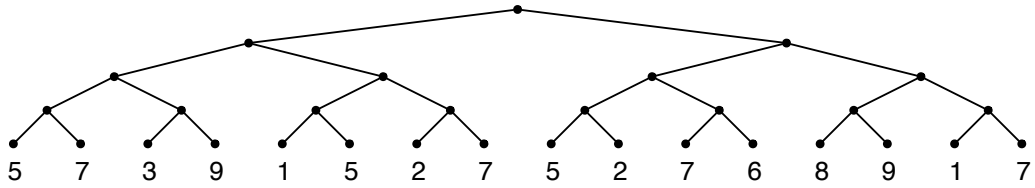
5. (a) Describe the minimax with alpha-beta pruning algorithm and show how it operates on the following tree, where the first player is the maximising player. State which move the first player should choose, and what utility they should expect. You should show the resulting search tree. [7]



(b) i. Describe how a cut point can be chosen for a depth-first search of the game tree, as carried out by the minimax algorithm. [4]

ii. Explain the horizon problem that is potentially faced when using such a cut point. How can this be avoided? [4]

(c) Using the Venn diagram decision procedure, determine if the following are valid or invalid syllogisms:

All hills are mountains
Some mountains have snow [2]

$\therefore$ Some hills have snow

All hills are mountains
Some mountains have snow [2]

$\therefore$ Some hills do not have snow

(d) Briefly outline alternative procedures for how you might determine heuristics for a search problem, and how you might combine multiple heuristics into a single useful heuristic. [6]