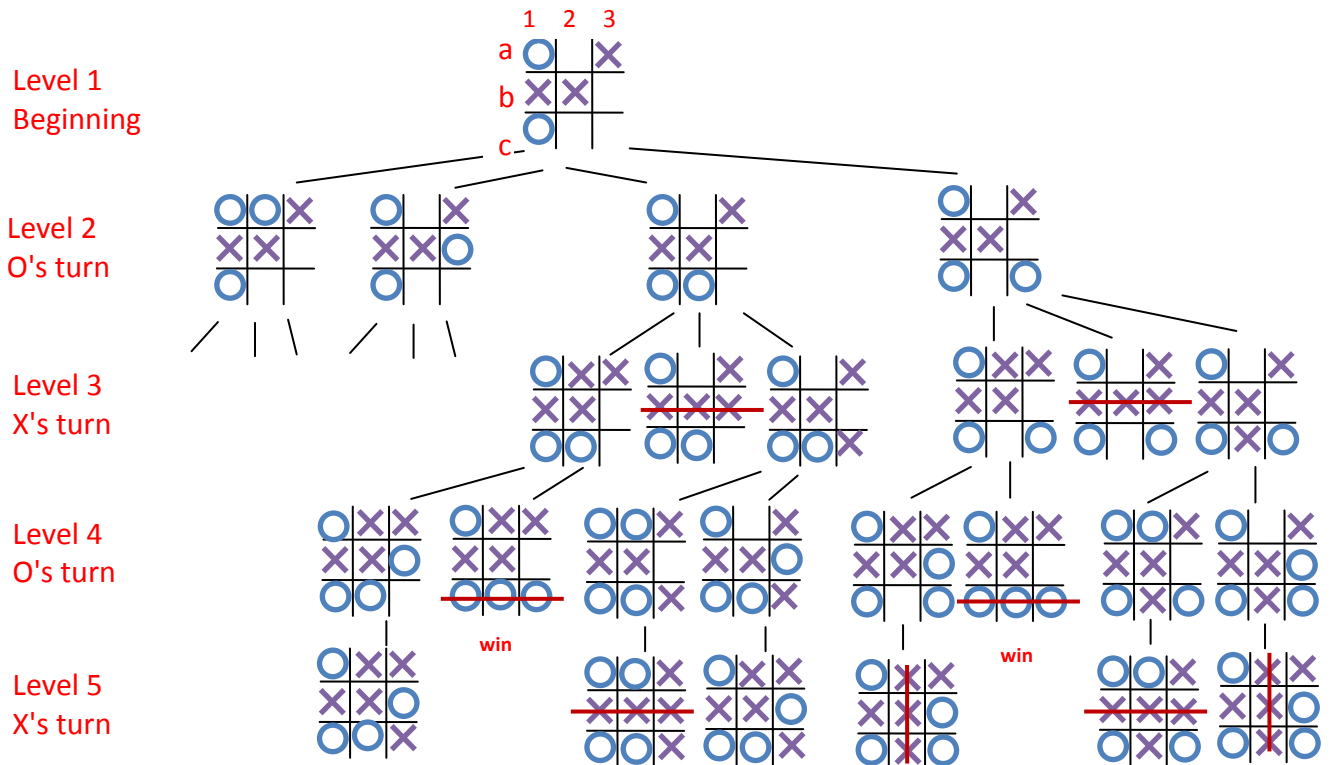


CS1356 Introduction to Information Engineering

Homework 13

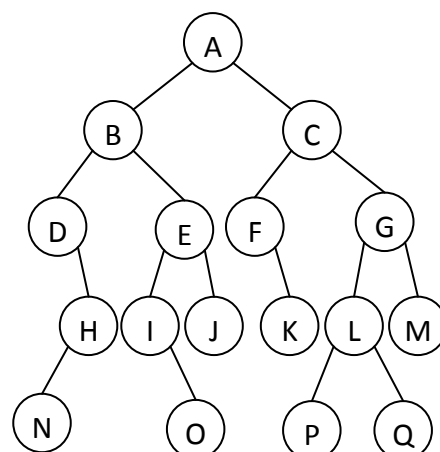
1. Draw the game tree of the tic-tac-toe game and find the best next move



Above is the uncompleted game tree. Since the left two nodes of Level2 wouldn't have any win node for O, so we do not draw out here. Every level O or X fill into one grid in turn. In the beginning, there are three X and two O, so the next move is in the turn of O. This means we have to find the move which can made O being most possible to win.

The right subtree in the left side both have one win node for O. But if we put O in c2 in Level 2, then there are two nodes can be tied, which is better than put O in c3. So the best next move is put O in c2 position.

2. For the tree in the right figure
 - (a) What are leaf nodes?
 - (b) What is the root?
 - (c) What are internal nodes?
 - (d) What are the children of node E?



- (e) What are the ancestors of node K?
- (f) What is the depth of the tree?
- (g) What is the parent of node F?

Ans:

- (a) N,O,J,K,P,Q,M
- (b) A
- (c) B,C,D,E,F,G,H,I,L
- (d) I,J
- (e) A,C,F
- (f) 5
- (g) C

3. Traverse the tree in the right figure with

- (a) Breadth first order
- (b) Depth first-preorder
- (c) Depth first-inorder
- (d) Depth first-postorder

Ans:

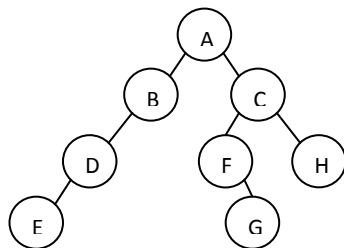
- (a) A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q
- (b) Preorder : Root.->left subtree.->rightsubtree.
A,B,D,H,N,E,I,O,J,C,F,K,G,L,P,Q,M
- (c) Inorder : Left subtree.->root.->right subtree
D,N,H,B,I,O,E,J,A,F,K,C,P,L,Q,G,H
- (d) Postorder : Left subtree.->rightsubtree.->root
N,H,D,O,I,J,E,B,K,F,P,Q,L,M,G,C,A

4. The in-order traversal of a binary tree is EDBAFGCH and the pre-order traversal is ABDECFGH.

- (a) Draw the tree
- (b) What is the post-order of the tree?

Ans:

- (a)



- (b) E,D,B,G,F,H,C,A