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#include<stdio.h>
#include<stdlib.h>

struct BST {
    int data;
    struct BST *lchild;
    struct BST *rchild;
};

typedef struct BST* NODE;

NODE create() {
    NODE temp = (NODE) malloc(sizeof(struct BST));
    printf("\nEnter The value: ");
    scanf("%d", &temp->data);

    temp->lchild = NULL;
    temp->rchild = NULL;
    return temp;
}

void insert(NODE root, NODE newnode) {
    if (newnode->data < root->data) {
        if (root->lchild == NULL)
            root->lchild = newnode;
        else
            insert(root->lchild, newnode);
    }
    else if (newnode->data > root->data) {
        if (root->rchild == NULL)
            root->rchild = newnode;
        else
            insert(root->rchild, newnode);
    }
}

void search(NODE root) {
    int key;
    NODE cur;

    if (root == NULL) {
        printf("\nBST is empty.");
        return;
    }

    printf("\nEnter Element to be searched: ");
    scanf("%d", &key);

    cur = root;
    while (cur != NULL) {
        if (cur->data == key) {
            printf("\nKey element is present in BST\n");
            return;
        }
        if (key < cur->data)
            cur = cur->lchild;
        else
            cur = cur->rchild;
    }

    printf("\nKey element is not found in BST\n");
}

void inorder(NODE root) {
    if (root != NULL) {
        inorder(root->lchild);
        printf(" %d ", root->data);
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        inorder(root->rchild);
    }
}

void preorder(NODE root) {
    if (root != NULL) {
        printf("%d ", root->data);
        preorder(root->lchild);
        preorder(root->rchild);
    }
}

void postorder(NODE root) {
    if (root != NULL) {
        postorder(root->lchild);
        postorder(root->rchild);
        printf("%d ", root->data);
    }
}

int main() {
    int ch, n, i;
    NODE root = NULL, newnode;

    while (1) {
        printf("\n-----BST MENU-----");
        printf("\n1. Create a BST");
        printf("\n2. Search");
        printf("\n3. BST Traversals");
        printf("\n4. Exit");
        printf("\nEnter your choice: ");
        scanf("%d", &ch);

        switch (ch) {

            case 1:
                printf("\nEnter the number of elements: ");
                scanf("%d", &n);
                for (i = 0; i < n; i++) {
                    newnode = create();
                    if (root == NULL)
                        root = newnode;
                    else
                        insert(root, newnode);
                }
                break;

            case 2:
                search(root);
                break;

            case 3:
                if (root == NULL)
                    printf("\nTree is not created");
                else {
                    printf("\nThe Preorder Traversal : ");
                    preorder(root);

                    printf("\nThe Inorder Traversal : ");
                    inorder(root);

                    printf("\nThe Postorder Traversal: ");
                    postorder(root);

                    printf("\n");
                }
        }
    }
}
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        break;

    case 4:
        exit(0);

    default:
        printf("\nInvalid Choice\n");
    }
}
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