

ChatGPT 3.5

CA

explain briefly and give examples for each, and converting one to another for the following binary search tree traversals Preorder traversal

Inorder traversal

Postorder traversal

ChatGPT

Binary search tree traversals are methods of visiting and processing nodes in a binary search tree (BST) in a specific order. In a binary search tree, each node has at most two children, a left child and a right child, and they follow a specific order to maintain the properties of the BST.

1. Preorder Traversal:

- **Explanation:** In preorder traversal, we visit the root node first, then recursively traverse the left subtree, and finally traverse the right subtree.
- **Example:**
yaml

Tree:



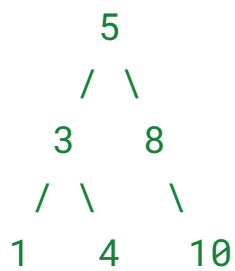
Preorder Traversal: 5, 3, 1, 4, 8, 10

•

Inorder Traversal:

- **Explanation:** In inorder traversal, we recursively traverse the left subtree, visit the root node, and then traverse the right subtree.
- **Example:**
yaml

Tree:



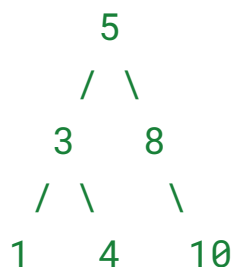
Inorder Traversal: 1, 3, 4, 5, 8, 10

•

Postorder Traversal:

- **Explanation:** In postorder traversal, we recursively traverse the left subtree, then the right subtree, and finally visit the root node.
- **Example:**
yaml

Tree:



Postorder Traversal: 1, 4, 3, 10, 8, 5

○

Converting one traversal to another: Converting between these traversals involves understanding the order in which nodes are visited. Here's a brief guide:

- Preorder to Inorder:
 1. Preorder: Root, Left, Right
 2. Inorder: Left, Root, Right
- Inorder to Postorder:

1. Inorder: Left, Root, Right
2. Postorder: Left, Right, Root
- Postorder to Preorder:
 1. Postorder: Left, Right, Root
 2. Preorder: Root, Left, Right

Understanding these relationships can be helpful when you need to switch between different traversal orders in a binary search tree.

CA

prefix, infix, postfix notations

ChatGPT

Prefix Notation:

- **Explanation:** In prefix notation, also known as Polish notation, the operators come before their operands. It does not require any parentheses to indicate the order of operations because the position of the operator determines the grouping.
- **Example:**
mathematica

Infix: $(A + B) * (C - D)$

Prefix: $* + A B - C D$

●

Infix Notation:

- **Explanation:** In infix notation, operators are placed between their operands. This is the conventional way mathematical expressions are written.
- **Example:**
mathematica

Infix: $(A + B) * (C - D)$

●

Postfix Notation:

- **Explanation:** In postfix notation, also known as Reverse Polish notation (RPN), operators come after their operands. Similar to prefix notation, postfix notation eliminates the need for parentheses.
- **Example:**
mathematica

Infix: $(A + B) * (C - D)$

Postfix: $A B + C D - *$

-

Conversion between Notations:

- Converting from Infix to Postfix involves using the Shunting Yard Algorithm or a stack-based approach.
- Converting from Infix to Prefix first involves reversing the infix expression, then applying the Shunting Yard Algorithm, and finally reversing the result.
- Converting from Postfix to Infix or Prefix involves using a stack to process the postfix expression.
- Converting from Prefix to Infix or Postfix involves using a stack to process the prefix expression.

These notations are alternative ways of representing mathematical expressions, and each has its own advantages in terms of simplicity, ease of parsing, and elimination of ambiguity.

CA

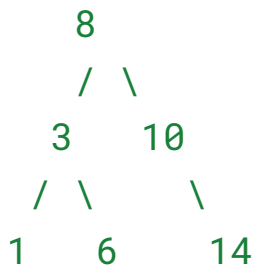
from above two prompts generate an exam of 20 questions

ChatGPT

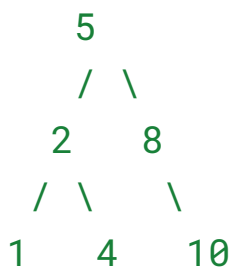
Certainly! Here's an exam with 20 questions related to binary search tree traversals and notations:

Question 1-5: Binary Search Tree Traversals

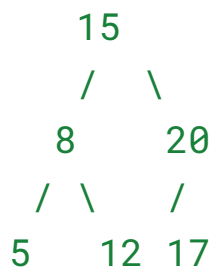
1. Perform a preorder traversal on the following binary search tree:
markdown



Conduct an inorder traversal on the binary search tree given below:
 markdown



Provide the postorder traversal for the binary search tree:
 markdown



- 1.
2. Convert the following preorder traversal to an inorder traversal: 6, 3, 1, 5, 8, 9.
3. Convert the given inorder traversal to a postorder traversal: 2, 4, 6, 8, 10.

Question 6-15: Notations 6. Convert the infix expression "A + (B * C)" to postfix notation.

7. Write the prefix notation for the infix expression "(D - E) / (F + G)".
8. Transform the postfix expression "P Q + R /" to infix notation.
9. What is the infix notation for the following postfix expression: "X Y + Z / W -"?

10. Convert the infix expression $(A * B) + (C - D)$ to postfix notation.
11. Provide the postfix notation for the prefix expression $* + A B - C D$.
12. Write the infix expression for the postfix expression $M N * O + P / Q -$.
13. Convert the prefix expression $/ + A B - C D$ to postfix notation.
14. Transform the postfix expression $8 2 + 5 / 7 *$ to infix notation.
15. What is the prefix notation for the infix expression $(X + Y) * (Z - W)$?

Question 16-20: Mixed Questions 16. Perform an inorder traversal on the binary search tree: $12 /$

8 15 / \
5 10 18

vbnet

17. Convert the given postfix expression $P Q * R / S + T -$ to an infix expression.

18. Write the postfix notation for the binary search tree's preorder traversal:

```

...
    7
  / \
 3  10
 / \
 9  12
...

```

19. Convert the infix expression $(A * B) - (C / D)$ to postfix notation.

20. Provide the preorder traversal for the binary search tree:

```

...
    20
  / \
 10 25
 / \ /
 5 15 22
...

```

Feel free to use these questions for practice or modify them as needed!