COMP 221. Prof Qiang Yang.

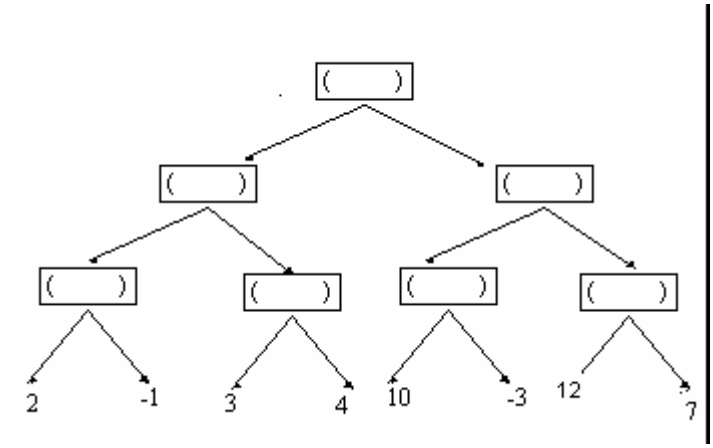
Homework Assignment 2. Fall 2007

Due in class on Oct 18, 2007

1. Game Tree Search

Suppose you are given the following game tree for a 2-person game. Suppose that the MAX player makes the first move and that evaluation of the leaf nodes are already calculated as in the figure.

a) Show the evaluation values of all nodes in a minimax search.
b) Circle the nodes that would be skipped by an alpha-beta search (in left to right order of node evaluation). Briefly explain how to use alpha beta values to skip nodes in the tree.



2. Judge Dee was a legendary Chinese detective who lived in 600 AD. In his lifetime he solved many intricate murder cases. If interested, you can find a whole series of his stories by Robert V. Gulik.

Consider the following fragment of a story:

> Merchant Lee was murdered last night, and Judge Dee was called in to solve the case. He made the following observations: The local detectives questioned everyone who had the opportunity and was not tall. Some of the murderers had the opportunity and were only questioned by murderers. No murderers were tall.

Based on these observations, Judge Dee was able to verify an important suspicion:

1. Some of the local detectives were murderers!
2. For this assignment, show how Judge Dee verified the suspicion using resolution refutation. Specifically, represent the problem statements in First Order Logic. This should include a list of all the relations with descriptive mnemonics, and a clause for each of the English sentences. Then
    - Convert the clauses (except the one to be proved) to their clausal form.
    - Convert the negation of the statement to be proved to a clausal form.
    - Construct a proof of the empty clause by resolution refutation, as discussed in class.