

Select all that apply

- ☒ Average case space is  $\Theta(n)$
- ☐ Worst case space is  $\Theta(n^2)$
- ☐ Average case insert is  $\Theta(n \log n)$
- ☐ Worst case insert is  $\Theta(n^2)$
- ☒ Average case delete is  $\Theta(\log n)$
- ☒ Worst case delete is  $\Theta(\log n)$

↳ Add Subquestion

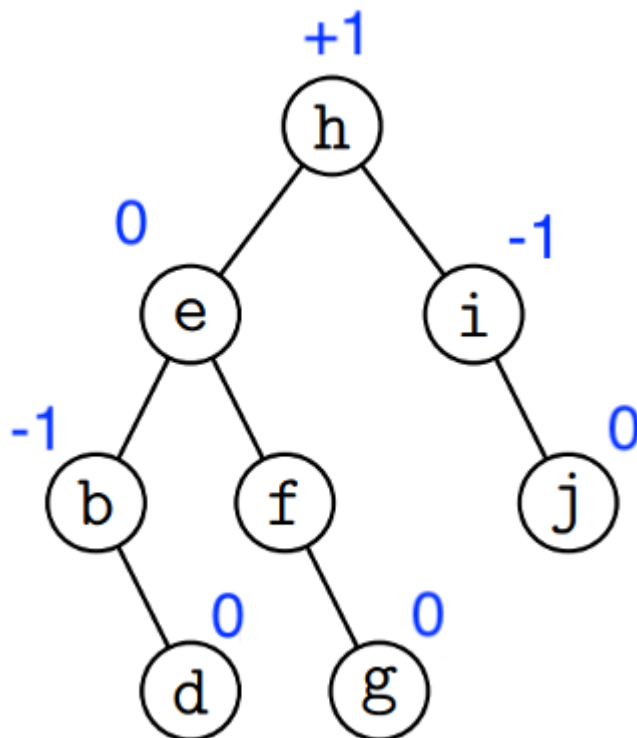
+ Add Question 7

Save

## Q1 Question 1

10 Points

Consider the following diagram:



**Q1.1**

5 Points

What is the missing balance factor for this tree? (indicate + or - if you are showing an integer)

**Q1.2**

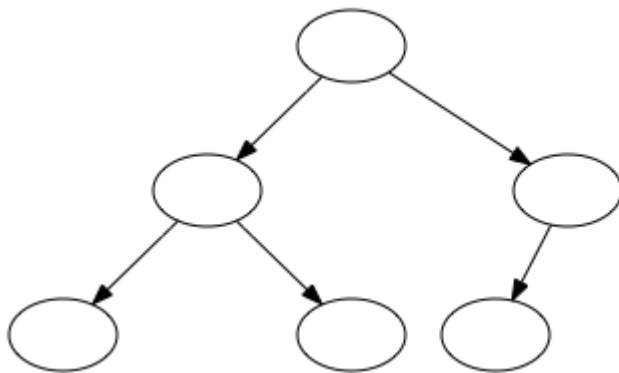
5 Points

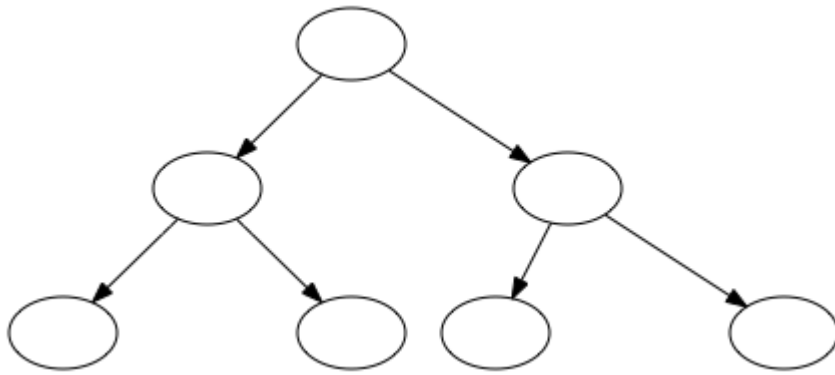
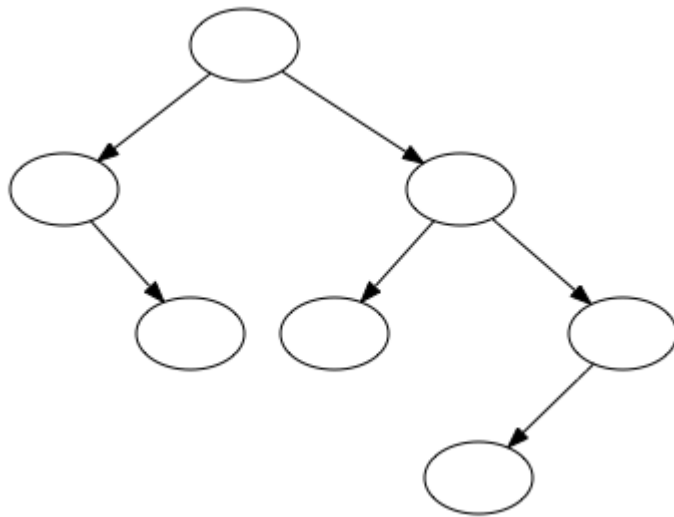
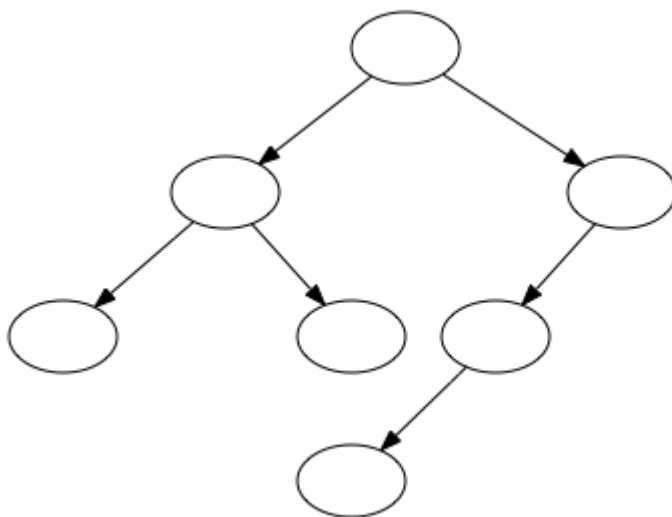
What is the height of the subtree rooted at node e?

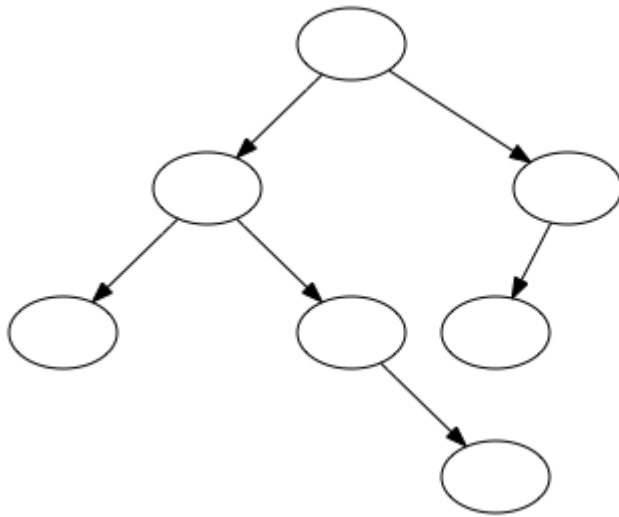
**Q2**

10 Points

Which of the following trees is **not** AVL balanced?

☐ A☐ B

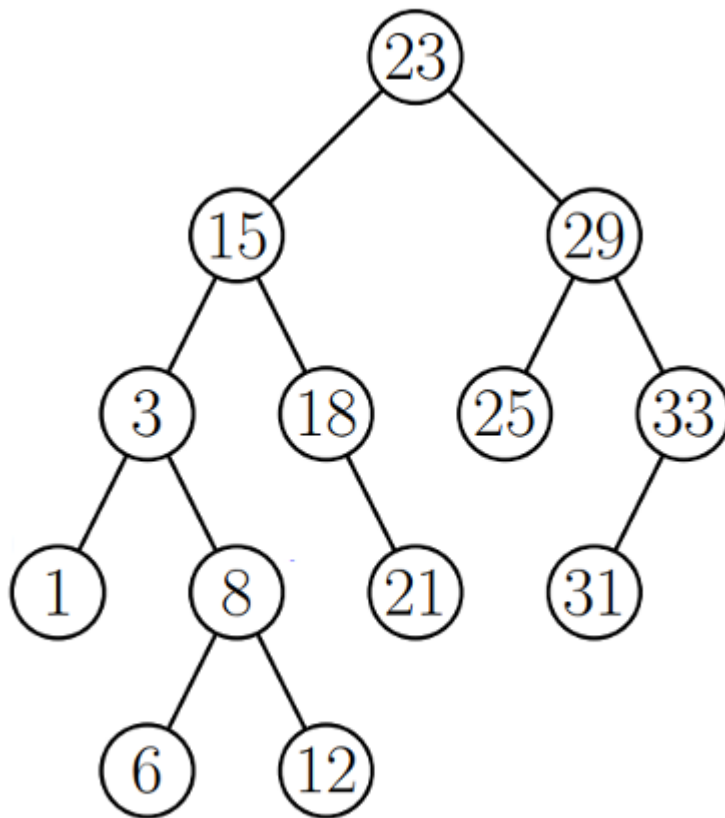
☐ C☒ D☐ E



### Q3 Question 3

40 Points

The following questions all begin with the following tree. **They do not build on one another.**



**Q3.1**

10 Points

Show the final tree after `insert(13)` is called. (You *must* show intermediary steps for full credit.)

 No files uploaded

**Q3.2**

10 Points

Show the final tree after `insert(7)` is called. (You *must* show intermediary steps for full credit.)

 No files uploaded

**Q3.3**

10 Points

Show the final tree after `delete(25)` is called. (You *must* show intermediary steps for full credit.)

 No files uploaded

**Q3.4**

10 Points

Show the final tree after `delete(15)` is called. (You *must* show intermediary steps for full credit.)

 No files uploaded

**Q4 Question 4**

5 Points

True or False: An AVL tree is guaranteed to have  $O(\log(n))$  search time, irrespective of the order of insertion and deletion.

☒ True

☐ False

## Q5 Question 5

5 Points

What is the height of an empty tree?

- ☐ +1
- ☐ 0
- ☒ -1
- ☐ null

## Q6 Question 6

30 Points

Select all that apply

☒ Average case space is  $O(n)$

☐ Worst case space is  $O(n^2)$

☐ Average case insert is  $O(n \log n)$

☐ Worst case insert is  $O(n^2)$

☒ Average case delete is  $O(\log n)$

☒ Worst case delete is  $O(\log n)$