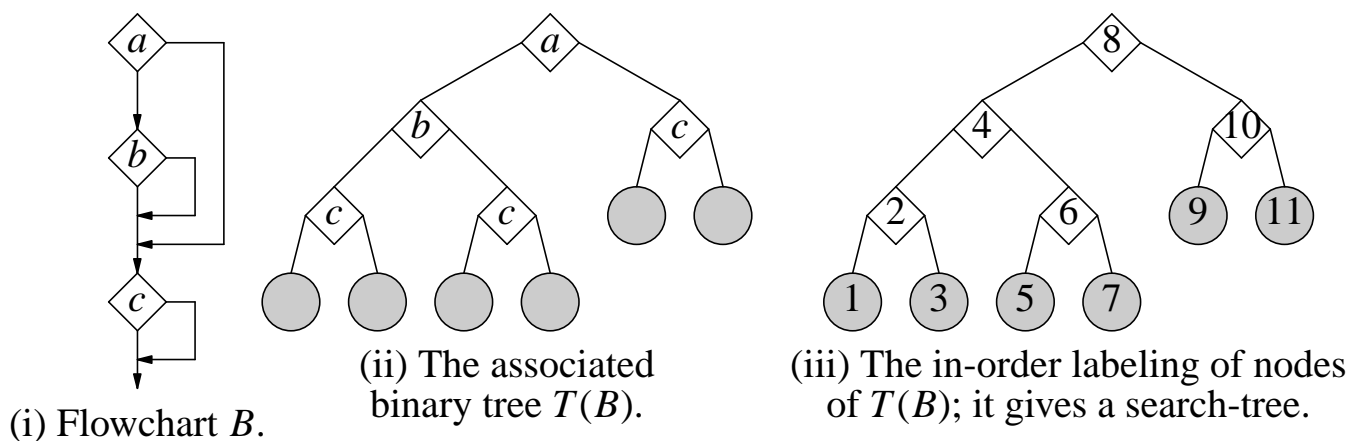


EXERCISE

1. Show all flowcharts like those above with one if-then-else node nested 2 levels deep and one nested just one level deep.

BINARY TREE FROM A FLOWCHART

- The true-branch of a decision node goes to the left and so does the branch from an action node.
- Each terminal node corresponds to the unique end-node of flowchart.
- For every path through the flowchart corresponds to a path from the root to a terminal node and vice-versa.



- We can linearly order all flowcharts according to the dictionary order of the strings obtained pre-order traversal of the labeled binary trees.

The pre-order traversal of $T(B) = \langle 8, 4, 2, 1, 3, 6, 5, 7, 10, 9, 11 \rangle$, the string associated with flowchart B .

EXERCISE

1. Show the labeled binary trees corresponding to the flowcharts $A - H$, their pre-order traversal-strings, and their linear ordering.

EXERCISE

1. Show each of the resulting flowcharts after we insert one action-node in the flowchart A above. Show the labeled binary-tree for some of these flowcharts.
2. Do we get the same number of flowcharts from each of A to H when we add one action-node? What is the number of flowcharts obtained in this way if start with a flowchart with n if-then-else nodes? How many flowcharts would be obtained in we add two action-nodes in any of A to H ? What is that number if we start with a flowchart of n if-then-else nodes?