CS301p
Final Term (Live Quiz)
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Past Papers for Mids./Finals are also Available

1. If the data is given in sorted order, the tree generated will be similar to _____.

Queue

Linked list

Stack

[✓] Heap

2. If you create a BST with data that is sorted in an ascending or descending order, it will be similar to:

Complete Binary Tree

AVL tree

Strictly Binary Tree

[✓] Linked List

3. Which type of rotation can balance the following AVL tree?

(Tree: 15 -> 20 -> 18)

Single right

[✓] Single left

Double left-right

Double right-left

4. Which type of rotation can balance the following AVL tree?

(Tree: 11 -> 16 -> 12)

[✓] Double left-right

Double right-left

Single left

Single right

5. Which of the following function prototype is declaring the function as constant?

const EType& findMin();

void EType& findMin(const int a);

[✓] const EType& findMin() const;

EType& findMin(const int a);

6. Which of the following function is returning a const value?

int EType& findMin() const;

void EType& findMin(const int a);

[✓] const EType& findMin() const;

void EType& findMin(const int a) const;

7. Choose the correct option that why the following tree is not an AVL tree.

(Tree: 2 -> 4 -> 8 -> 11 -> 13)

The balance factor of node 13 is two

This tree is a balanced AVL tree

[✓] The balance factor of node 11 is two

The balance factor of root node is two

8. In the given BST, the balance factor of the root node is:

-1

0

[✓] 1

-2

9. What will be the height of an empty AVL tree?

2

-1

[✓] 0

1

10. The balance of a node in a binary search tree is defined as the _____.

[✓] height of its left subtree - height of its right subtree

height of its right subtree - height of root node

height of its left subtree - height of its leaf nodes

height of its right subtree + height of its left subtree

1. The balance of a node in a binary search tree is defined as the:

* height of its right subtree + height of its left subtree
* height of its left subtree - height of its leaf nodes
* height of its right subtree - height of root node
* ✓ height of its left subtree - height of its right subtree

2. What will be the height of an empty AVL tree?

* ✓ -1
* 0
* 1

3. (Image of AVL tree with nodes 11, 16, and 12) Which type of rotation can balance the following AVL tree?

* Single right
* Single left
* ✓ Double right-left
* Double left-right

4. (Image of AVL tree)

* The balance factor of node 11 is two
* The balance factor of root node is two
* This tree is a balanced AVL tree
* ✓ The balance factor of node 13 is two

5. If the data is given in sorted order, the tree generated will be similar to_____.

* Stack
* Heap
* ✓ Linked list
* Queue

6. (Image of BST with nodes 1, 2, and 3) In the given BST, the balance factor of root node is:

* 0
* -1
* 1
* ✓ -2

7. (Image of BST with nodes 1, 2, and 3) What will be the value of root node if we apply rotation to this non AVL tree?

* 1
* 3
* Rotation is not required
* ✓ 2

8. Which of the following function is returning a const value?

* int EType& findMin( ) const;
* void EType& findMin(const int a) const;
* ✓ const EType& findMin( ) const;

* void EType& findMin(const int a);

9. Which of the following function prototype is declaring the function as constant?

* EType& findMin(const int a);
* ✓ const EType& findMin( ) const;
* const EType& findMin( );
* void EType& findMin(const int a);

10. (Image of AVL tree with nodes 20, 15, and 18)

* ✓ Single right
* Double right-left
* Single left
* Double left-right

Which type of rotation can balance the following AVL tree?

- Double left-right
- Single right
- Double right-left ✔
- Single left

If the data is given in sorted order, the tree generated will be similar to.

- Linked list ✔
- Queue
- Stack

Which of the following will be used to avoid the problems caused by the BST generated using sorted data?

- AVL Tree ✔
- Linked list
- Queue
- Stack

What does the following traversal code do?

```
scss

Copy code

void func (TreeNode* treeNode) {

   if(treeNode != NULL) {

      func(treeNode->getLeft());

      func(treeNode->getRight());

      cout << *(treeNode->getinfo()) << "";

   }

}
```

- Level-order traversal
- **Post-order traversal ✓**
- Preorder traversal
- In-order traversal

Binary search tree class is defined as a template class so that it can be used for _____ datatype(s).

- Integer
- **Any ✓**
- Strings
- Character

Which file extension is used in C++ to keep the class interface in a separate file?

- ctxt
- **.h ✓**
- exe

Level order traversal of a binary tree can be implemented with which data structure?

- Stack
- Linked List
- Binary Tree
- Queue ✔

The code of BST traversal methods becomes very short by using:

- Non-recursive calls
- Friend functions
- Heap
- Recursive calls ✔

What does the following traversal code do?

- Post-order traversal ✔
- Level-order traversal
- In-order traversal
- Preorder traversal

Which traversal method should be maintained when a node is deleted from a Binary Search Tree?

- Pre-Order
- Post-Order
- Level Order
- In-Order ✔

Which of the following traversal method will be used, if we want the output as 3,4,7,9,14,15,16,18,20?

- Level-order traversal
- Post-order traversal
- Preorder traversal
- In-order traversal ✔

What will be the output of the given C++ program:

- Syntax error ✔

Which of the following condition will be true if a node is NULL during the in-order traversal using recursive calls?

- Node does not contain both left and right children ✔
- Node contains only left child
- Node can contain only one child
- Node contains only right child

In C++, the ampersand '&' symbol is used for:

- Pointers
- Arrays
- Reference Variables ✔
- Static variables

Which of the following is visited at the last step in post-order traversal method?

- Left Node
- Right Node
- Root Node ✔
- Leaf Node

Which of the following memory portion is used to dynamically allocate the memory?

- Stack
- Code
- Heap ✔
- Queue

1. _____ is a user-defined data type.

- a) Pointer

- b) Class

- c) Function

- d) Constructor

- **Correct Option: b) Class**

2. Which function is automatically called when an object of a class is initiated?

- a) Destructor

- b) Constructor

- c) Utility function

- d) Friend function

- **Correct Option: b) Constructor**

3. Which of the following is not true about Destructor?

- a) Destructors cannot be overloaded.
- b) Destructors cannot be used for memory manipulation.
- c) Destructors take no arguments.
- d) Destructors don't return a value.
- **Correct Option: b) Destructors cannot be used for memory manipulation.**

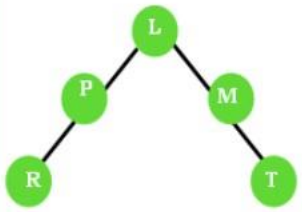
4. Where to put an inline function during frequent calling inside the program from multiple source files?

- a) Main()
- b) Header File
- c) Inside the class
- d) Outside the class
- **Correct Option: b) Header File**

5. A constructor with arguments is known as:

- a) Virtual Constructor
- b) Parameterized Constructor
- c) Destructor
- d) Default Constructor
- **Correct Option: b) Parameterized Constructor**

How many rotations will be made if a node is inserted as left child of the node R in the given tree?

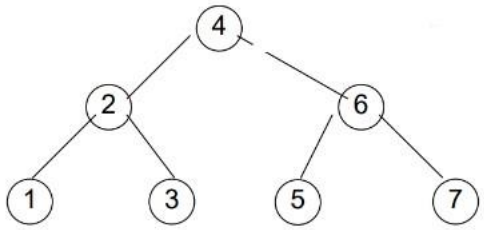


elect the correct option

○	4
○	3
○	1
○	2

Question # 3 of 5 (Start time: 10:30:45 PM, 05 January 2024)

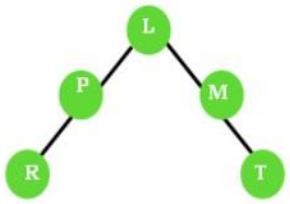
What will be the balance factor of node 6 if node 5 is deleted from the given tree ?



Select the correct option

○	1
○	0
○	2
○	-1

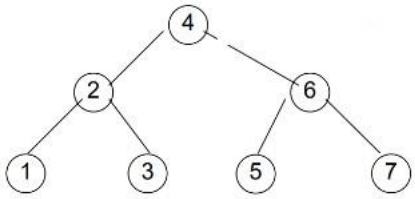
Which node will become unbalanced if a node is inserted as child of the node R in the given tree?



Select the correct option

○	P
○	R
○	L
○	M

What will be the balance factor of node 2 if node 1 is deleted from the given tree ?



Select the correct option

○	1
○	2
○	0
○	-1

Question: A binary tree will not be considered an AVL tree if the difference between the left and right subtree of each node is not more than: 1

1. In Binary Search Algorithm, if the value being searched is smaller than "mid," then updated "high" for the left half of the array will be computed as:

Options:

- A) High = mid + 1
- B) High = mid * 2
- C) High = mid + low
- D) High = mid - 1

Correct Option: D) High = mid - 1

2. Binary Search Algorithm cannot be applied to:

Options:

- A) Array sorted in any order
- B) Array sorted in descending order
- C) Linked List
- D) Array sorted in ascending order

Correct Option: C) Linked List

3. A hole is created which needs to be filled if the element is _____ from the heap.

Options:

- A) There is no concept of a hole in the heap
- B) Inserted
- C) Updated
- D) Deleted

Correct Option: D) Deleted

4. While implementing a min heap, the for loop in the insert() method is initialized with _____.

Options:

- A) int hole = 2 * currentSize;

- B) int hole = 2 * currentSize;

- C) int hole = currentSize;

- D) int hole = ++currentSize;

  Correct Option: D) int hole = ++currentSize;

5. Which of the following formulas gives the index position of the right child of "i"?

  Options:

- A) i/2

- B) 2 + i

- C) 2i + 1

- D) 2 * i

  Correct Option: C) 2i + 1

6. Union by size is also known as:

  Options:

- A) Union by Height

- B) Union by Weight

- C) Union by nodes

  Correct Option: B) Union by Weight

7. Consider the max heap represented by the following array. Which of the following is the parent of node 14?

  Array: 50, 40, 30, 20, 25, 26, 27, 18, 14

  Options:

- A) 30

- B) 40

- C) 50

- D) 20

  Correct Option: B) 40

8. Which of the following methods take one element at a time to make a heap?

Options:

- A) percolatedown()
- B) Buildheap()
- C) Insert()
- D) Traverse()

Correct Option: C) Insert()

9. In a min heap, deletemin() will put the _____ element at the first position of the array.

Options:

- A) Third
- B) None of the given options
- C) Last
- D) Second

Correct Option: C) Last

10. In Binary Search Algorithm, if the value being searched is greater than "mid," then updated "low" for the right half of the array will be computed as:

Options:

- A) Low = mid - 1
- B) Low = mid * 2
- C) Low = mid + high
- D) Low = mid + 1

Correct Option: D) Low = mid + 1

1. The statement cin.get(); is used to_____.

- a) Read a String from file
- b) Read a character from file
- c) Read a string from the keyboard

- d) Read a character from the keyboard

- Correct Option: d) Read a character from the keyboard

2. For the joining of two strings in the string class, we may use the "+" operator, can we use the "-" operator the same way for subtracting strings?

- a) Yes

- b) No

- c) Yes along "?:?" operator only

- d) Yes along "+" operator only

- Correct Option: b) No

3. If text is a pointer of type String, then what will be the functionality of the following statement?

`text = new String [5];`

- a) Creates an array of pointers to string

- b) Creates a string object

- c) Creates an array of 5 objects statically

- d) Creates an array of 5 objects dynamically

- Correct Option: d) Creates an array of 5 objects dynamically

4. What does STL stand for?

- a) Stream template library

- b) Standard template library

- c) Source template library

- d) Standard temporary library

- Correct Option: b) Standard template library

5. The first parameter of the operator function for the << operator _____.

- a) Must be passed by reference

- b) Must be an object of class

- c) Can be passed by value or reference

- d) Must be passed by value

- Correct Option: a) Must be passed by reference

6. The read and write member functions input or output some number of bytes to or from a character array in memory.

- Correct Option: True

7. What will be the output of the following code segment?

```cpp
float pi = 32.3996;
cout << fixed;
cout << setprecision(2) << pi;
```

- a) 32.39

- b) 32.40

- c) 32.00

- d) 32.31

- Correct Option: b) 32.40

8. In C++ operators, which of the following operators cannot be overloaded _____.

- a) :

- b) -

- c) <<

- d) +

- Correct Option: a) :

9. The second parameter of the operator function for the >> operator must always be passed _____.

- a) Function takes no argument

- b) None of the given options

- c) By value

- d) By reference

- Correct Option: d) By reference

10. What is the use of the function call operator?

- a) Overloading the methods
- b) Overloading the objects
- c) Overloading the parameters
- d) Overloading the string
- Correct Option: a) Overloading the methods

1. In union operation, the root of one tree points to the _____ of the other tree.

Options:

A) Root node

B) Right Subtree

C) Left Subtree

D) Left Subtree

Correct Option: C) Left Subtree

2. Union by size is also known as:

Options:

A) Union by Height

B) Union by Root

C) Union by Nodes

D) Union by Weight

Correct Option: D) Union by Weight

3. If we call the union function as union(5, 7), then the name of the new set will be _____.

Correct Answer: The name of the new set would depend on the specific implementation and could be represented as "Set 8" or "Component 8" or something similar. There is no specific option provided for this question.

1. In union operation, the root of one tree points to the _____ of the other tree.

Options:

a) Right Subtree

b) Leaf node

c) Left Subtree

d) Root node

Correct Option: d) Root node

2. If we call the union function as union(5, 7), then the name of the new set will be _____.

Options:

a) 755+75

b) 75&7

c) 755+75&7

d) 5+7

Correct Option: c) 755+75&7

3. Union by size is also known as:

Options:

a) Union by Weight

b) Union by Height

c) Union by Height

d) Union by nodes

Correct Option: a) Union by Weight

MCQ 1:

In the given array representation of a tree constructed with Union by size method, which node(s) are without a parent node?

Options:

A. 1,2,3

B. 1,3

C. 2,3

D. 1,2

Correct Option: A. 1,2,3

MCQ 2:

In the given array representation of a tree constructed with Union by size method, which node is the parent of 7?

Options: A 13

B 22

C 23

D 23

Correct Option: C. 5

1. Which of the following method takes an array to make a heap out of it?

- A) traverse ()
- B) Insert ()
- C) Insert ()
- D) percolatedown ()
- Correct Option: B) Insert ()

2. Which of the following formula gives the index position of the left child of “i”?

- A) 2i+1
- B) i/2
- C) 2*i
- D) 2+i
- Correct Option: A) 2i+1

3. In min heap, deletemin() will put the _____ element at the first position of the array.

- A) Last
- B) Last
- C) None of the given options
- D) Third
- Correct Option: A) Last

4. While implementing min heap, the for loop in insert() method is initialized with _____.

- A) int hole = ++currentSize;
- B) int hole = currentSize;
- C) int hole = 2*currentSize;
- D) int hole = --currentSize;
- Correct Option: A) int hole = ++currentSize;

5. Which of the following formula gives the index position of the right child of “i”?

- A) 2*i
- B) 2+ii/2
- C) 2i+2
- D) 2i+1
- Correct Option: C) 2i+2

1. Which of the following formula gives the index position of the right child of “i”?

Options:

A. 2 + i

B. i / 2

C. 2 * i + 1

D. 2i + 1

Correct Option: C

2. In min heap, deletemin() will put the _____ element at the first position of the array.

Options:

A. Last

B. Second

C. None of the given options

D. Third

Correct Option: D

3. Which of the following methods takes one element at a time to make a heap?

Options:

A. traverse()

B. percolatedown()

C. percolatedown()

D. Insert()

Correct Option: D

4. Which of the following methods takes an array to make a heap out of it?

Options:

A. Insert()

B. Buildheap()

C. Buildheap() D. traverse()

Correct Option: B

5. Which of the following formula gives the index position of the left child of "i"?

Options:

A. 2i + 1

B. 2 + i

C. 2 * i + 2

D. 2 / (i + 1)

Correct Option: A

1. A hole is created which needs to be filled if the element is _____ from the heap.

Options:

a) Updated

b) Inserted

c) Deleted

Correct Option: c) Deleted

2. Consider a max heap, represented by the following array: 49, 39, 36, 31, 27, 21, 35, 12. After the deletion of node with value 49, which of the following is the updated max heap?

Options:

a) 39, 36, 31, 12, 27, 21, 35

b) 39, 36, 31, 27, 21, 35, 12

c) 39, 36, 35, 21, 27, 31, 12

d) 39, 31, 36, 12, 27, 21, 35

Correct Option: b) 39, 36, 31, 27, 21, 35, 12

3. Consider the max heap represented by the following array: 50, 40, 30, 20, 25, 26, 27, 18, 14. What is the parent of node 14?

Options:

a) 50

b) 30

c) 40

d) 20

Correct Option: c) 40

4. Consider a min heap, represented by the following array: 5, 6, 8, 9, 7. After deleting the root node, which of the following is the updated min heap?

Options:

a) 6, 7, 8, 9

b) 6, 7, 9, 8

c) 8, 9, 6, 7

d) 7, 9, 6, 8

Correct Option: a) 6, 7, 8, 9

5. A complete binary tree with a property that the value at each node is at least as small as the values in its children are called as _____.

Options:

a) Max Heap

b) Binary tree

c) Min Heap

d) Binary search tree

Correct Option: c) Min Heap

1. A hole is created which needs to be filled if the element is _____ from the heap.

Options:

A) Deleted

B) Updated

C) There is no concept of a hole in heap

D) Inserted

Correct Answer: D) Inserted

2. A complete binary tree with a property that the value at each node is at least as small as the values in its children are called as _____.

Options:

A) Min Heap

B) Binary search tree

C) Max Heap

D) Binary tree

Correct Answer: A) Min Heap

3. Which of the following node has the maximum value in a max heap?

Options:

A) None of the given options

B) Root node

C) Right-most child

D) Left-most child

Correct Answer: B) Root node

4. Consider a min heap, represented by the following array: 5,6,8,9,7 After deleting the root node. Which of the following is the updated min heap?

Options:

A) 8,7,9,6

B) 6,7,8,9

C) 6,8,9,7

D) 6,8,9,7

Correct Answer: C) 6,8,9,7

5. Consider a max heap, represented by the following array: 49, 39, 36, 31, 27, 21, 35, 12 After the deletion of the node with value 49. Which of the following is the updated max heap?

Options:

A) 39, 36, 31,12, 27, 21, 35

B) 39, 31, 36,12, 27, 21, 35

C) 39, 31, 36,12, 27, 21, 35

D) (None of the above)

Correct Answer: B) 39, 31, 36,12, 27, 21, 35

1. A binary tree will not be considered an AVL tree if the difference between left and right subtree of each node is not more than:

- Option 1: 0
- Option 2: 1
- Option 3: 2
- Option 4: 3
- Correct Option: 3

2. Which of the following represents frequency of all characters in Huffman Encoding tree?

- Option 1: Leaf Node
- Option 2: Leaf Node
- Option 3: Root Node
- Option 4: Right Branch
- Correct Option: Right Branch

3. If values 9, 5, 7 are used to build AVL tree, then which type of rotation can balance the AVL tree?

- Option 1: Single right
- Option 2: Double left-right
- Option 3: Double right-left
- Option 4: Single left
- Correct Option: Double left-right

1. **MCQ:** What will be the balance factor of node 2 if node 1 is deleted from the given tree?

- Options:
- 2
- 1
- 0
- -1
- **Correct Option:** 0

2. **MCQ:** Which type of rotation can balance the following AVL tree?

- Options:

- Single right

- Double left-right

- Double right-left

- Single left

- **Correct Option:** Single left

3. **MCQ:** What will be the balance factor of node 6 if node 5 is deleted from the given tree?

- Options:

- 0

- 2

- 1

- -1

- **Correct Option:** 1

4. **MCQ:** What is the encoding of character 'C' in the given Huffman encoding tree?

- Options:

- 01

- 00

- 11

- 10

- **Correct Option:** 01

5. **MCQ:** What is the total frequency of character 'B' in the given Huffman encoding tree?

- Options:

- 5

- 0

- 9

- 14

- **Correct Option:** 5

6. **MCQ:** How many rotations will be made if a node is inserted as the left child of the node R in the given tree?

- Options:

- 4

- 1

- 2

- 3

- **Correct Option:** 1

7. **MCQ:** Which type of rotation can balance the following AVL tree?

- Options:

- Single right

- Single left

- Double right-left

- Double left-right

- **Correct Option:** Single left

1. **Which type of rotation can balance the following AVL tree?**

- Double right-left

- Double left-right

- Single left

- Single right

- **Correct Answer: Single right**

2. **Which type of rotation can balance the following AVL tree?**

- Single left

- Single right

- Double left-right

- Double right-left

- **Correct Answer: Single left**

3. **What is the encoding of character 'C' in the given Huffman encoding tree?**

- 01

- 00

- 10

- 11

- **Correct Answer: 01**

4. **What will be the balance factor of node 2 if node 1 is deleted from the given tree?**

- 0

- 1

- -1

- 2

- **Correct Answer: 1**

5. **What is the total frequency of character 'B' in the given Huffman encoding tree?**

- 9

- 14

- 5

- 0

- **Correct Answer: 5**

6. **How many rotations will be made if a node is inserted as left child of the node R in the given tree?**

- 4

- 2

- 3

- 1

- **Correct Answer: 1**

1. If the tree becomes unbalanced after deleting a node then we use _____ to rebalance it.

Options:

A. Rotations

B. Heap

C. Stack

D. Insertions

Correct Option: A

2. The ASCII value for the character 'A' is:

Options:

A. 65

B. 66

C. 67

D. 66

Correct Option: A

3. Which of the following represents the frequency of all characters in Huffman Encoding tree?

Options:

A. Right Branch

B. Leaf Node

C. Leaf Node

D. Left Branch

Correct Option: B

4. If values 10, 20, 15 are used to build an AVL tree, then which type of rotation can balance the AVL tree?

Options:

A. Single left

B. Single right

C. Double left-right

D. Double right-left

Correct Option: C

---

1. If values 10,20,15 are used to build an AVL tree, which type of rotation can balance the AVL tree?

- Single right
- **Single left** ✅
- Double left-right
- Double right-left

---

2. If the data is given in sorted order, the tree generated will be similar to_____.

- Stack
- **Linked list** ✅
- Queue
- Heap

---

3. What will be the height of an empty AVL tree?

- **-1** ✅
- 0
- 1
- 2

---

4. Which of the following function is returning a const value?

- void EType& findMin(const int a);
- **const EType& findMin() const;** ✅
- void EType& findMin(const int a) const;
- int EType& findMin() const;

---

5. Which type of rotation can balance the following AVL tree?

(Tree with 11, 16, and 12)

- **Single left** ✅
- Double left-right
- Single right
- Double right-left

---

6. In the given BST, the balance factor of the root node is:

(Tree with 1, 2, and 3 arranged in left-skewed form)

- **-2** ✅

- 0

- -1

- 1

---

7. The balance of a node in a binary search tree is defined as the:

- height of its left subtree - height of its leaf nodes

- height of its right subtree - height of root node

- **height of its left subtree - height of its right subtree** ✅

- height of its right subtree + height of its left subtree

---

8. If you create a BST with data that is sorted in an ascending or descending order, it will be similar to:

- Strictly Binary Tree

- Complete Binary Tree

- **Linked List** ✅

- AVL tree

---

9. If values 9, 5, 7 are used to build an AVL tree, which type of rotation can balance the AVL tree?

- Single right

- Double left-right

- Single left

- **Double right-left** ✅

---

10. What will be the value of the root node if we apply rotation to this non-AVL tree?

(Tree with 1, 2, and 3 arranged in left-skewed form)

- 1

- Rotation is not required

- **2** ✅

- 3

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