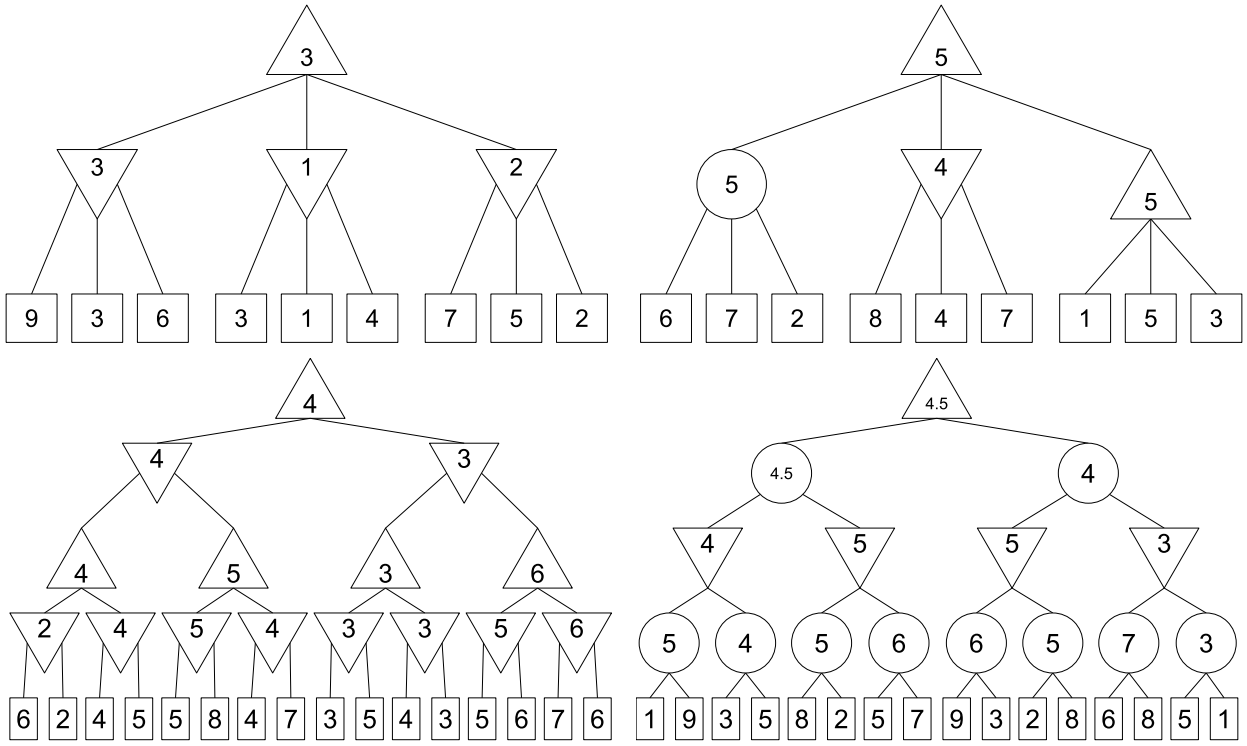
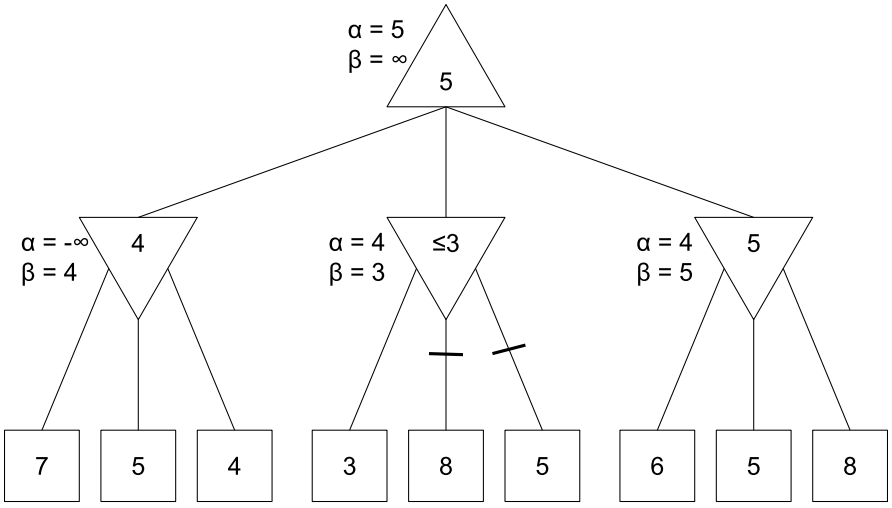
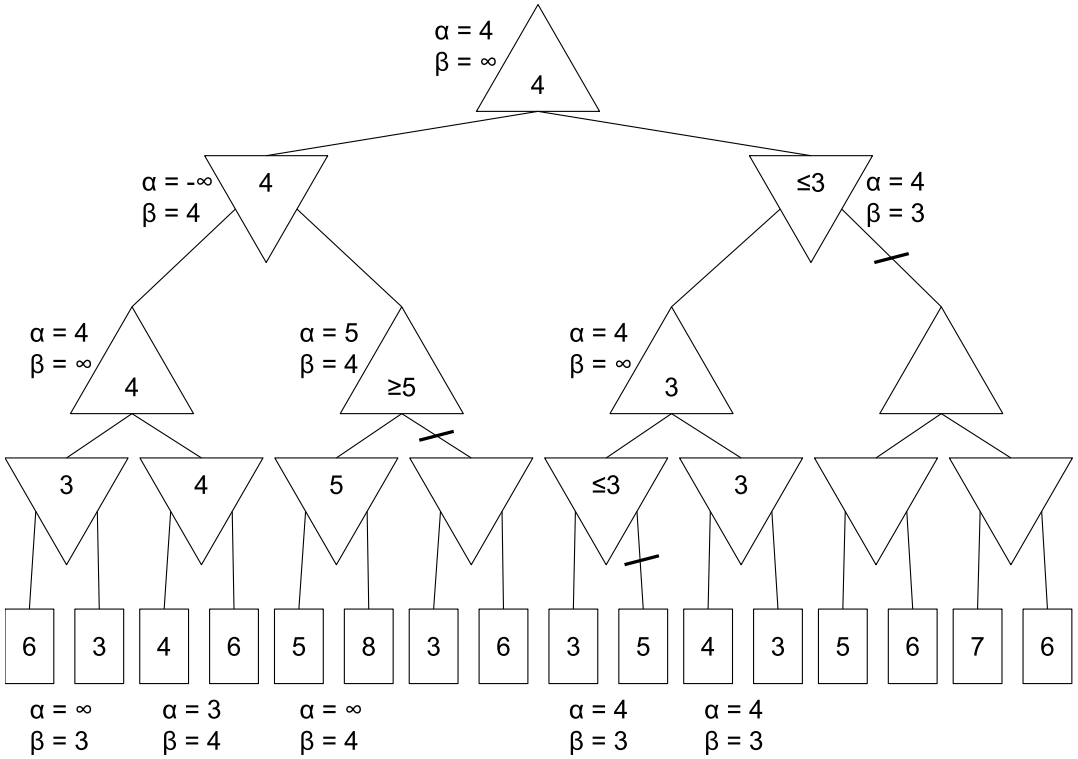
Quiz 2 - Multi-Agent Search

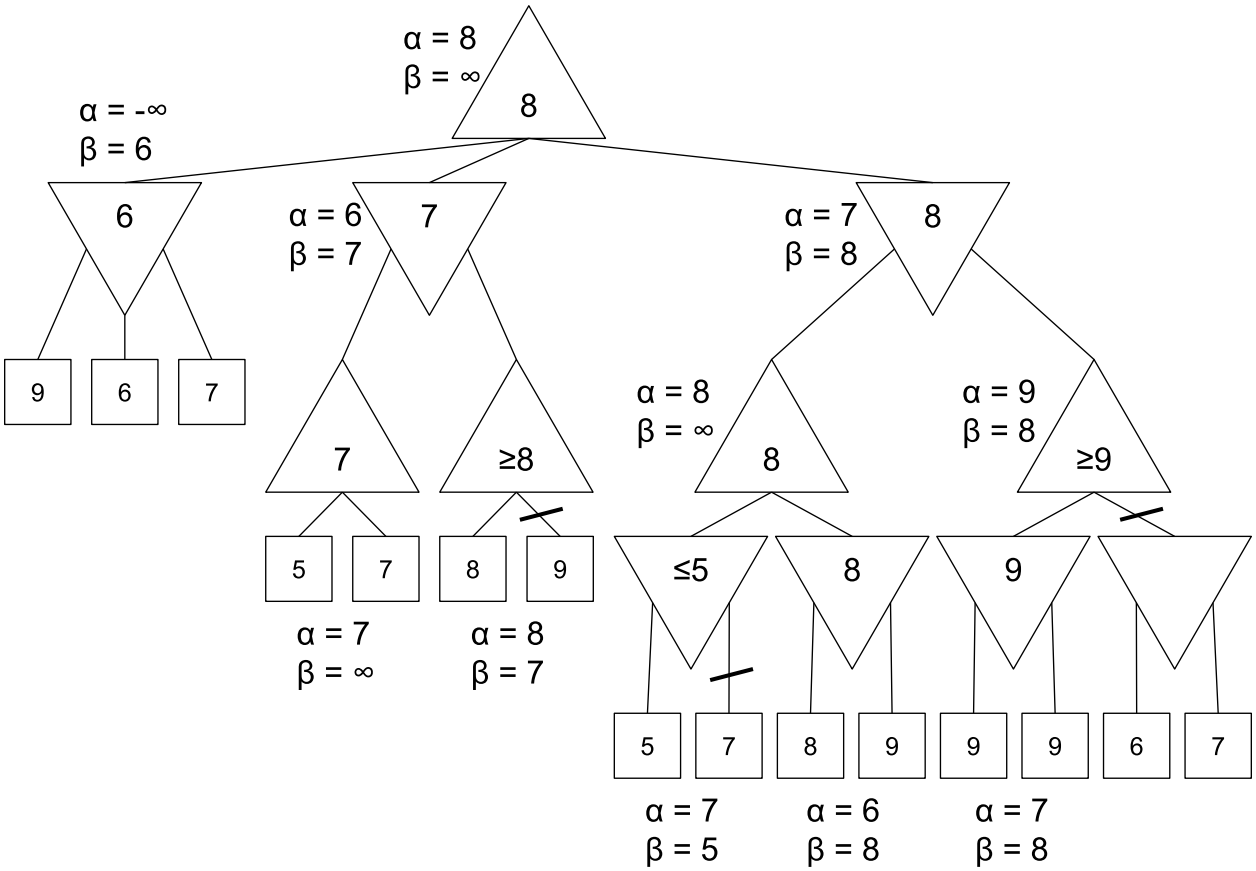
1. Compute the value of each node in the following game trees. Maximizer nodes are denoted by upward pointing triangles, minimizer nodes by downward pointing triangles, and chance nodes by circles. Assume uniform distribution for all chance nodes.



2. Simulate alpha-beta pruning on the following game trees. Assume the nodes are evaluated from left to right. Mark all branches that are pruned, and show the computed value of each node that wasn't pruned. If only an upper or lower bound is known, write ≤x or ≥x, where x is the value of that bound. Next to each non-terminal node, write the final values of alpha and beta used in evaluating that node.




α = 4
β = ∞
4
α = -∞
β = 4
4
≤3
α = 4
β = 3
α = 4
β = ∞
4
α = 5
β = 4
≥5
α = 4
β = ∞
3
3
4
5
≤3
3
6
3
4
6
5
8
3
6
3
5
4
3
5
6
7
6
α = ∞
β = 3
α = 3
β = 4
α = ∞
β = 4
α = 4
β = 3
α = 4
β = 3


α = 8
β = ∞
8
α = -∞
β = 6
6
α = 6
β = 7
7
α = 7
β = 8
8
9
6
7
7
≥8
α = 8
β = ∞
8
α = 9
β = 8
≥9
5
7
8
9
≤5
8
9
α = 7
β = ∞
α = 8
β = 7
5
7
8
9
9
9
6
7
α = 7
β = 5
α = 6
β = 8
α = 7
β = 8

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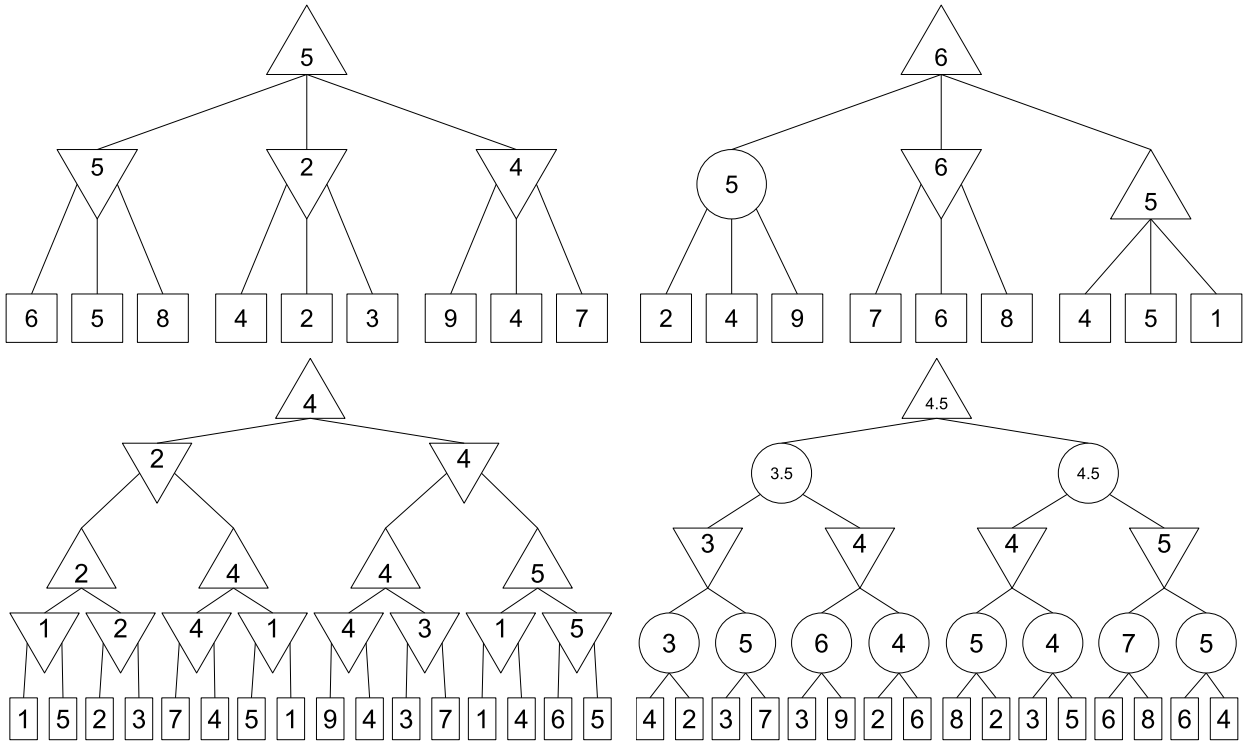
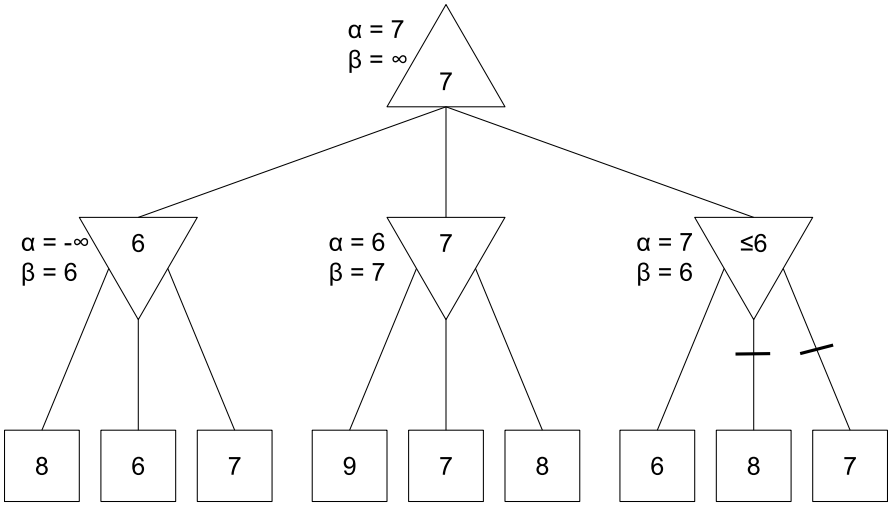
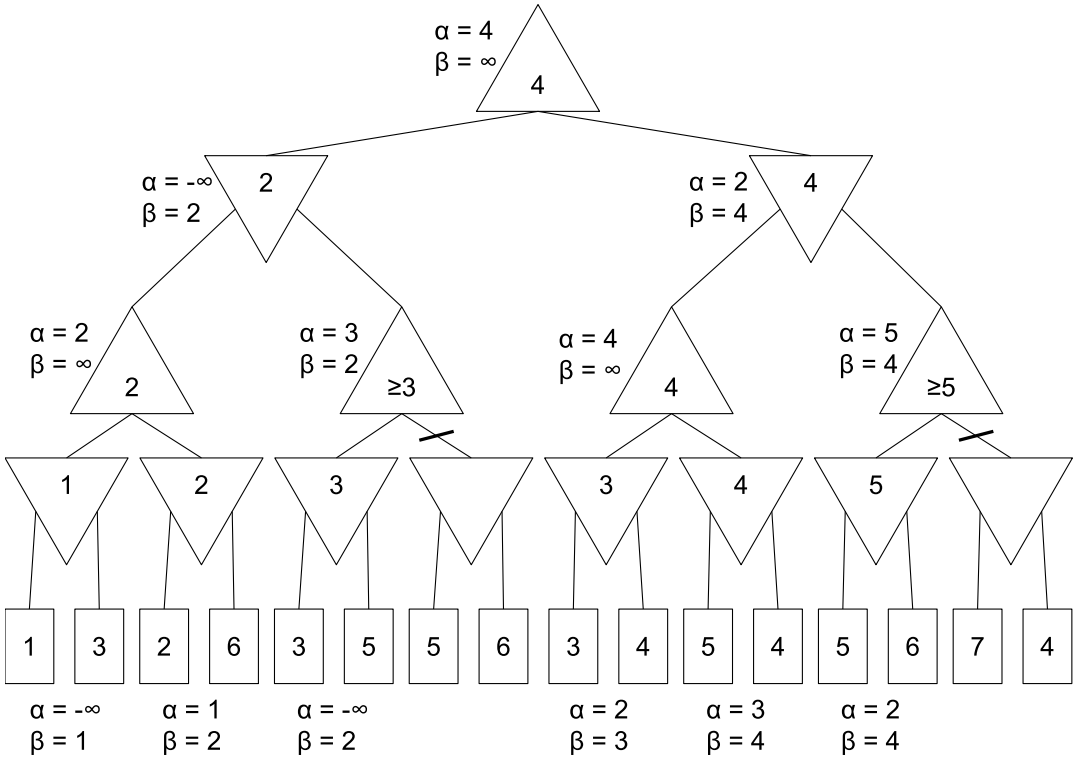
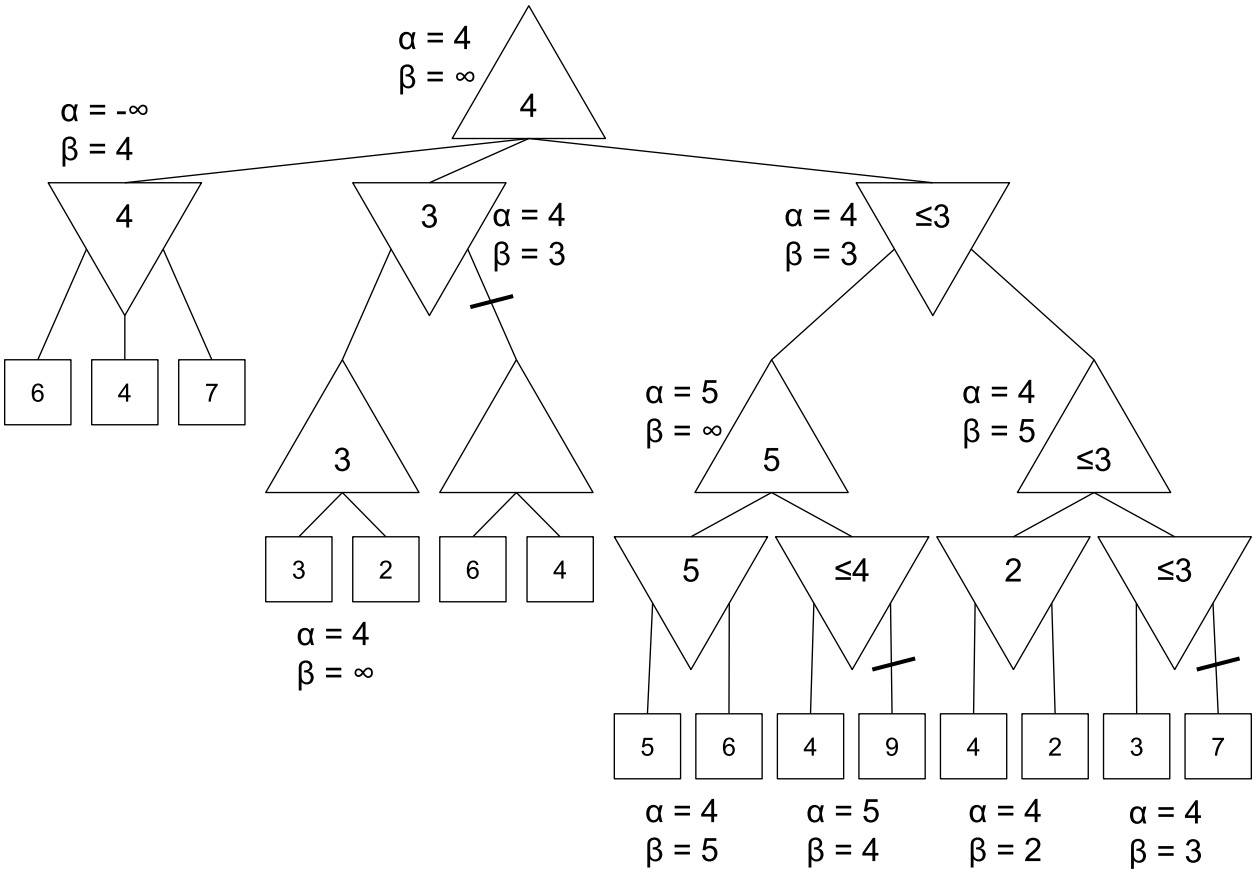
1. Compute the value of each node in the following game trees. Maximizer nodes are denoted by upward pointing triangles, minimizer nodes by downward pointing triangles, and chance nodes by circles. Assume uniform distribution for all chance nodes.



2. Simulate alpha-beta pruning on the following game trees. Assume the nodes are evaluated from left to right. Mark all branches that are pruned, and show the computed value of each node that wasn't pruned. If only an upper or lower bound is known, write ≤x or ≥x, where x is the value of that bound. Next to each non-terminal node, write the final values of alpha and beta used in evaluating that node.

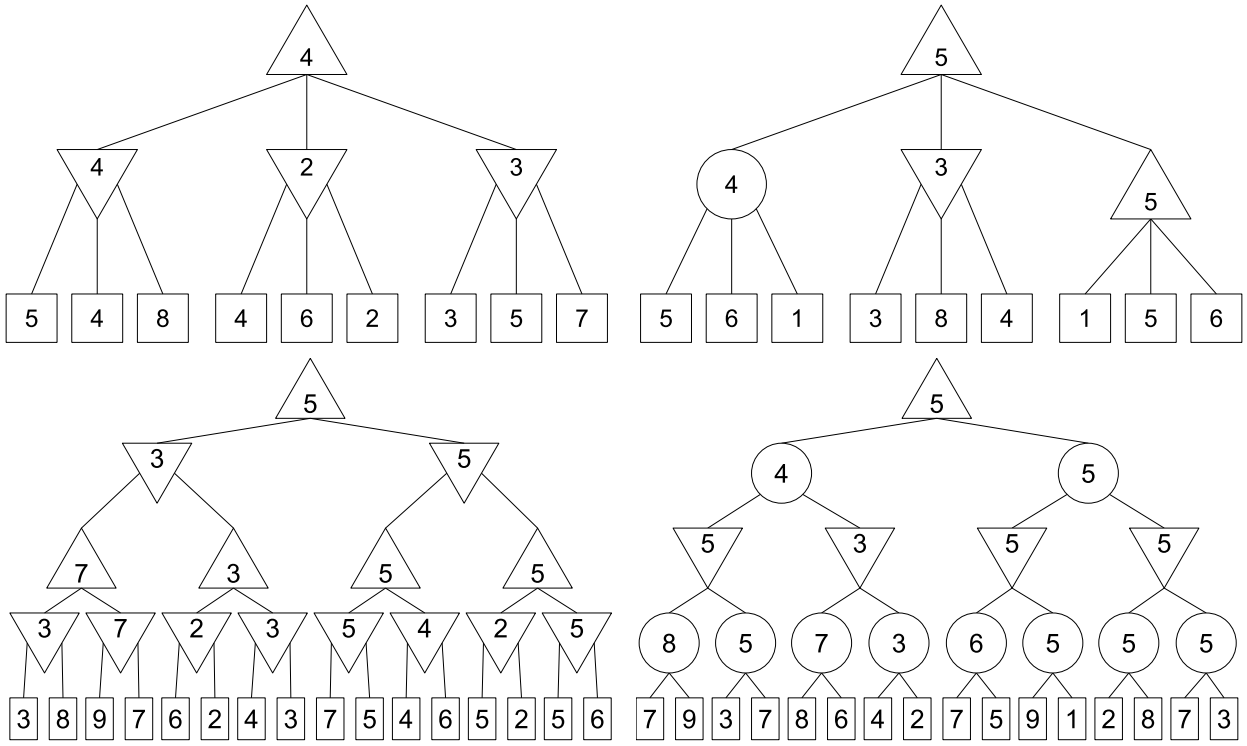



α = 4
β = ∞
4
α = -∞
β = 2
2
α = 2
β = 4
4
α = 2
β = ∞
2
α = 3
β = 2
≥3
α = 4
β = ∞
4
α = 5
β = 4
≥5
1
2
3
3
4
5
1
3
2
6
3
5
5
6
3
4
5
4
5
6
7
4
α = -∞
β = 1
α = 1
β = 2
α = -∞
β = 2
α = 2
β = 3
α = 3
β = 4
α = 2
β = 4

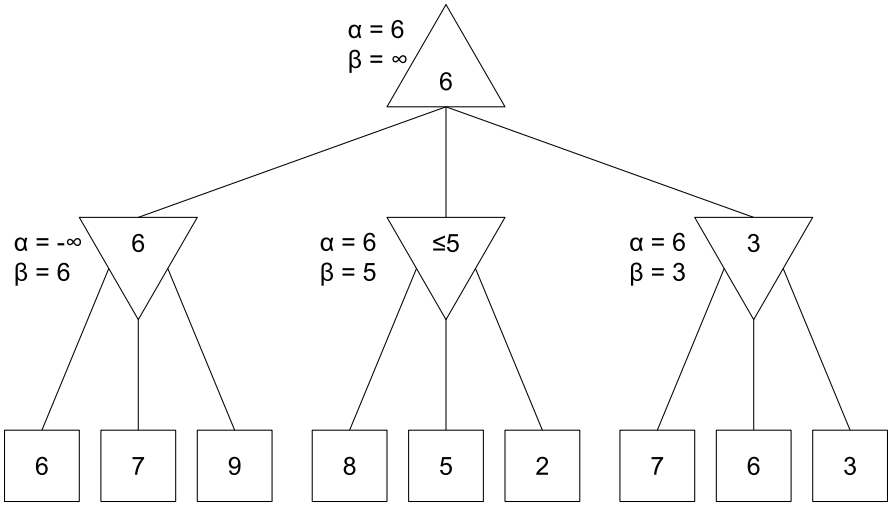

α = 4
β = ∞
4
α = -∞
β = 4
4
3
α = 4
β = 3
α = 4
β = 3
≤3
6
4
7
3
α = 5
β = ∞
5
α = 4
β = 5
≤3
3
2
6
4
5
≤4
2
≤3
α = 4
β = ∞
5
6
4
9
4
2
3
7
α = 4
β = 5
α = 5
β = 4
α = 4
β = 2
α = 4
β = 3

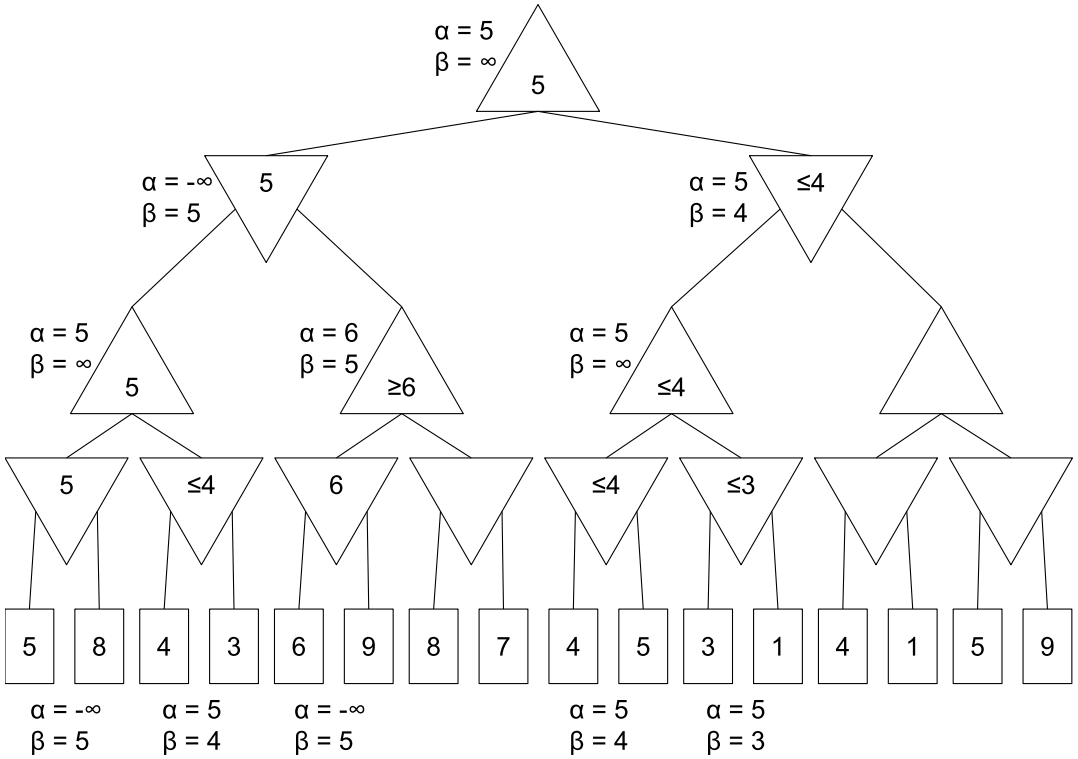
Makeup Quiz 2 - Multi-Agent Search

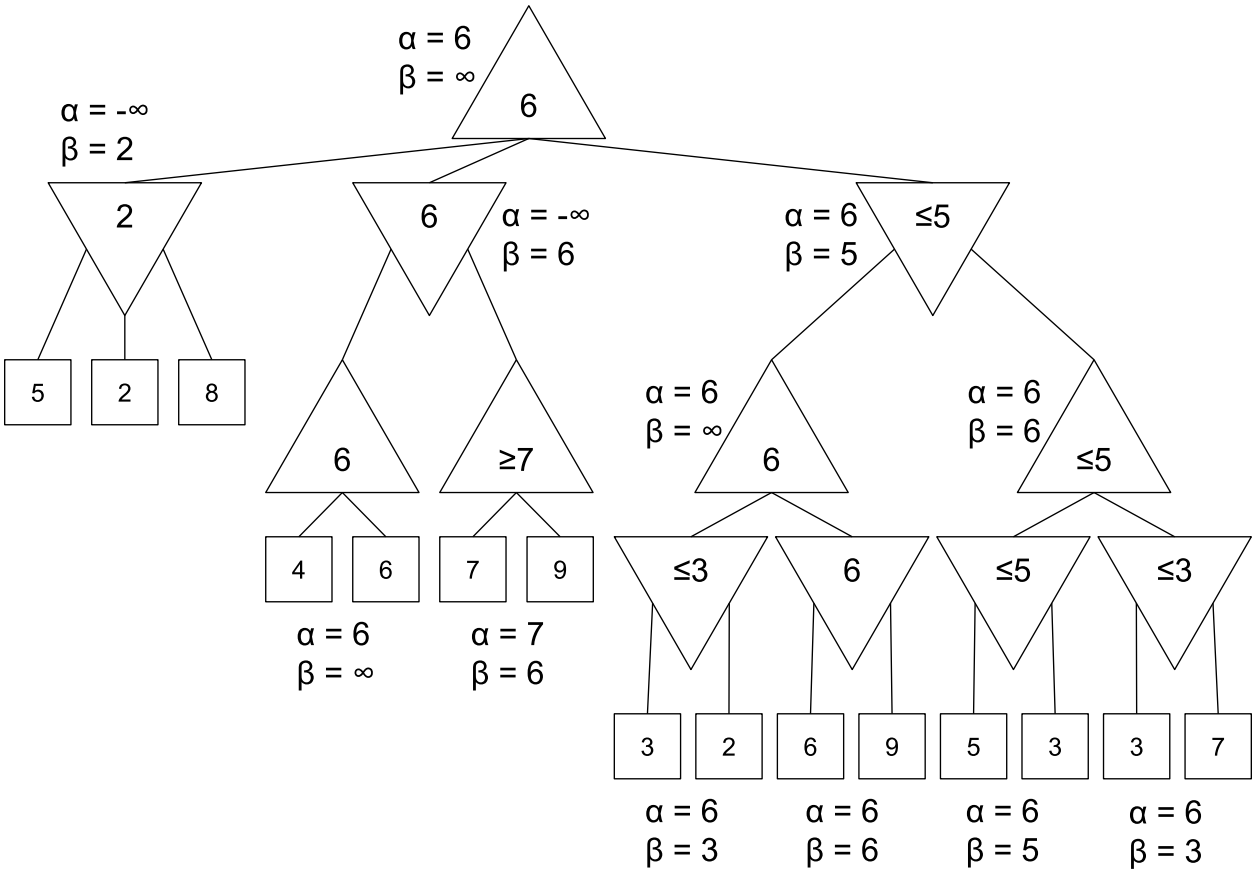
1. Compute the value of each node in the following game trees. Maximizer nodes are denoted by upward pointing triangles, minimizer nodes by downward pointing triangles, and chance nodes by circles. Assume uniform distribution for all chance nodes.



2. Simulate alpha-beta pruning on the following game trees. Assume the nodes are evaluated from left to right. Do not prune on equality. Mark all branches that are pruned, and show the computed value of each node that wasn't pruned. If only an upper or lower bound is known, write ≤x or ≥x, where x is the value of that bound. Next to each non-terminal node, write the final values of alpha and beta used in evaluating that node.




α = 5
β = ∞
5
α = -∞
β = 5
5
α = 5
β = 4
≤4
α = 5
β = ∞
5
α = 6
β = 5
≥6
α = 5
β = ∞
≤4
5
≤4
6
≤4
≤3
5
8
4
3
6
9
8
7
4
5
3
1
4
1
5
9
α = -∞
β = 5
α = 5
β = 4
α = -∞
β = 5
α = 5
β = 4
α = 5
β = 3


α = 6
β = ∞
6
α = -∞
β = 2
2
6
α = -∞
β = 6
α = 6
β = 5
≤5
5
2
8
6
≥7
α = 6
β = ∞
6
α = 6
β = 6
≤5
4
6
7
9
≤3
6
≤5
≤3
α = 6
β = ∞
α = 7
β = 6
3
2
6
9
5
3
3
7
α = 6
β = 3
α = 6
β = 6
α = 6
β = 5
α = 6
β = 3