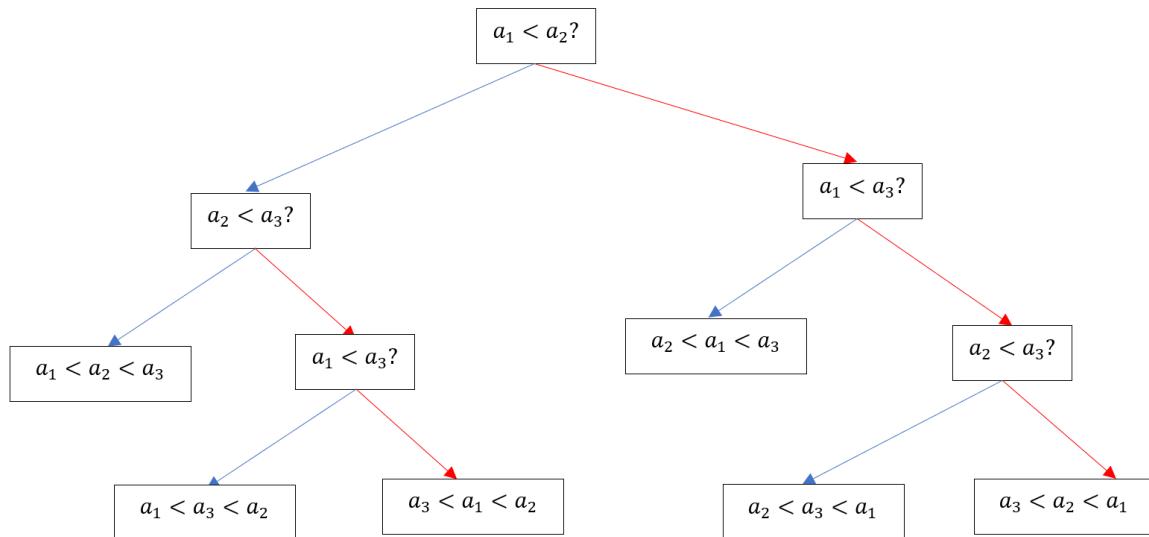


Graph Theory Fall 2020

Extra Credit Assignment (5 points)

Due at 5:00 pm on Wednesday, November 4

Recall from lecture on Wednesday, October 21, the decision tree to sort a list of three distinct elements using at most three levels of binary decisions:



An algorithm that is the same as the above tree:

Input: A list a_1, a_2, a_3 of three distinct elements.

Output: The same list, in ascending order.

Level 1: Is $a_1 < a_2$?

 Level 2: If $a_1 < a_2$, then is $a_2 < a_3$?

 If $a_2 < a_3$, return $a_1 < a_2 < a_3$

 Level 3: If $a_3 < a_2$, then is $a_1 < a_3$?

 If $a_1 < a_3$, return $a_1 < a_3 < a_2$

 If $a_3 < a_1$, return $a_3 < a_1 < a_2$

 Level 2: If $a_2 < a_1$, then is $a_1 < a_3$?

 If $a_1 < a_3$, return $a_2 < a_1 < a_3$

 Level 3: If $a_3 < a_1$, then is $a_2 < a_3$?

 If $a_2 < a_3$, return $a_2 < a_3 < a_1$.

 If $a_3 < a_2$, return $a_3 < a_2 < a_1$.

Your mission: Produce either a decision tree or the details of an algorithm that demonstrates how to sort a list of five distinct elements a_1, a_2, a_3, a_4, a_5 using at most seven levels of binary decisions (this is the same as producing a binary tree of height 7).