

```

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

// Define the structure for an AVL tree node
typedef struct AVLNode {
    int key;
    struct AVLNode *left;
    struct AVLNode *right;
    int height;
} AVLNode;

// Function to get the height of the node
int height(AVLNode *node) {
    if (node == NULL)
        return 0;
    return node->height;
}

// Utility function to get the maximum of two integers
int max(int a, int b) {
    return (a > b) ? a : b;
}

// Function to create a new node
AVLNode* createNode(int key) {
    AVLNode *node = (AVLNode *)malloc(sizeof(AVLNode));
    node->key = key;
    node->left = NULL;
    node->right = NULL;
    node->height = 1; // New node is initially at height 1
    return node;
}

// Right rotate subtree rooted with y
AVLNode* rightRotate(AVLNode *y) {
    AVLNode *x = y->left;
    AVLNode *T2 = x->right;

    // Perform rotation
    x->right = y;
    y->left = T2;

    // Update heights
    y->height = max(height(y->left), height(y->right)) + 1;
    x->height = max(height(x->left), height(x->right)) + 1;

    // Return new root
    return x;
}

```

```

}

// Left rotate subtree rooted with x
AVLNode* leftRotate(AVLNode *x) {
    AVLNode *y = x->right;
    AVLNode *T2 = y->left;

    // Perform rotation
    y->left = x;
    x->right = T2;

    // Update heights
    x->height = max(height(x->left), height(x->right)) + 1;
    y->height = max(height(y->left), height(y->right)) + 1;

    // Return new root
    return y;
}

// Get Balance factor of node N
int getBalance(AVLNode *node) {
    if (node == NULL)
        return 0;
    return height(node->left) - height(node->right);
}

// Recursive function to insert a key in the subtree rooted with node and returns the new root
// of the subtree
AVLNode* insert(AVLNode* node, int key) {
    // Perform the normal BST insertion
    if (node == NULL)
        return createNode(key);

    if (key < node->key)
        node->left = insert(node->left, key);
    else if (key > node->key)
        node->right = insert(node->right, key);
    else // Equal keys are not allowed in BST
        return node;

    // Update height of this ancestor node
    node->height = 1 + max(height(node->left), height(node->right));

    // Get the balance factor of this ancestor node to check whether this node became
    // unbalanced
    int balance = getBalance(node);

    // If this node becomes unbalanced, then there are 4 cases

```

```

// Left Left Case
if (balance > 1 && key < node->left->key)
    return rightRotate(node);

// Right Right Case
if (balance < -1 && key > node->right->key)
    return leftRotate(node);

// Left Right Case
if (balance > 1 && key > node->left->key) {
    node->left = leftRotate(node->left);
    return rightRotate(node);
}

// Right Left Case
if (balance < -1 && key < node->right->key) {
    node->right = rightRotate(node->right);
    return leftRotate(node);
}

// Return the (unchanged) node pointer
return node;
}

// A utility function to print the tree in order
void inOrder(AVLNode *root) {
    if (root != NULL) {
        inOrder(root->left);
        printf("%d ", root->key);
        inOrder(root->right);
    }
}

int main() {
    AVLNode *root = NULL;

    // Insert nodes
    root = insert(root, 10);
    root = insert(root, 20);
    root = insert(root, 30);
    root = insert(root, 40);
    root = insert(root, 50);
    root = insert(root, 25);

    // Print in-order traversal of the AVL tree
    printf("In-order traversal of the AVL tree is: ");
    inOrder(root);
}

```

```
printf("\n");
```

```
return 0;
```

```
}
```