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***BATCH: 2***

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***ROLL NO : 37***

***LAB ASSIGNMENT 9***

**QUESTION : WAP to create a Binary tree and perform non-recursive Preorder, Inorder and Postorder traversal on it.**

**CODE:**

#include <stdio.h>

#include <stdlib.h>

struct Node {

int data;

struct Node \*left, \*right;

};

struct Node\* newNode(int data) {

struct Node\* node = malloc(sizeof(struct Node));

node->data = data;

node->left = node->right = NULL;

return node;

}

void preorderIterative(struct Node\* root) {

if (root == NULL) return;

struct Node\* stack[100];

int top = -1;

stack[++top] = root;

printf("Preorder: ");

while (top != -1) {

struct Node\* current = stack[top--];

printf("%d ", current->data);

if (current->right)

stack[++top] = current->right;

if (current->left)

stack[++top] = current->left;

}

printf("\n");

}

void inorderIterative(struct Node\* root) {

struct Node\* stack[100];

int top = -1;

struct Node\* current = root;

printf("Inorder: ");

while (current != NULL || top != -1) {

while (current != NULL) {

stack[++top] = current;

current = current->left;

}

current = stack[top--];

printf("%d ", current->data);

current = current->right;

printf("\n");

}

void postorderIterative(struct Node\* root) {

if (root == NULL) return;

struct Node\* stack1[100], \*stack2[100];

int top1 = -1, top2 = -1;

stack1[++top1] = root;

while (top1 != -1) {

struct Node\* current = stack1[top1--];

stack2[++top2] = current;

if (current->left)

stack1[++top1] = current->left;

if (current->right)

stack1[++top1] = current->right;

}

printf("Postorder: ");

while (top2 != -1) {

printf("%d ", stack2[top2--]->data);

}

printf("\n");

}

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("Binary Tree Traversals (Non-Recursive):\n");

preorderIterative(root);

inorderIterative(root);

postorderIterative(root);

return 0;

}

**OUTPUT:**

