Homework 2 – Adversarial Search   Chapter 5
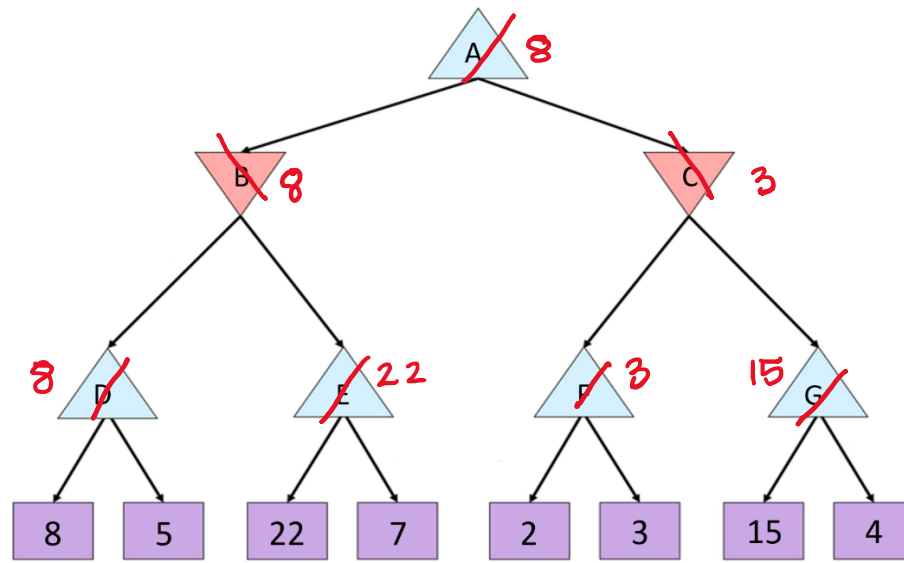
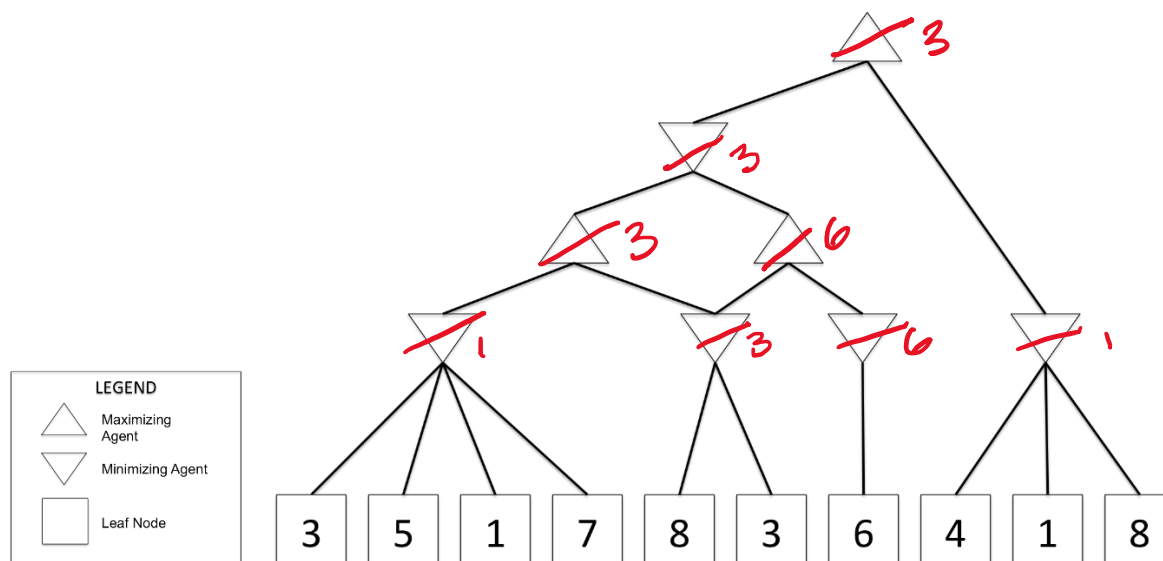**Due:** See online for exact date

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Directions: You must work on this assignment alone.

1.) [10pts] Write the Minimax values for nodes A-G in the following minimax tree:

2.) [10pts] Fill in the Minimax values for each node in the following minimax tree:

3.) [60pts] Perform alpha-beta pruning on the tree from #1. Assuming we use the variable *v* to represent the value currently assigned to the node, list the alpha(α), beta (β) and value (*v*) variables of each node as (α, *v*, β), as we did in class.

Generate the tree in the space below (you may want to do it on a separate piece of paper and then copy it over when you are sure you have it) using a **depth-first search**. When alpha-beta pruning determines that you can prune certain nodes, then draw an "X" instead of the corresponding node or sub-tree.
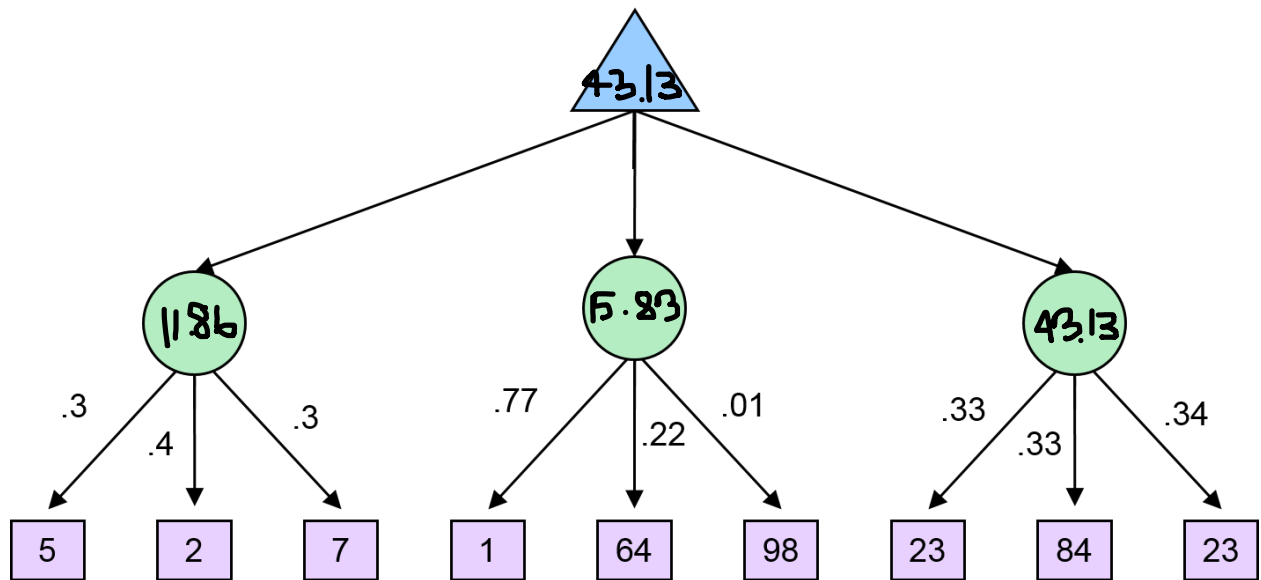
NOTE: For a decent Youtube demonstration of alpha-beta pruning, click here.
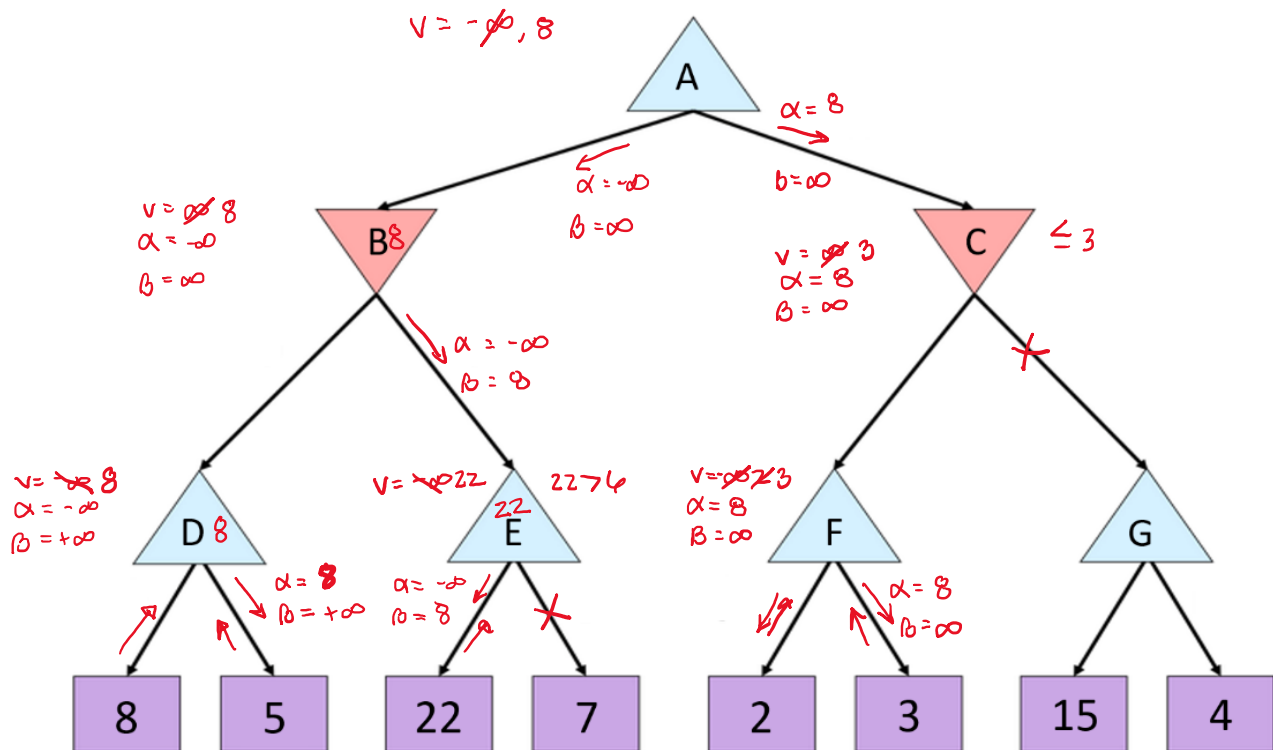
Use the table to help you keep track of the current (α, *v*, β) state of each node. So, the (α, *v*, β) state at the bottom of each row represents the current state of that node. Values in the same row have no meaning...**the most important thing is that each value on the bottom of each column represents the current (α, *v*, β) values for that state upon completion of the search**.

A	B	C	D	E	F	G
(-∞, v, +∞)	(-∞, v, +∞)	(-∞, v, +∞)	(-∞, v, +∞)	(-∞, v, +∞)	(-∞, v, +∞)	
(-∞, 8, +∞)	(-∞, -∞, +∞)	(8, ∞, +∞)	(-∞, -∞, +∞)	(-∞, -∞, 8)	(8, v, +∞)	
	(-∞, 8, +∞)	(8, 3, +∞)	(-∞, 8, +∞)	(-∞, 22, 8)	(8, 2, +∞)	
					(8, 3, +∞)	

4.) [20pts] Assign values to the nodes for the following expectimax tree:

Triangle (max node): 43.13

Left green node: 11.86
.3   .4   .3

Middle green node: 15.83
.77   .22   .01

Right green node: 43.13
.33   .33   .34

Leaves:
5   2   7   1   64   98   23   84   23

= 3(5) + .4(2) + .3(7)	= .77(1) + .22(64) + .01(98)	= .33(23) + .33(84) + .34(23)
= 1.5 + .8 + 2.1	= .77 + 14.08 + .98	= 7.59 + 27.72 + 7.82
= 11.6	= 15.83	= 43.13