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ITE – 1004

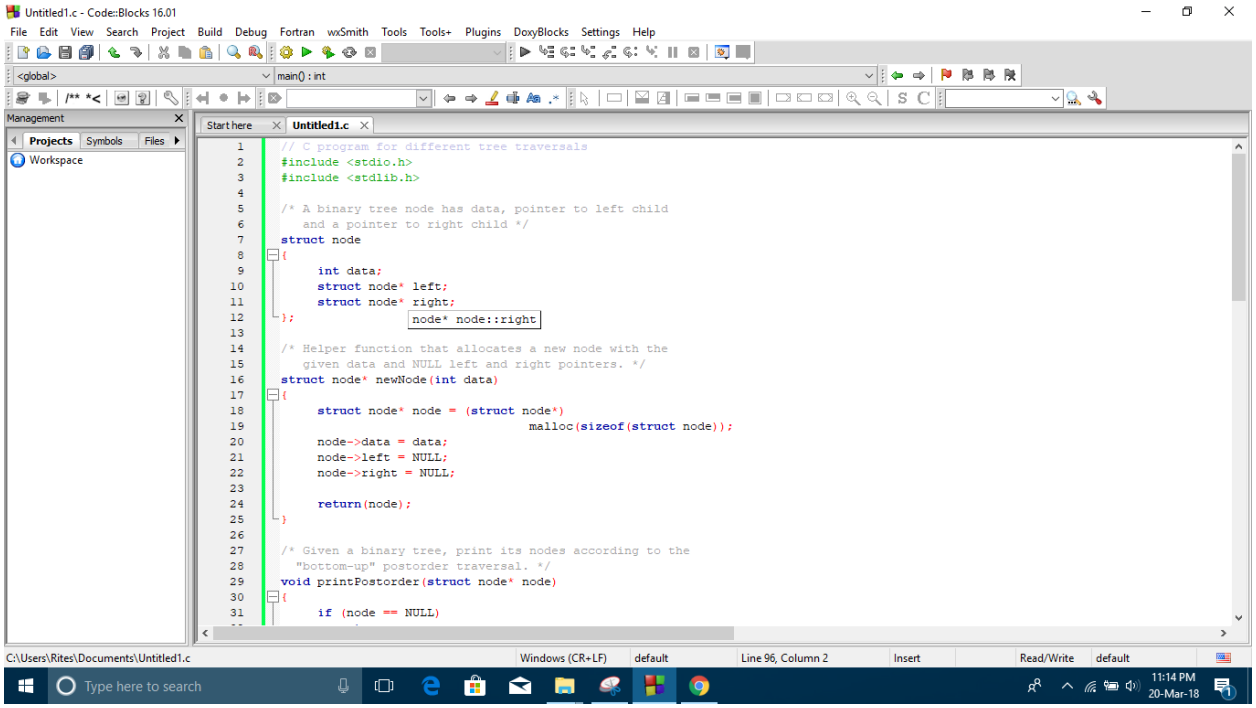
DATA STUCTURES AND ALGORITHM

BINARY TREE TRAVERSALS

```
// C program for different tree traversals
#include <stdio.h>
#include <stdlib.h>

/* A binary tree node has data, pointer to left child
   and a pointer to right child */
struct node
{
     int data;
     struct node* left;
     struct node* right;
};

/* Helper function that allocates a new node with the
   given data and NULL left and right pointers. */
struct node* newNode(int data)
{
     struct node* node = (struct node*)
                                malloc(sizeof(struct node));
     node->data = data;
     node->left = NULL;
     node->right = NULL;

     return(node);
}

/* Given a binary tree, print its nodes according to the
  "bottom-up" postorder traversal. */
void printPostorder(struct node* node)
{
     if (node == NULL)
        return;

     // first recur on left subtree
     printPostorder(node->left);

     // then recur on right subtree
     printPostorder(node->right);

     // now deal with the node
     printf("%d ", node->data);
```

```
}

/* Given a binary tree, print its nodes in inorder*/
void printInorder(struct node* node)
{
     if (node == NULL)
          return;

     /* first recur on left child */
     printInorder(node->left);

     /* then print the data of node */
     printf("%d ", node->data);

     /* now recur on right child */
     printInorder(node->right);
}

/* Given a binary tree, print its nodes in preorder*/
void printPreorder(struct node* node)
{
     if (node == NULL)
          return;

     /* first print data of node */
     printf("%d ", node->data);

     /* then recur on left sutree */
     printPreorder(node->left);

     /* now recur on right subtree */
     printPreorder(node->right);
}

/* Driver program to test above functions*/
int main()
{
     struct node *root  = newNode(1);
     root->left             = newNode(2);
     root->right           = newNode(3);
     root->left->left     = newNode(4);
     root->left->right   = newNode(5);

     printf("\nPreorder traversal of binary tree is \n");
     printPreorder(root);
```

```
    printf("\nInorder traversal of binary tree is \n");
    printInorder(root);

    printf("\nPostorder traversal of binary tree is \n");
    printPostorder(root);

    getchar();
    return 0;
}
```

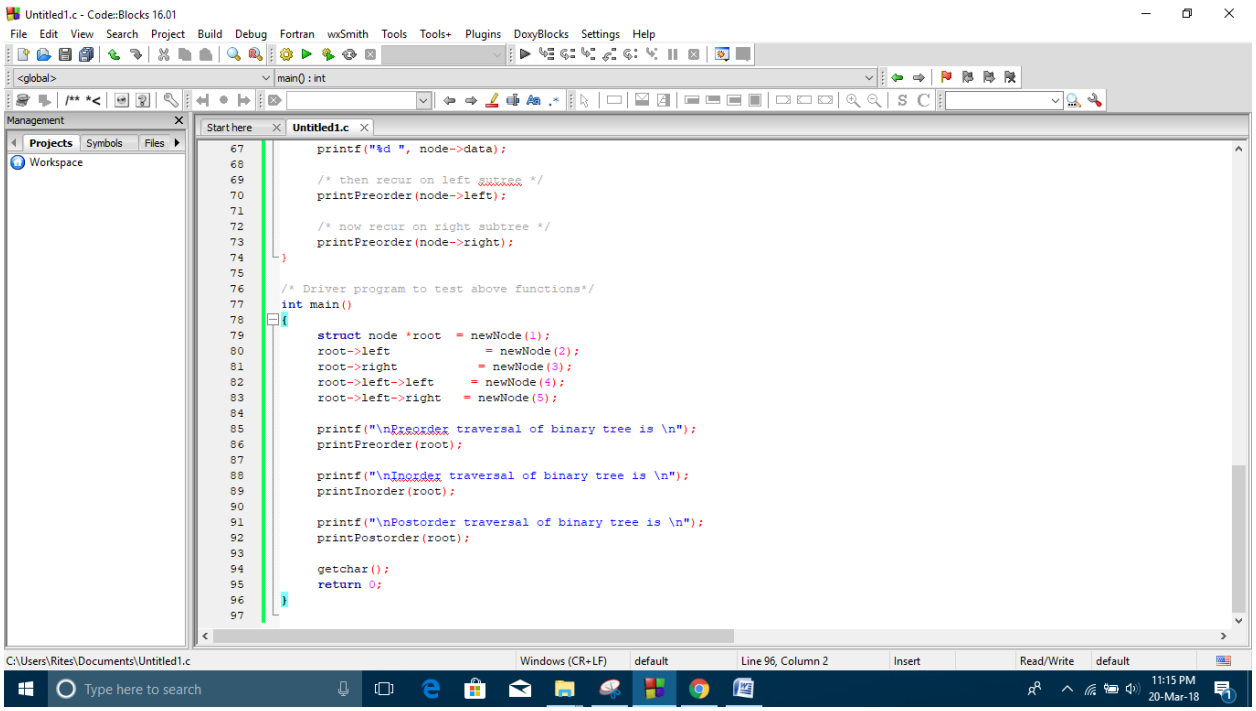


Untitled1.c - Code::Blocks 16.01

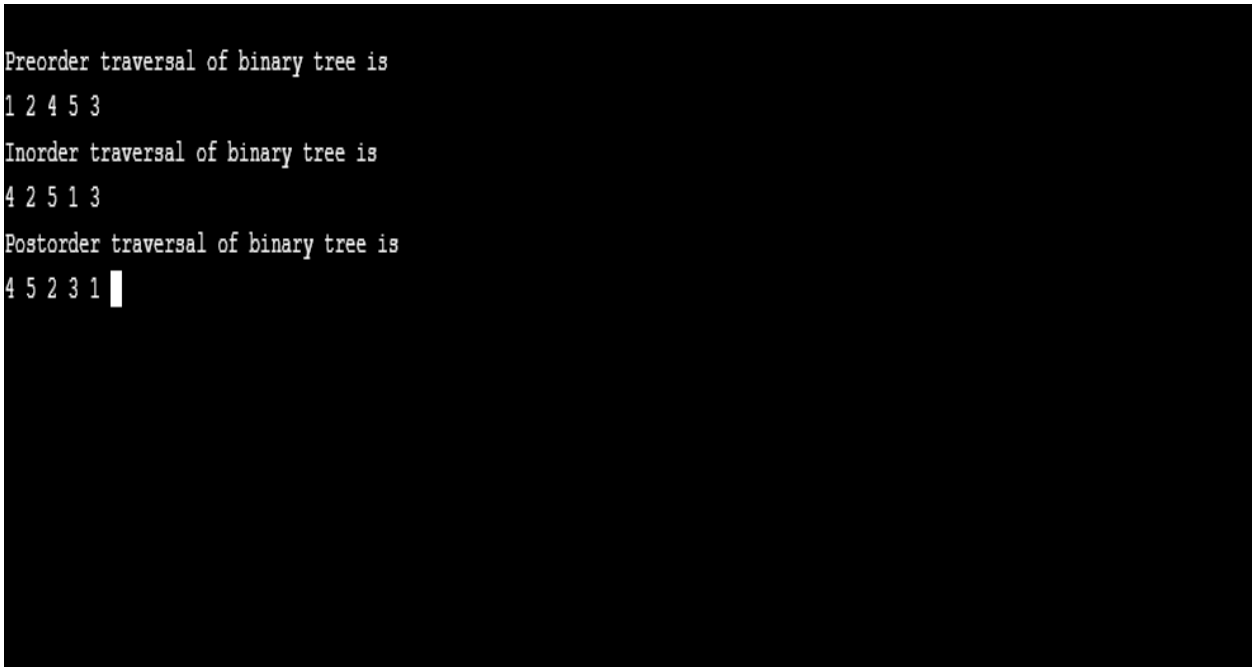
```c
    return(node);
}

/* Given a binary tree, print its nodes according to the
  "bottom-up" postorder traversal. */
void printPostorder(struct node* node)
{
    if (node == NULL)
       return;

    // first recur on left subtree
    printPostorder(node->left);

    // then recur on right subtree
    printPostorder(node->right);

    // now deal with the node
    printf("%d ", node->data);
}

/* Given a binary tree, print its nodes in inorder*/
void printInorder(struct node* node)
{
    if (node == NULL)
         return;

    /* first recur on left child */
    printInorder(node->left);

    /* then print the data of node */
```

Untitled1.c - Code::Blocks 16.01

```c
    /* first recur on left child */
    printInorder(node->left);

    /* then print the data of node */
    printf("%d ", node->data);

    /* now recur on right child */
    printInorder(node->right);
}

/* Given a binary tree, print its nodes in preorder*/
void printPreorder(struct node* node)
{
    if (node == NULL)
         return;

    /* first print data of node */
    printf("%d ", node->data);

    /* then recur on left sutree */
    printPreorder(node->left);

    /* now recur on right subtree */
    printPreorder(node->right);
}

/* Driver program to test above functions*/
int main()
{
    struct node *root  = newNode(1);
    root->left         = newNode(2);
```


Untitled1.c - Code::Blocks 16.01
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
main() : int
Management
Projects Symbols Files
Workspace
Start here
Untitled1.c
printf("%d ", node->data);
/* then recur on left subtree */
printPreorder(node->left);
/* now recur on right subtree */
printPreorder(node->right);
}
/* Driver program to test above functions*/
int main()
{
struct node *root = newNode(1);
root->left = newNode(2);
root->right = newNode(3);
root->left->left = newNode(4);
root->left->right = newNode(5);
printf("\nPreorder traversal of binary tree is \n");
printPreorder(root);
printf("\nInorder traversal of binary tree is \n");
printInorder(root);
printf("\nPostorder traversal of binary tree is \n");
printPostorder(root);
getchar();
return 0;
}
C:\Users\Rites\Documents\Untitled1.c
Windows (CR+LF)
default
Line 96, Column 2
Insert
Read/Write
default
Type here to search
11:15 PM
20-Mar-18

OUTPUT


Preorder traversal of binary tree is
1 2 4 5 3
Inorder traversal of binary tree is
4 2 5 1 3
Postorder traversal of binary tree is
4 5 2 3 1