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# Week 09 Quiz

## Plagiarism declaration

By submitting work for this quiz I hereby declare that I understand the University's policy on academic integrity (https://academicintegrity.unimelb.edu.au/) and that the work submitted is original and solely my work, and that I have not been assisted by any other person (collusion) apart from where the submitted work is for a designated collaborative task, in which case the individual contributions are indicated. I also declare that I have not used any sources without proper acknowledgment (plagiarism). Where the submitted work is a computer program or code, I further declare that any copied code is declared in comments identifying the source at the start of the program or in a header file, that comments inline identify the start and end of the copied code, and that any modifications to code sources elsewhere are commented upon as to the nature of the modification.

⚠ This is a preview of the draft version of the quiz.

You should attempt the quiz after the lecture and your tutorial.

- The quiz is available for a period of 10 days.
- You may attempt the quiz multiple times (if you happen to get a question wrong, you can do it again)
- Your score on the quiz will be recorded in the grade book. The score is not used when determining your final mark in this subject
- The quiz might not display equations correctly in some browsers. If you experience problems, we recommend that you use Firefox.

| | |
|---|---|
| **Quiz Type** | Graded Quiz |
| **Points** | 5 |
| **Assignment Group** | Imported Assignments |
| **Shuffle Answers** | No |
| **Time Limit** | No Time Limit |
| **Multiple Attempts** | Yes |
| **Score to Keep** | Highest |
| **Attempts** | Unlimited |
| **View Responses** | Always |
| **Show Correct Answers** | Immediately |
| **One Question at a Time** | No |

| Due | For | Available from | Until |
|---|---|---|---|
| - | Everyone | - | - |

**Preview**

Score for this attempt: **5** out of 5
Submitted Sep 25 at 11:27
This attempt took less than 1 minute.

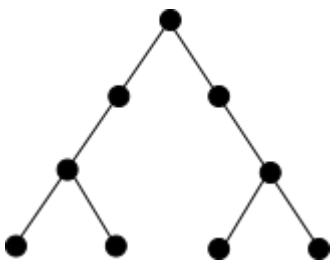
## Question 1

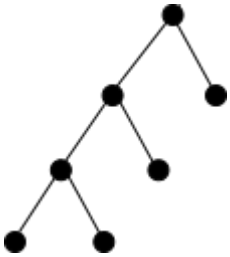
**1 / 1 pts**

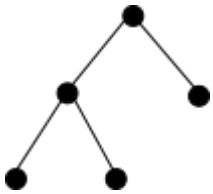
Which of the following binary trees are *balanced*? Note that you may select multiple answers.

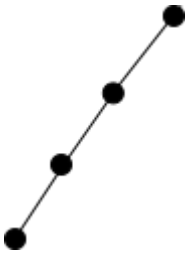
(a)

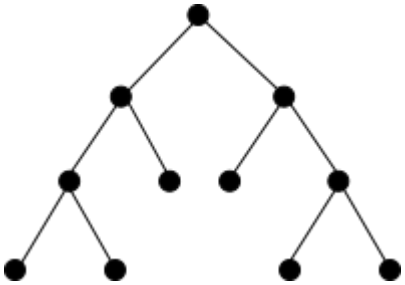
(b)



(c) 

(d) 

(e) 

(f) 

**Correct!**

- [x] (a)
- [ ] (b)
- [ ] (c)

**Correct!**

- [x] (d)
- [ ] (e)

**Correct!**

- [x] (f)

Correct! Trees (a), (d), and (f) are balanced. Trees (b), (c), and (e) are unbalanced.

To check whether a binary tree (or binary search tree) is balanced we perform the following test at each non-leaf node n. We compute the height of the left subtree of n, h(left subtree of n), and of the right subtree of n, height(right subtree of n). If the absolute difference between these two values is *less than or equal to* 1, for each non-leaf node, our tree is balanced. Consider tree (b). For each of the two children of the root node, this condition fails. The difference between the height of their left and right subtrees is 2. If a node does not have a left (or right) subtree, the height of that subtree is taken to be 0.

## Question 2

**1 / 1 pts**

If a binary tree is both a max-heap and an AVL tree, what is its largest possible number of nodes, assuming all keys are different?

**Correct!**

2

**rrect Answers**

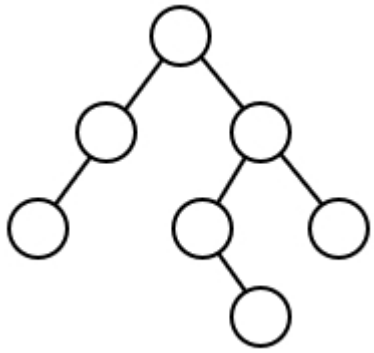
2 (with margin: 0)

That's right. Too easy.

## Question 3

**1 / 1 pts**

The AVL tree shown below was constructed by inserting the seven keys in a particular order. Identify which of the four insertion sequences below would generate an AVL tree of this shape.



- A, B, C, D, E, F, G
- B, C, D, E, F, G, A
- C, E, G, B, D, F, A

**Correct!**

- F, B, C, D, A, G, E

Yes, that's right.

## Question 4

**1 / 1 pts**

An AVL tree is constructed by inserting the following numbers in this order: 1, 7, 2, 6, 3, 5, 4. The in-, pre- and post-order traversals of the resulting tree are:

- In-order: 1, 2, 3, 4, 5, 6, 7
  Pre-order: 4, 2, 1, 3, 6, 5, 7
- Post-order: 1, 3, 2, 5, 7, 6, 4

In-order: 5, 1, 3, 4, 6, 7, 2
Pre-order: 6, 1, 5, 3, 4, 7, 2
Post-order: 5, 4, 3, 1, 2, 7, 6

**Correct!**

In-order: 1, 2, 3, 4, 5, 6, 7
Pre-order: 3, 2, 1, 6, 5, 4, 7
Post-order: 1, 2, 4, 5, 7, 6, 3

In-order: 1, 2, 3, 4, 5, 6, 7
Pre-order: 2, 1, 6, 3, 4, 5, 7
Post-order: 1, 4, 5, 3, 7, 6, 2

None of the above

Yes, well done.

## Question 5

**1 / 1 pts**

Given the string 001001001001 we wish to use some string search algorithm to see if the string contains the substring 111. The candidates are the brute-force method and Horspool's. The number of character comparisons the two will make are, respectively:

- 13 and 4
- **Correct!** 13 and 5
- 12 and 5
- 12 and 6
- 13 and 6
- 13 and 8

Yes, that's good.

Quiz Score: **5** out of 5