

CIS 630 assignment #4

Due: Oct. 17 at class meeting.

Problem 1 – Adversarial Research (25%)

Do problem 5.8 at the textbook (page 147)

Problem 2 – Adversarial Research (75%)

In the following game tree, assume the first player is a MAX player represented by squares, and the second player is a MIN player represented by circles. The values in the leaves of the tree are static scores. Answer the following questions.

1. What are the MIN values for the MIN nodes in the tree and what is the MAX values for the MAX nodes in the tree? Write these values in your tree.
2. Explain what are the $\alpha(s, t)$ (or $\beta(s, t)$) for a MAX (or MIN) node s at time t ? Is it true that for any non-terminal node s $\alpha(s, t) \leq MAX(s) \ \forall t?$ and $\beta(s, t) \geq MIN(s) \ \forall t?$ Explain the reason briefly.
3. Suppose we apply a MIN-MAX search, what path will you choose?
4. Suppose we apply an $\alpha - \beta$ search. Mark the α and β cutoffs by a cross and a circle respectively at the nodes where the cuts occur. Then mark the leaf nodes which are not examed during the $\alpha - \beta$ search.
5. Suppose you are allowed to reorder the children nodes for each non-terminal nodes. For example, you can reorder B, C, D for node A . Draw a new tree with your new orders of nodes so that the $\alpha - \beta$ search will prune the maximal number of leaves. How many leaves are not searched in your new tree? Then draw a second tree so that the $\alpha - \beta$ search will prune no nodes.

