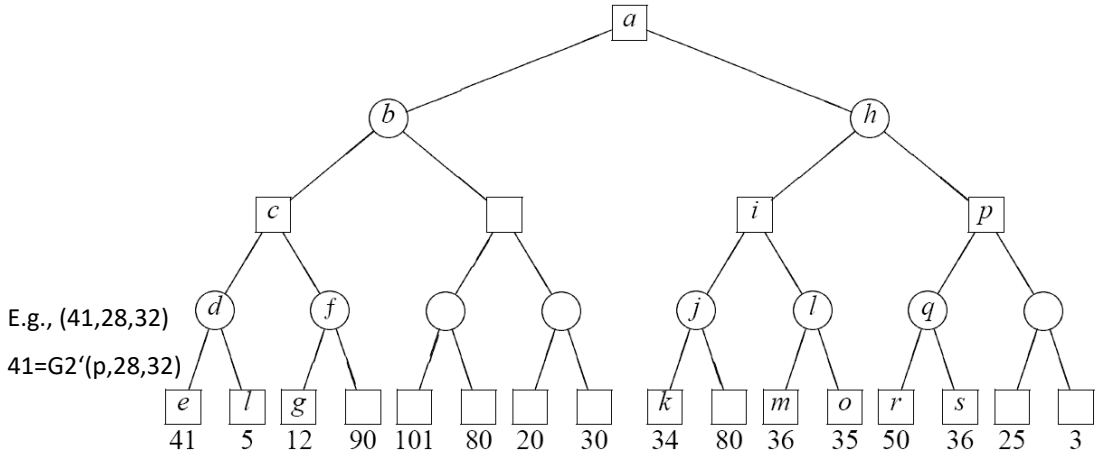
Homework/Pop Quiz #4 of the course: Theory of Computer Games.

(alpha-beta)

1. For the following two-player search tree, assume that we only consider the window of (28, 32) starting from node a. Use mini-max alpha-beta search to solve it. (a) Use fail-hard version (F2' and G2') to solve it. (b) Use fail-soft version (similar to F3, which is a fail-soft version for nega-max). In this problem, you need to indicate the values (***v***, ***alpha***, ***beta***) for *v = F2*(*p*, *alpha*, *beta*) on each edge. In addition, also need to indicate whether branches are cut off.



2. Do the problem 1 again with window (45, 60) for fail-soft only.
3. Do the AB-Dual* for the above tree (that is, MTD($-\infty$)). Hint: draw all passes of the search, you may skip subtrees as in the handout.

(zhash)

4. For Gomoku on a 15x15 board: (a) Design a Z-hashing function for any given position. (b) Furthermore, we want to distinguish a path P, defined a sequence of three consecutive positions, say (P_i, P_{i+1}, P_{i+2}). How do you define a new Z-hashing function for such a path? Hint: the key encoded from (p1, p2, p3) must be different from that for (p3, p2, p1).