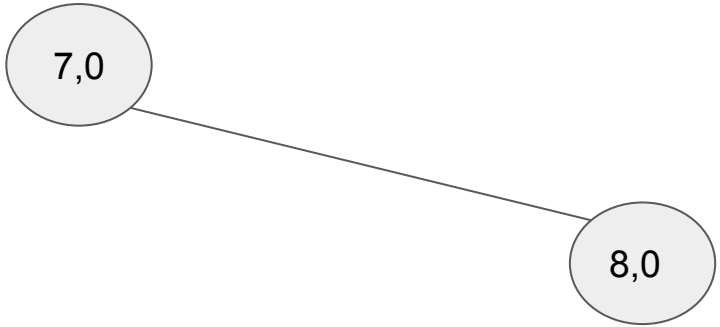
CSE2225 Data Structures - Project 2
Modified Splay Tree
Cost Calculation with an Example

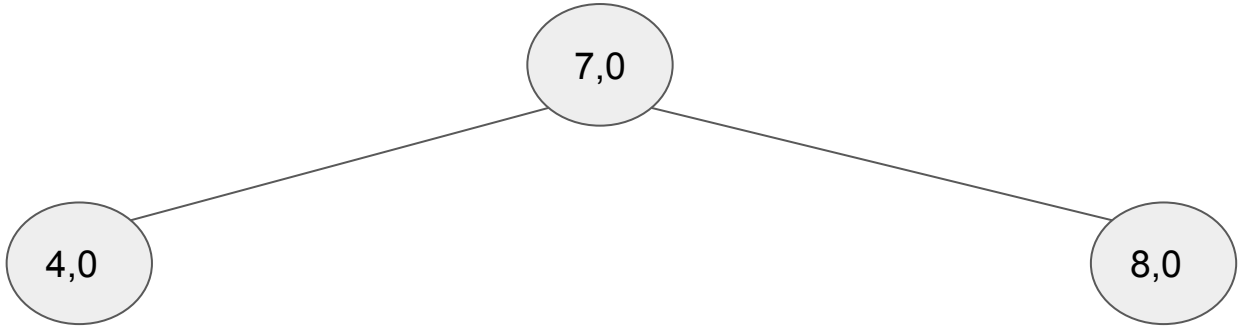
Total cost = Comparison Cost + Rotation cost

Cost of 1 Comparison = 1 time unit
Cost of 1 Zig-Zag Rotation = 2 time units
Cost of 1 Zig-Zig Rotation = 2 time units
Cost of 1 Zig Rotation = 1 time unit

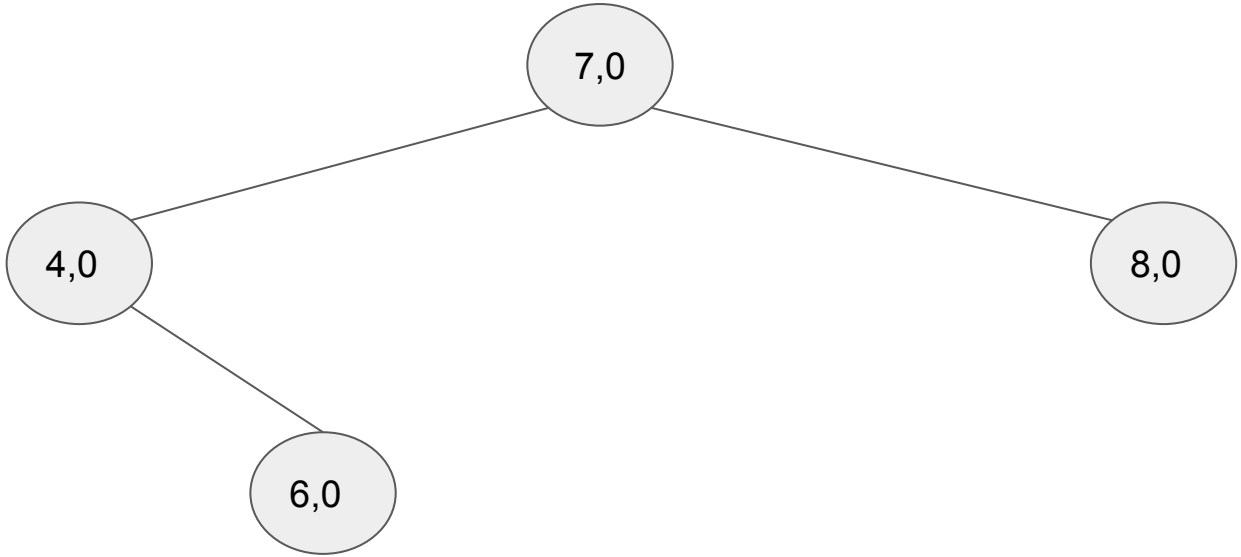
Insert 7 : 0 comparison, no rotation, Total cost: 0



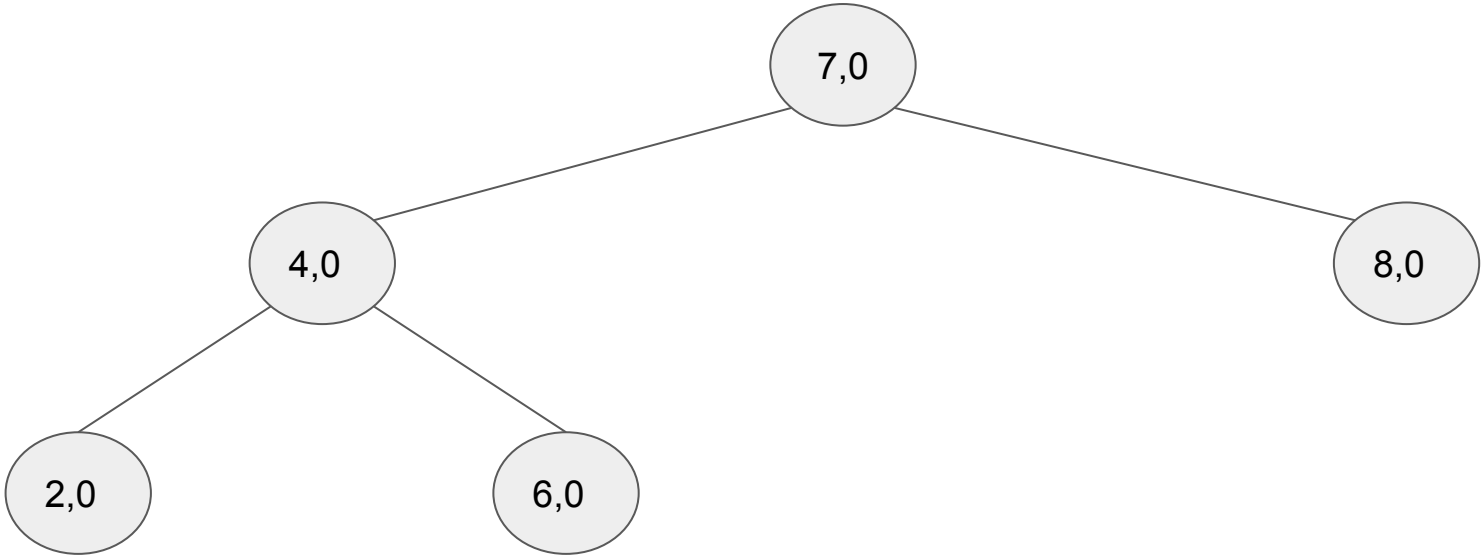
Insert 8 : 1 comparison, no rotation, Total cost: 1



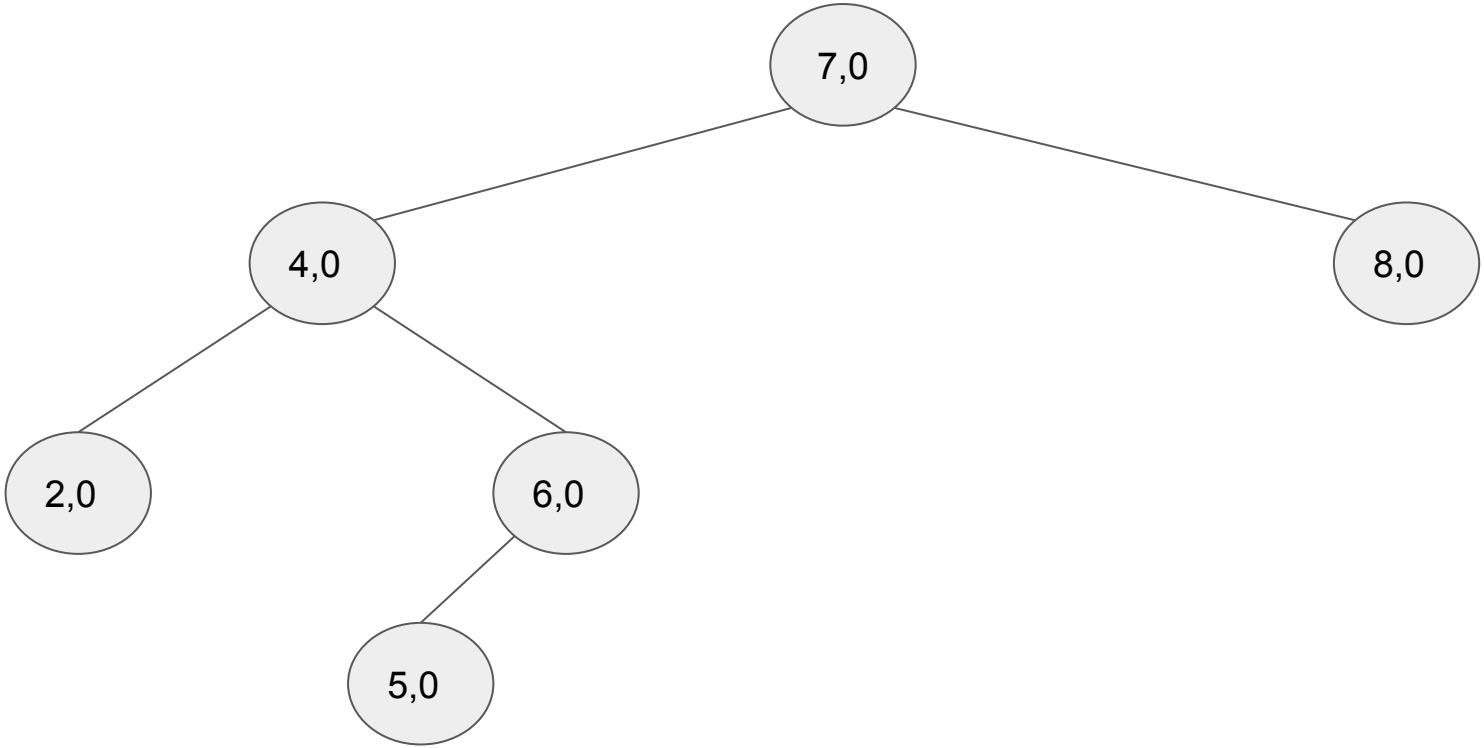
Insert 4 : 1 comparison, no rotation, Total cost: 2



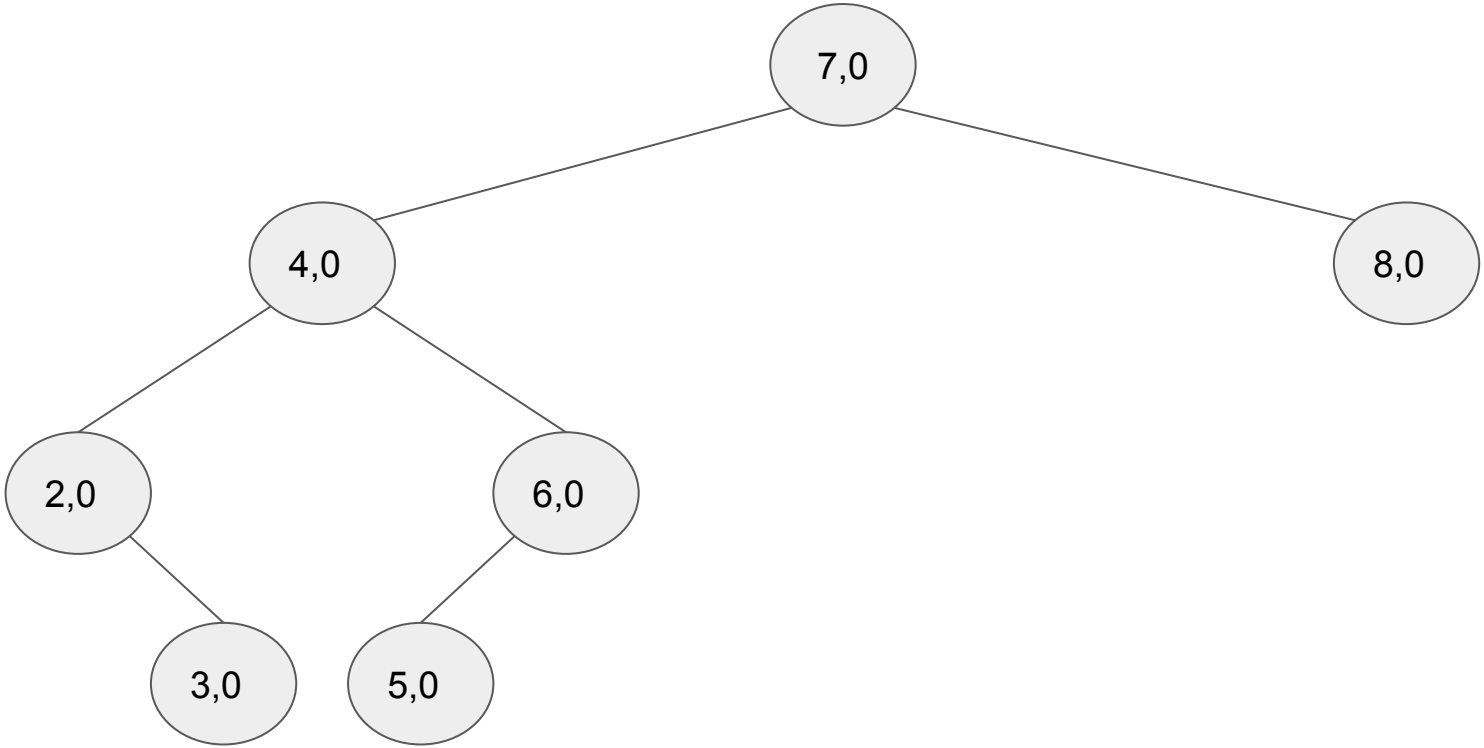
Insert 6 : 2 comparisons, no rotation, Total cost: 4



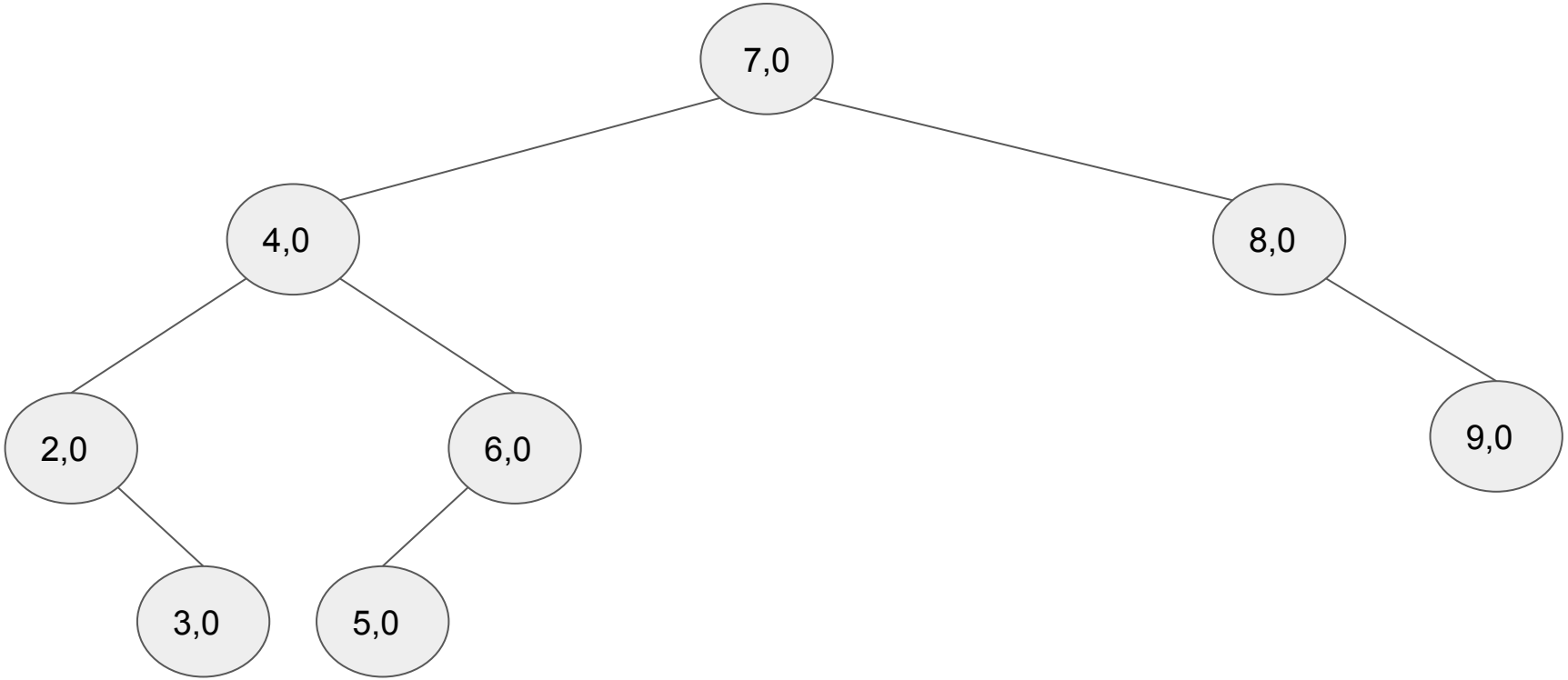
Insert 2 : 2 comparisons, no rotation, Total cost: 6



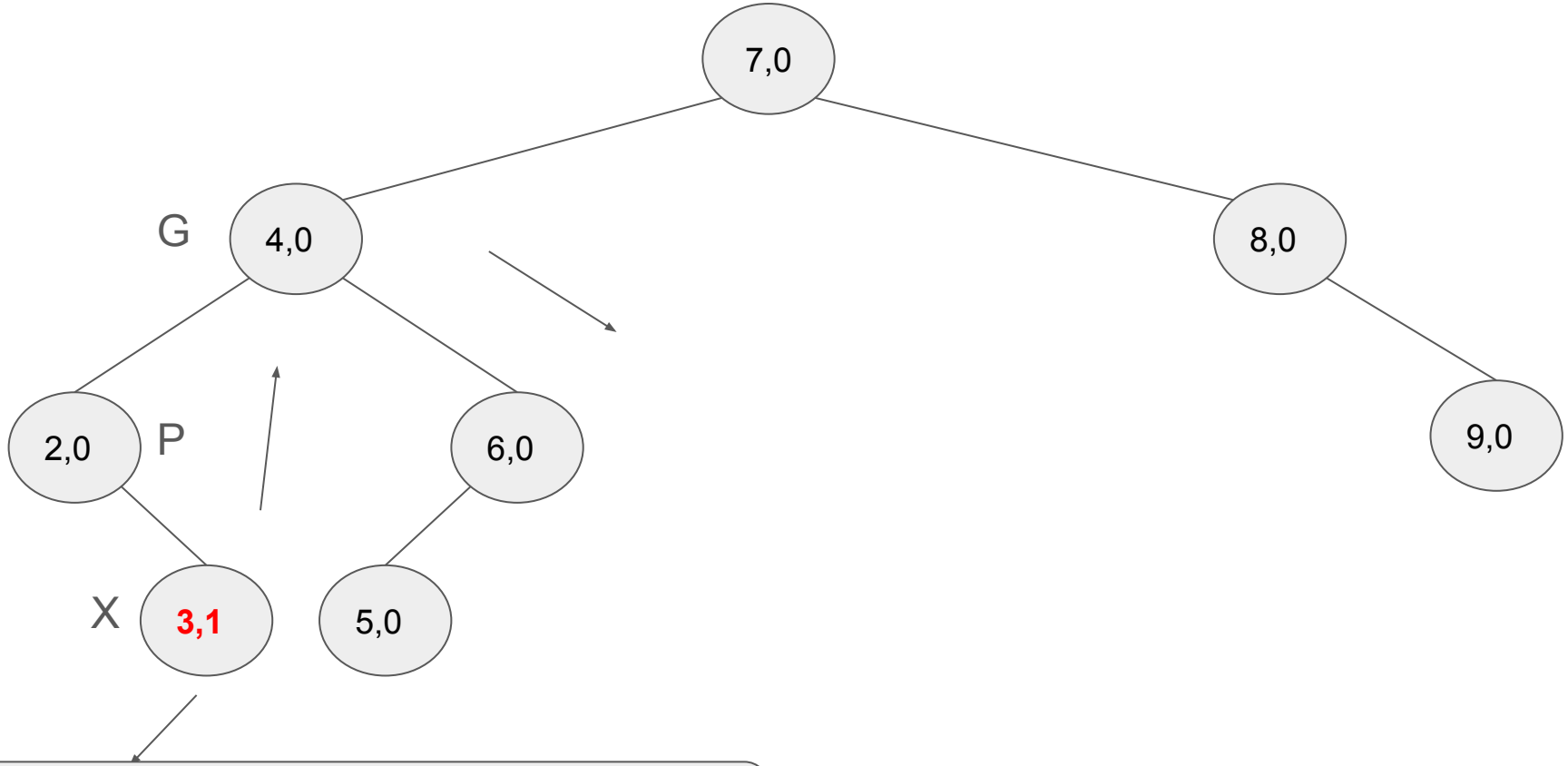
Insert 5 : 3 comparisons, no rotation, Total cost: 9



Insert 3 : 3 comparisons, no rotation, Total cost: 12

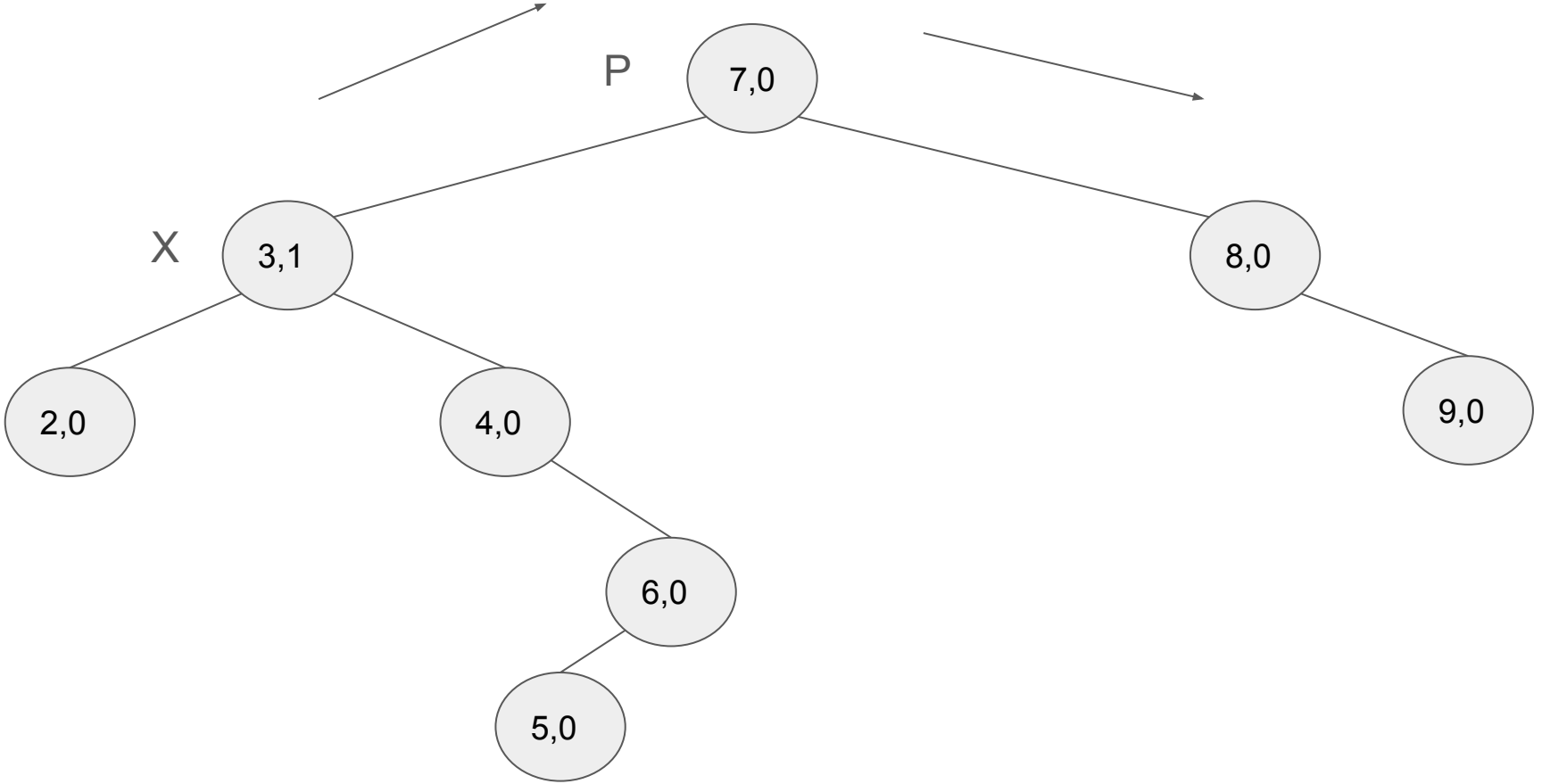


Insert 9 : 2 comparisons, no rotation, Total cost: 14

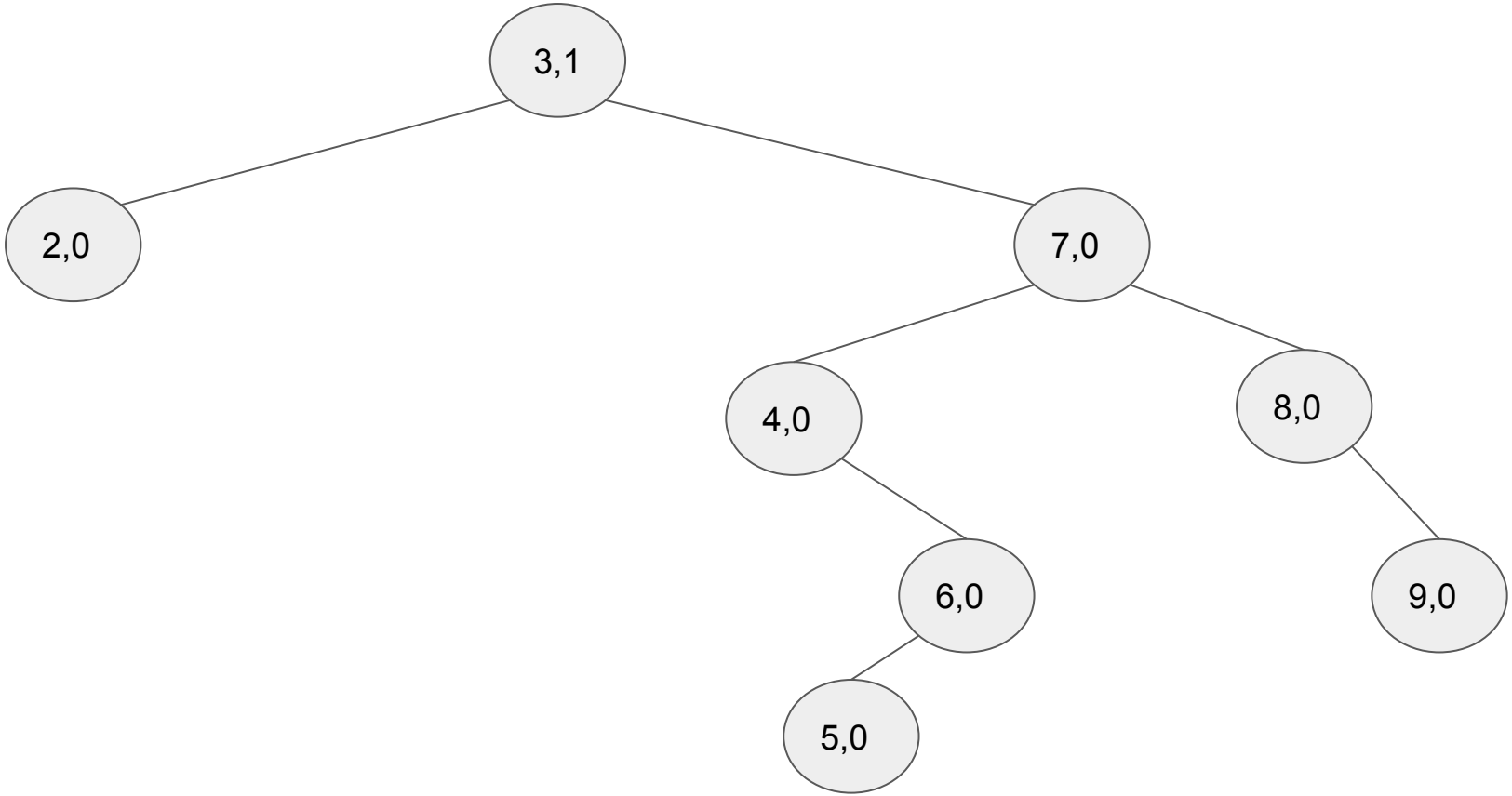


Frequency of node 3 is 1 which is maximum in the tree;
So we need to perform splay operation

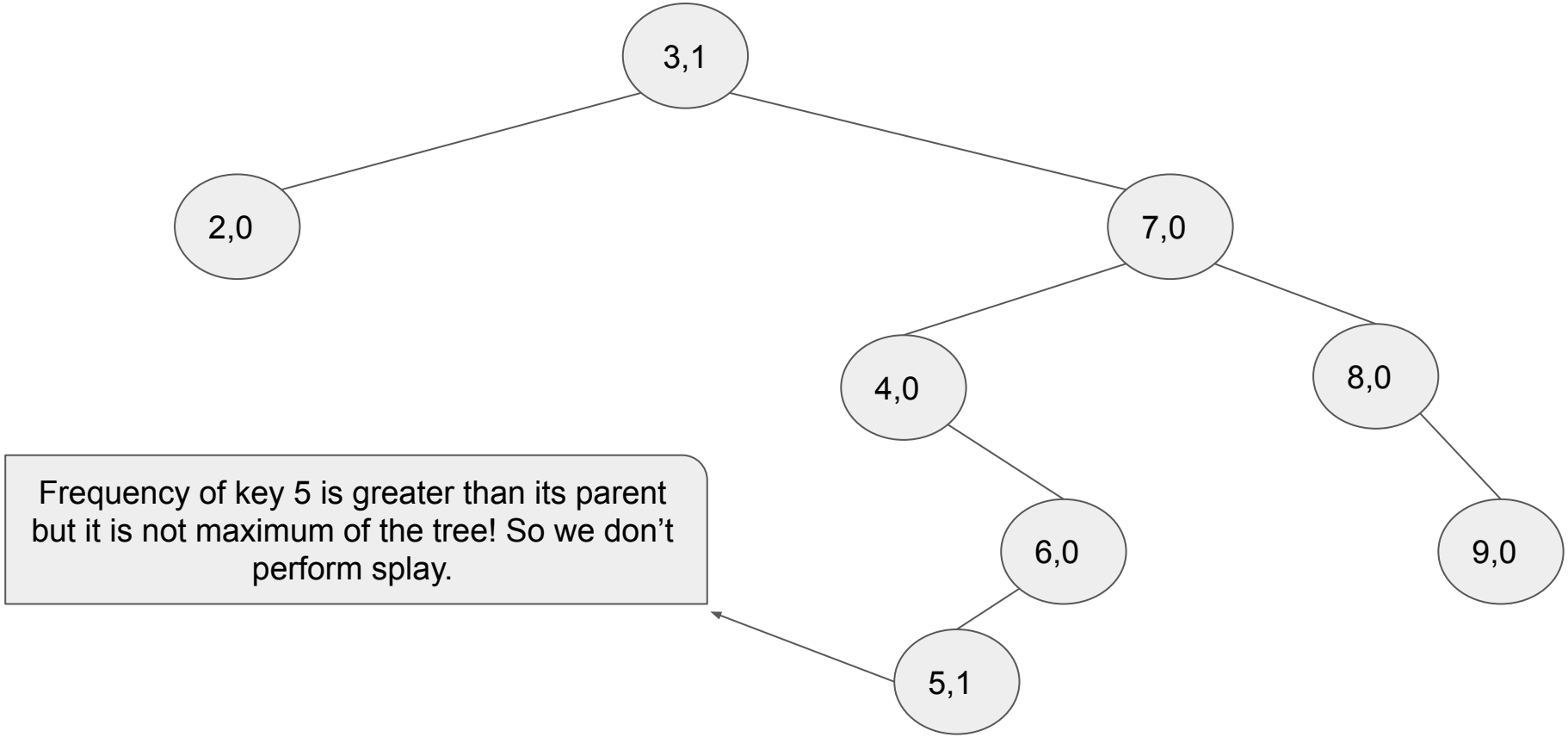
Search 3 : 4 comparisons, Total cost: 18



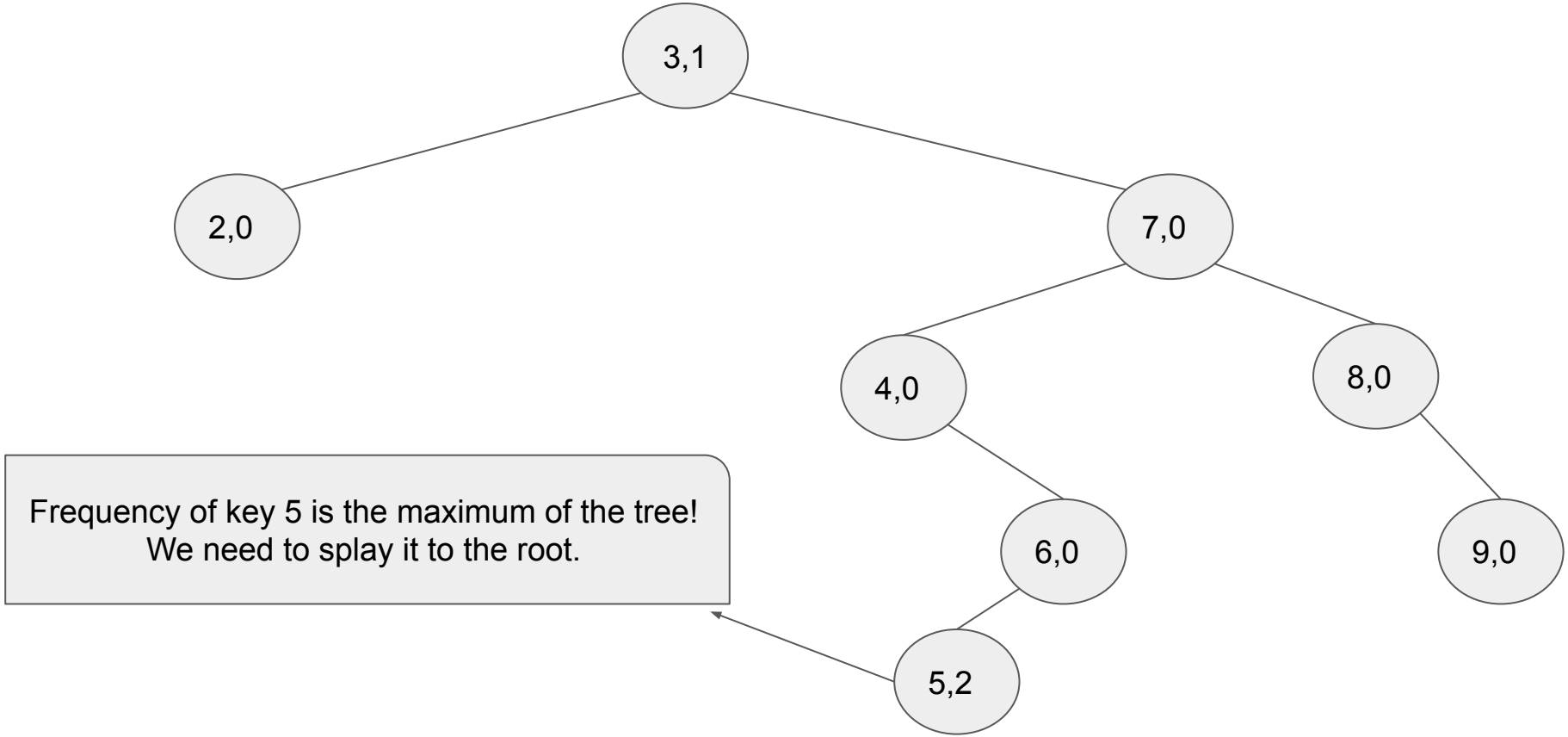
1 zig-zag (2 time units), Total cost: 20



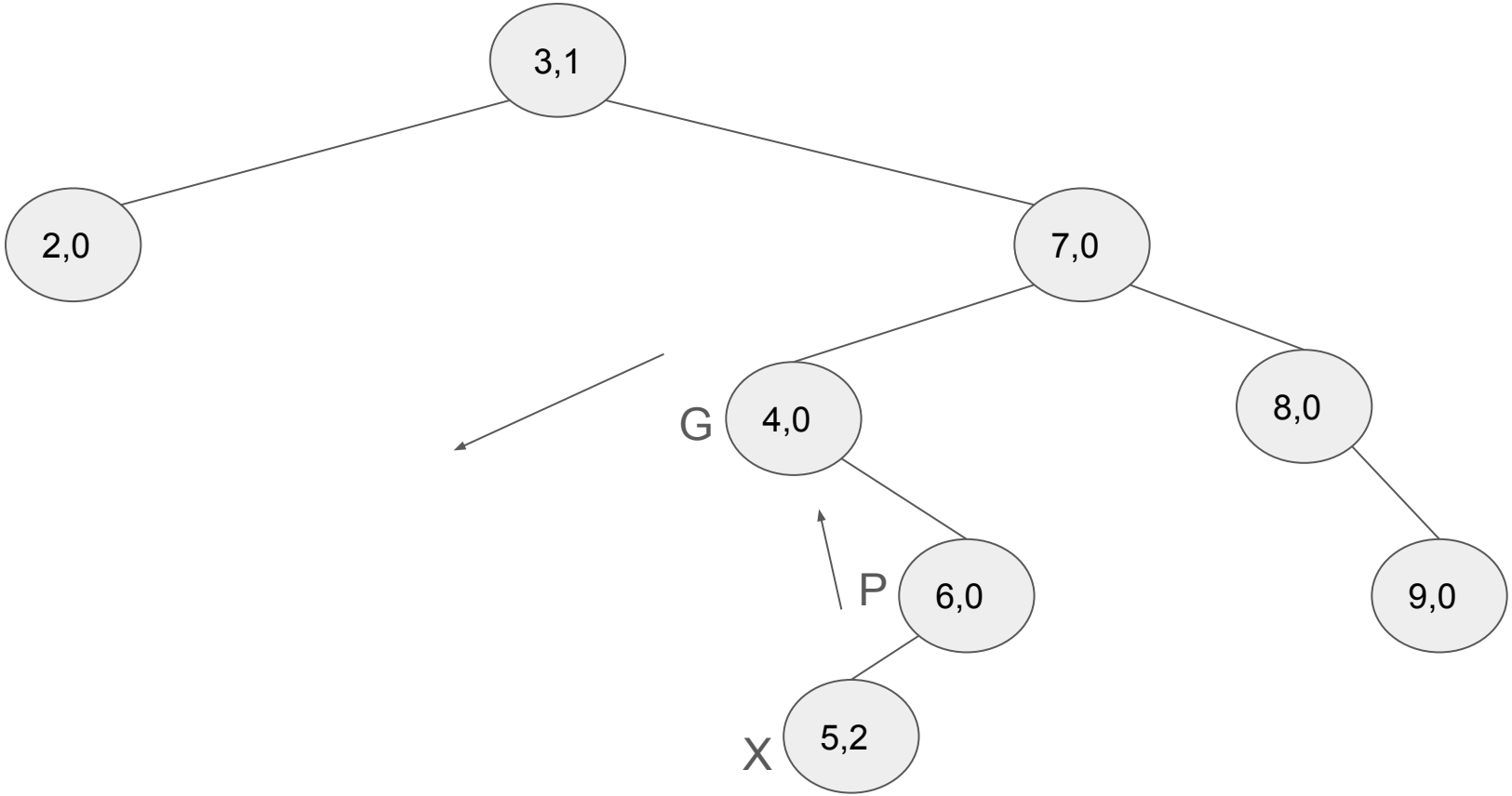
1 zig rotation (1 time unit), Total cost: 21



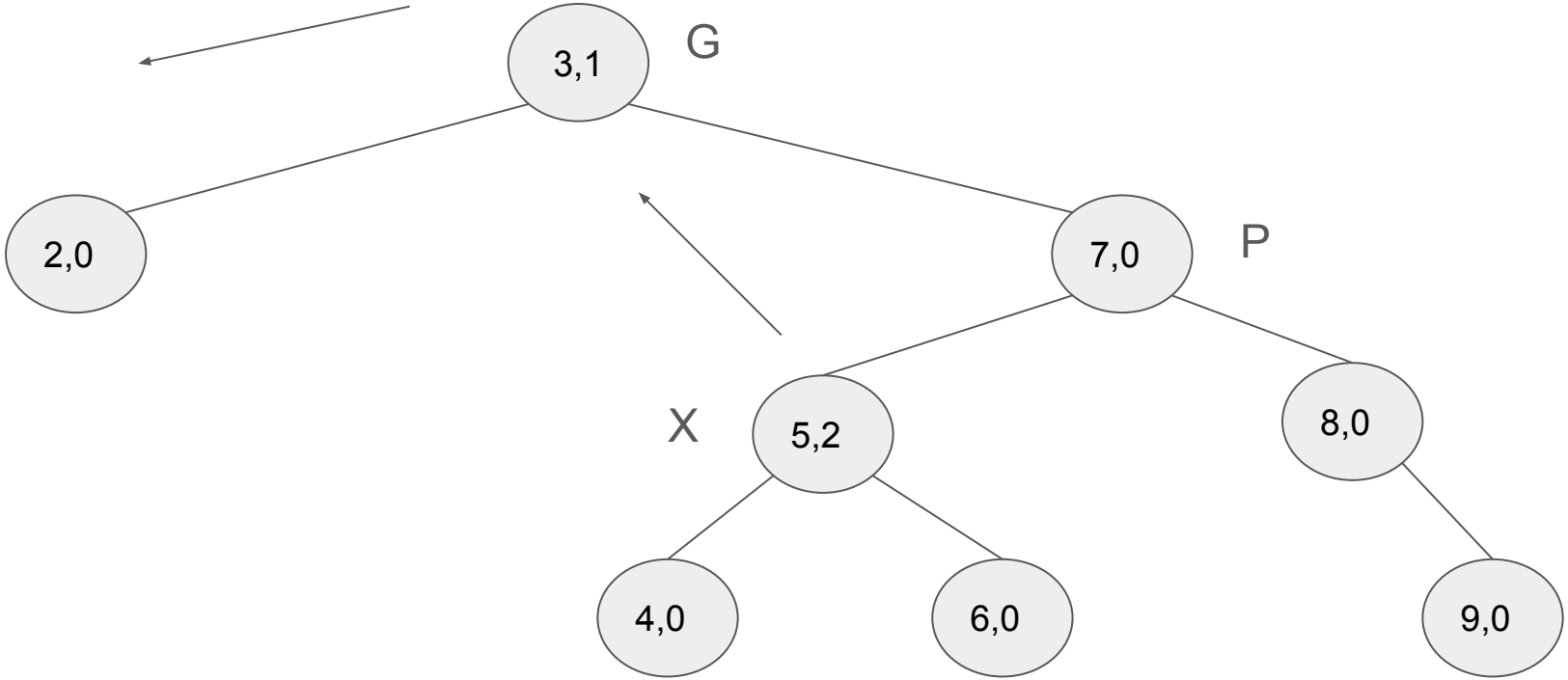
Search 5 : 5 comparisons, no rotation, Total cost: 26



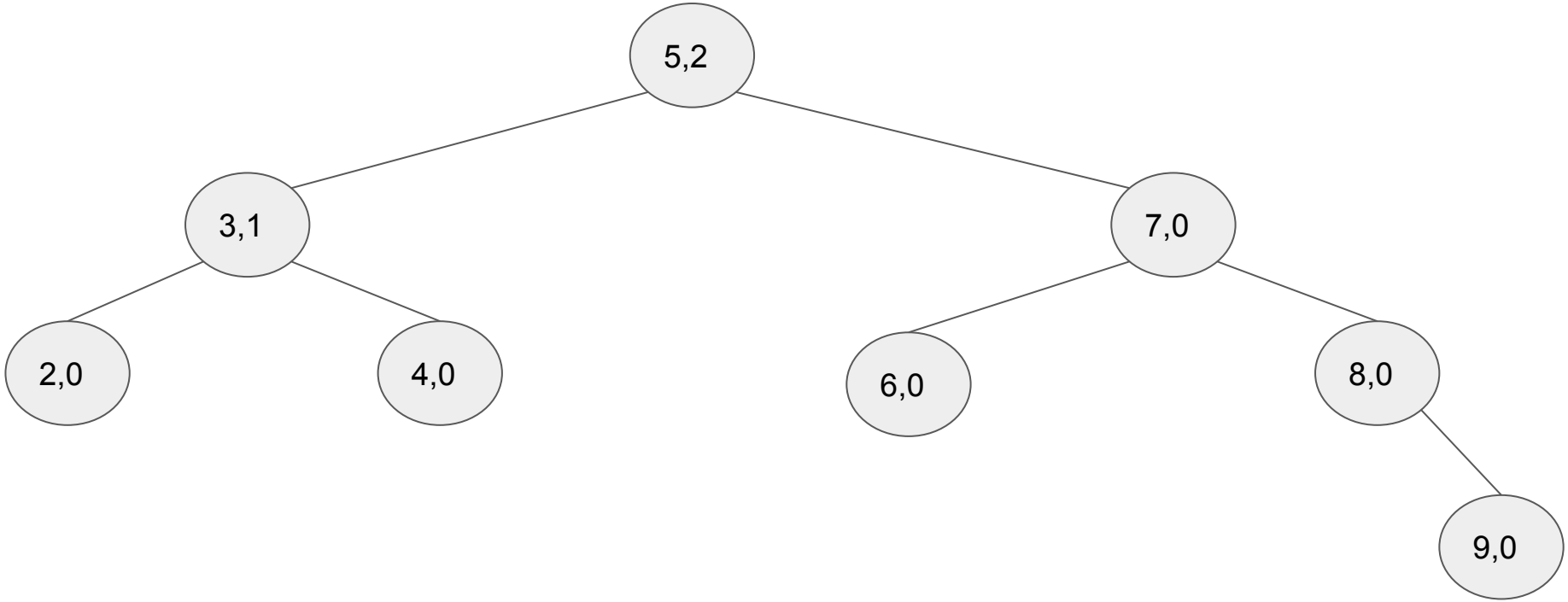
Search 5 (again) : 5 comparisons, Total cost: 31



Search 5 (again) : 5 comparisons, Total cost: 31



2 Zig-zag rotations (2x2 time units), Total cost: 35



2 Zig-zag rotations (2x2 time units), Total cost: 35