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COSC 470.001
Assignment 2 (due date: 11/18/2018):

This assignment is to assess your understanding of the Adversarial Search (chapter 5 sections 1, 2, 3) and Constraint Satisfaction Problems (Chapter 6 Sections 1, 2, and 3). Please read these two chapters as they are very fun to read, and also very essential to understand the concept of logic as well adversarial games.

Exercise 1: Please define each of the following terms:

Adversarial Agent: is an agent that plans ahead of what other agents are doing from in the same competitive environments. Adversarial agent is relevant to games like chess, checkers, or other two component games.

Zero Sum Game: means that the regardless how bad someone losses or wins. These losses and winds are balanced out accordingly together.

Alpha-Beta Pruning: gets its name from the
following two parameters that describe bounds on the backed-up values that appear anywhere along the path:
α = the value of the best (i.e., highest-value) choice we have found so far at any choice point along the path for MAX.
β = the value of the best (i.e., lowest-value) choice we have found so far at any choice point along the path for MIN.

Arc Consistency:

A variable in a CSP is arc-consistent if every value in its domain satisfies the variable's binary constraints. More formally, Xi is arc-consistent with respect to another variable Xj if for every value in the current domain Di there is some value in the domain Dj that satisfies the binary constraint on the arc (Xi, Xj).

Forward Checking: Whenever a variable X is assigned, the forward-checking process establishes arc consistency for it: for each
unassigned variable Y that is connected to X by a constraint, delete from Y 's domain any value that is inconsistent with the value chosen for X. Because forward checking only does arc consistency inferences, there is no reason to do forward checking if we have already done arc consistency as a preprocessing step.

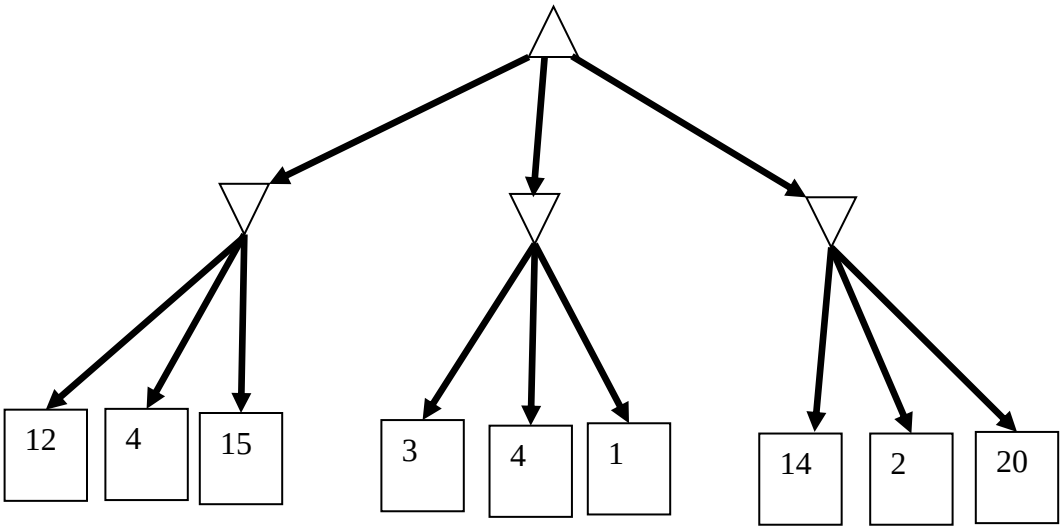
Ordering:

To solve a tree-structured CSP, first pick any variable to be the root of the tree, and choose an ordering of the variables such that each variable appears after its parent in the tree. It turns out that, for a wide variety of problems, a variable ordering that chooses a variable with the minimum number of remaining values helps minimize the number of nodes in the search tree by pruning larger parts of the tree earlier. For value ordering, the trick is that we only need one solution; therefore it makes sense to look for the most likely values first. If we wanted to enumerate all solutions rather than just find one, then value ordering would be irrelevant.

Backtracking:

has is to backtrack to a variable that might fix the problem—a variable that was responsible for making one of the possible values of SA impossible

Exercise 2: Please use the Alpha Bet pruning and identify which nodes will be pruned. Please explain the process and how you are doing this.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Solution for Exercise #2