# 1.

## A picture containing circle Description automatically generatedBuild a BST

## A picture containing circle, diagram Description automatically generatedDraw the BST after we remove node 146.

## The above tree is not balanced. If you want to build a balanced BST tree, what if the orders of numbers in the above sequence? Draw a BST for new sequence of numbers.

If we want to build a balanced BST tree, we should rearrange the orders:

121, 61, 36, 12, 47, 77, 74, 93, 248, 153, 146, 217, 337, 286, 463.

The new BST:

# A picture containing circle, white Description automatically generated2. Suppose we have integer values between 1 and 1000 in a BST and we want to search for 363. Which of the following can not be the sequence of keys examined. Why?

## 2 252 401 398 330 363

A picture containing circle

Description automatically generatedThis can be the sequence of keys examined because if we create a BST, this sequence of keys will form a single path lead to node 363

## 399 387 219 266 382 381 278 363

A picture containing circle

Description automatically generatedThis can be the sequence of keys examined because if we create a BST, this sequence of keys will form a single path lead to node 363

## 3 923 220 911 244 898 258 362 363

A picture containing circle, line

Description automatically generatedThis can be the sequence of keys examined because if we create a BST, this sequence of keys will form a single path lead to node 363

## 4 924 278 347 621 299 392 358 363

A picture containing circle, clock

Description automatically generatedThis can not be the sequence of keys examined because if we create a BST, this sequence of keys won’t form a single path lead to node 363

## 5 925 202 910 245 363

A picture containing circle

Description automatically generatedThis can be the sequence of keys examined because if we create a BST, this sequence of keys will form a single path lead to node 363

# A picture containing circle, sketch, drawing, line Description automatically generated3.

## List all possible insertion orders of the keys that could have produced this BST.

(1) 24 9 15 3 1 4

(2) 24 9 15 3 4 1

(3) 24 9 3 15 1 4

(4) 24 9 3 15 4 1

(5) 24 9 3 1 15 4

(6) 24 9 3 4 15 1

(7) 24 9 3 1 4 15

(8) 24 9 3 4 1 15

## Draw the same BST after the insertion of keys: 6, 45, 32, 98, 55, and 69, in this order.

A picture containing circle, design

Description automatically generated

## Draw the BST resulting from the deletion of keys 9 and 45 from the BST resulting from

## A picture containing circle Description automatically generatedquestion b.

## Write an insertion order of the keys remaining in the BST after question 5c that would produce a balanced tree (i.e., a minimum-height tree).

Order of original tree from question c:

24, 6, 3, 1, 4, 15, 32, 98, 55, 69.

New order is:

15, 3, 1, 4, 6, 55, 24, 32, 69, 98.

A picture containing circle, design

Description automatically generatedNew BST: