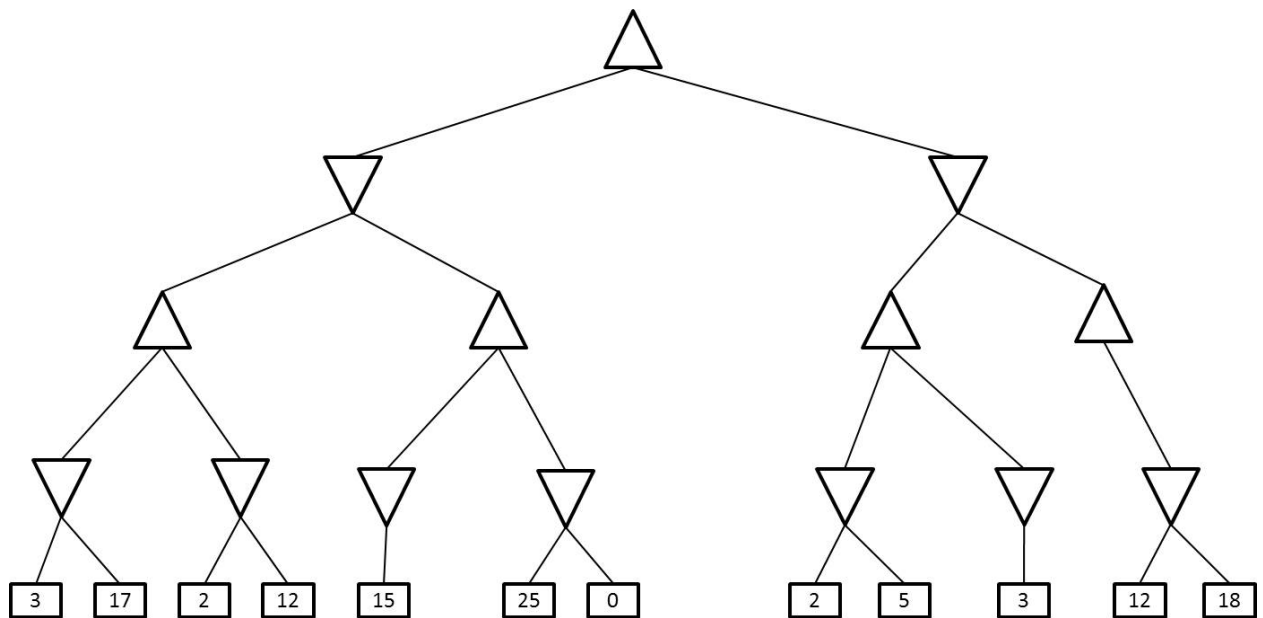


CS 6364: Homework 4
FALL 2016
INSTRUCTOR: VIBHAV GOGATE

To get full credit, you should at least submit solutions to the problems not marked *optional* below.

1. Exercise 5.20 from Russell and Norvig.
2. On the game-tree given below, indicate which states will not be explored (i.e., pruned) if alpha-beta pruning is used. Show your work by showing the alpha and beta values associated with each node. No credit will be given if you don't show your work. Assume that the branches are explored from left to right. \triangle denotes MAX nodes and ∇ denotes MIN nodes.



3. Show that the following sentences are consistent by identifying a world that satisfies each sentence:
 - (a) $(A \Rightarrow B) \wedge (A \Rightarrow \neg B)$
 - (b) $(A \vee B) \Rightarrow (\neg A \wedge \neg B)$
4. Which of the following sentences are valid? If a sentence is not valid, identify a world that does not satisfy the sentence.
 - (a) $(A \wedge (A \Rightarrow B)) \Rightarrow B$
 - (b) $(A \wedge B) \vee (A \wedge \neg B)$
 - (c) $(A \Rightarrow B) \Rightarrow (\neg B \Rightarrow \neg A)$
5. (Optional) Exercise 7.5 from Russell and Norvig.
6. Exercise 7.17 from Russell and Norvig.

7. Exercise 7.24 from Russell and Norvig.
8. Convert the following sentences to CNF:
 - (a) $P \Rightarrow (Q \Rightarrow R)$
 - (b) $\neg((P \Rightarrow Q) \wedge (R \Rightarrow S))$
9. (Optional) Exercise 7.19 from Russell and Norvig.