DAY-10

1. **Write a program to ask the user has to enter the 3names and stored it in a file with index number and print the data to console?**

Code:

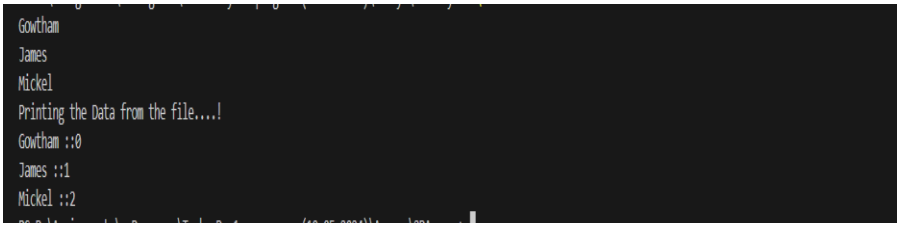
```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
void file(const char *data) {
    FILE *f = fopen("D://Assignments//2d.txt", "ab");
    if (f == NULL) {
        printf("Error opening the file\n");
        return;
    }
    fwrite(data, sizeof(char), strlen(data), f);
    fwrite("\n", sizeof(char), 1, f);
    fclose(f);
}

void display() {
    char a[21];
    FILE *f = fopen("D://Assignments//2d.txt", "rb");
    if (f == NULL) {
        printf("Error opening the file\n");
        return;
    }
    while (fgets(a, sizeof(a), f) != NULL) {
        printf("%s", a);
    }
    fclose(f);
}

int main() {
    char a[10][20];
    for (int i = 0; i < 3; i++) {
        scanf("%s", a[i]);
        char k[7];
        snprintf(k, sizeof(k), " ::%d", i);
        strcat(a[i], k);
        file(a[i]);
```

```
    }
    printf("Printing the Data from the file....!\n");
    display();
    return 0;
}
```

Output:



2. Write a program to implement AVL tree by using Linked list ?

Code:

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

struct Node {

  int key;

  struct Node *left;

  struct Node *right;

  int height;

};

int max(int a, int b);


int height(struct Node *N) {

  if (N == NULL)

    return 0;
```

```
  return N->height;
}
int max(int a, int b) {
  return (a > b) ? a : b;
}
struct Node *newNode(int key) {
  struct Node *node = (struct Node *)
    malloc(sizeof(struct Node));
  node->key = key;
  node->left = NULL;
  node->right = NULL;
  node->height = 1;
  return (node);
}
struct Node *rightRotate(struct Node *y) {
  struct Node *x = y->left;
  struct Node *T2 = x->right;
  x->right = y;
  y->left = T2;
  y->height = max(height(y->left), height(y->right)) + 1;
  x->height = max(height(x->left), height(x->right)) + 1;
  return x;
```

```
}
struct Node *leftRotate(struct Node *x) {
  struct Node *y = x->right;
  struct Node *T2 = y->left;
  y->left = x;
  x->right = T2;
  x->height = max(height(x->left), height(x->right)) + 1;
  y->height = max(height(y->left), height(y->right)) + 1;
  return y;
}
int getBalance(struct Node *N) {
  if (N == NULL)
    return 0;
  return height(N->left) - height(N->right);
}
struct Node *insertNode(struct Node *node, int key) {
  // Find the correct position to insertNode the node and insertNode it
  if (node == NULL)
    return (newNode(key));
  if (key < node->key)
    node->left = insertNode(node->left, key);
```

```
  else if (key > node->key)
    node->right = insertNode(node->right, key);
  else
    return node;
  node->height = 1 + max(height(node->left),height(node->right));
  int balance = getBalance(node);
  if (balance > 1 && key < node->left->key)
    return rightRotate(node);
  if (balance < -1 && key > node->right->key)
    return leftRotate(node);
  if (balance > 1 && key > node->left->key) {
    node->left = leftRotate(node->left);
    return rightRotate(node);
  }
  if (balance < -1 && key < node->right->key) {
    node->right = rightRotate(node->right);
    return leftRotate(node);
  }
  return node;
}
struct Node *minValueNode(struct Node *node) {
  struct Node *current = node;
```

```
  while (current->left != NULL)
    current = current->left;
  return current;
}

struct Node *deleteNode(struct Node *root, int key) {
  if (root == NULL)
    return root;
  if (key < root->key)
    root->left = deleteNode(root->left, key);
  else if (key > root->key)
    root->right = deleteNode(root->right, key);
  else {
    if ((root->left == NULL) || (root->right == NULL)) {
      struct Node *temp = root->left ? root->left : root->right;
      if (temp == NULL) {
        temp = root;
        root = NULL;
      } else
        *root = *temp;
      free(temp);
    } else {
```

```
    struct Node *temp = minValueNode(root->right);
    root->key = temp->key;
    root->right = deleteNode(root->right, temp->key);
  }
}
if (root == NULL)
  return root;
root->height = 1 + max(height(root->left),
              height(root->right));
int balance = getBalance(root);
if (balance > 1 && getBalance(root->left) >= 0)
  return rightRotate(root);
if (balance > 1 && getBalance(root->left) < 0) {
  root->left = leftRotate(root->left);
  return rightRotate(root);
}
if (balance < -1 && getBalance(root->right) <= 0)
  return leftRotate(root);
if (balance < -1 && getBalance(root->right) > 0) {
  root->right = rightRotate(root->right);
  return leftRotate(root);
```

```
  }

  return root;

}

void printPreOrder(struct Node *root) {

  if (root != NULL) {

    printf("%d ", root->key);

    printPreOrder(root->left);

    printPreOrder(root->right);

  }

}

void inorder(struct Node *root){
    if(root==NULL){
        // printf("The tree is empty\n");
        return ;
    }
    inorder(root->left);
    printf("%d ", root->key);
    inorder(root->right);
}
void postorder(struct Node *root){
    if(root==NULL){
        // printf("The tree is empty\n");
        return ;
    }
    postorder(root->left);
    postorder( root->right);
    printf("%d ",root->key);
}

int main() {

  struct Node *root = NULL;
```

```
  root = insertNode(root, 2);

  root = insertNode(root, 1);

  root = insertNode(root, 7);

  root = insertNode(root, 4);

  root = insertNode(root, 5);

  root = insertNode(root, 3);

  root = insertNode(root, 8);

  printPreOrder(root);

  root = deleteNode(root, 3);

  printf("\nAfter deletion: ");

 struct Node *r=root;
 printf("\nPre order traversal:\n");
  printPreOrder(root);
  printf("\nIn order traversal:\n");
  inorder(root);
  printf("\nPost order traversal:\n");
  postorder(root);
  return 0;

 }
```

Output:

```
4 2 1 3 7 5 8
After deletion:
Pre order traversal:
4 2 1 7 5 8
In order traversal:
1 2 4 5 7 8
Post order traversal:
1 2 5 8 7 4
```