Week 6: PYQs

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Heaps:

1. Quiz 2, Jan 24

   You have a **max-heap** with the following set of elements:

   {10, 5, 15, 3, 8, 12}

   Which of the following elements is guaranteed to be a child of the element **15**?

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   Options:
   a. 10
   b. 5
   c. 12
   d. 8

2. Quiz 2, Sep 23

   Consider a max-heap represented as the following list:

   [30, 20, 25, 5, 15, 23, 10, 3, 2]

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   What are the leaf nodes in the resultant max-heap after the following operations are performed on it?
   i. Delete_max()
   ii. Insert(24)

   Options:
   a. 2, 3, 5, 10, 15
   b. 2, 3, 10, 15, 23
   c. 2, 3, 5, 10, 20
   d. 2, 3, 5, 10, 23

3. Quiz 2, Sep 23

Question Label : Multiple Select Question

Which of the following operation can be performed in $O(log\ n)$ time on min-heap? Consider the size of min-heap is n and implemented using an array.

Options :

6406531963681. ✔ Inserting a new element

6406531963682. ✔ Deleting the smallest element

6406531963683. ✔ Update the value at the known index

6406531963684. ✖ Finding the largest element

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4. Quiz 2, Sep 23

Question Label : Multiple Choice Question

Consider a min-heap represented as the following list:

`[3, 6, 27, 65, 45, 33, 29, 72].`

What would be the resultant min-heap after the following operations are done on it?

1. delete_min()
2. Insert(10)
3. Insert(5)

Options :

6406532306622. ✖ [5, 6, 27, 10, 72, 29, 33, 65, 45]

6406532306623. ✖ [5, 6, 27, 10, 72, 33, 29, 45, 65]

6406532306624. ✖ [5, 6, 27, 72, 10, 33, 29, 45, 65]

6406532306625. ✔ [5, 6, 27, 10, 72, 33, 29, 65, 45]

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5. Quiz 2, Sep 23

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following statements is/are **true** about min-heap with distinct elements?

Options :

6406532306618. ✔ The largest element in a min-heap is always at a leaf node.

6406532306619. ✖ The largest element in a min-heap is always at the lowest level.

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following statements is/are **true** about min-heap with distinct elements?

Options :

6406532306618. ✔ The largest element in a min-heap is always at a leaf node.

6406532306619. ✖ The largest element in a min-heap is always at the lowest level.

6406532306620. ✔ The second-smallest element in a min-heap is always a child of the root node.

6406532306621. ✖ Finding the largest element in min-heap takes *O(log n)* time.

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6. End Term, Jan 24

Question Label : Multiple Choice Question

A Priority-Queue is implemented as a Max-Heap. Initially, the max-heap is `[22, 19, 18, 15, 13]`. Two new elements 31 and 24 are inserted in the given Max-Heap in that order. Max-Heap after the insertion of the elements is__ .

Options :

[redacted] `[31, 19, 24, 15, 13, 22, 18]`

[redacted] `[31, 19, 24, 15, 13, 18, 22]`

[redacted] `[31, 19, 24, 18, 15, 13, 22]`

[redacted] `[31, 19, 24, 22, 18, 15, 13]`

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BST:

1. Quiz 2, Jan 24

Consider the following sequence of numbers inserted into an empty **Binary Search Tree(BST):**

50, 30, 20, 40, 70, 60, 80, 35

What will be the height of the resulting BST? Consider that the height of empty binary search tree is 0.

Options :

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Options:

a. 3
b. 4
c. 5
d. 6

2. Quiz 2, Jan 24

Question Label : Multiple Choice Question

Which of the following traversals would visit the nodes of a **binary search tree** in the following order?

10, 5, 3, 8, 15, 12, 20

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Options:

a. In-order
b. Pre-order
c. Post-order

3. Quiz 2, Sep 23

Question Label : Short Answer Question

Consider a binary search tree consisting of 15 elements. Let m be the maximum height possible for a given binary search tree, and n be the minimum height possible for a given binary search tree.

What will be the value of $m - n$?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

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4. Quiz 2, Sep 23

Consider the following class for nodes in BST.

```
class Node:
    def __init__(self, value = None):
        self.data = value
        self.left = None
        self.right = None
```

You are given a binary search tree where each node is created by the given class `Node` and, the `root` contains the reference to the root node of the BST. Which of the following implementations is suitable to print the node's data in **descending order**?

Options :

[redacted]

```
def traverse(root):
    if root is None:
        return
    traverse(root.left)
    traverse(root.right)
    print(root.data, end=' ')
```

[redacted]

```
def traverse(root):
    if root is None:
        return
    traverse(root.right)
    traverse(root.left)
    print(root.data, end=' ')
```

[redacted]

```
def traverse(root):
    if root is None:
        return
    traverse(root.left)
    print(root.data, end=' ')
    traverse(root.right)
```

[redacted]

```
def traverse(root):
    if root is None:
        return
    traverse(root.right)
    print(root.data, end=' ')
    traverse(root.left)
```

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5. End Term, Jan 24

Question Label : Multiple Choice Question

Consider the elements **71, 65, 84, 69, 66, 81, and 62** inserted into empty binary search tree in the same sequence. Which element will be inserted in the lowest level?

Options :

Options:

a. 62
b. 69
c. 66
d. 81

6. End Term, Jan 24

Question Label : Short Answer Question

Consider a complete binary tree **T** with **19** nodes. The number of leaf nodes in **T** is ____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

[redacted]

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7. End Term, Sep 23

Question Label : Short Answer Question

The post-order traversal of a binary search tree is `1, 3, 4, 5, 2, 7, 8, 6`.

What would be the sum of elements stored in the leaf nodes of the binary search tree?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

[redacted]

Possible Answers :

[redacted]

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