Experiment:15-Design a C program to organise the file using a two level directory structure.

Aim:
The aim of this program is to organize files using a two-level directory structure in C. A two-level directory structure is a hierarchical system where a root directory contains subdirectories, and each subdirectory contains files. This program will:

1. Create a root directory.
2. Create subdirectories within the root directory.
3. Create files inside the subdirectories.
4. List the files in the subdirectories.

Procedure:

1. Create Root Directory: The program will create a root directory.
2. Create Subdirectories: Create subdirectories under the root directory.
3. Create Files in Subdirectories: Files will be created inside these subdirectories.
4. List Files in Subdirectories: The program will list all files present in the subdirectories.
5. Error Handling: Proper error handling will be performed to ensure that each step, such as directory creation and file creation, is successful.

Steps Involved:

1. Create Root Directory: Use mkdir() to create the root directory.
2. Create Subdirectories: Similarly, use mkdir() to create subdirectories inside the root directory.
3. Create Files in Subdirectories: Use fopen() to create files in these subdirectories.
4. List Files in Subdirectories: Use opendir() and readdir() to list the contents of subdirectories.

C Program to Organize Files Using a Two-Level Directory Structure:

```
#include <stdio.h>
#include <stdlib.h>
#include <dirent.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <unistd.h>

#define ROOT_DIRECTORY "root_directory"

// Function to create a directory
void create_directory(const char *dir_name) {
    if (mkdir(dir_name, 0755) == -1) {
        perror("Error creating directory");
        exit(EXIT_FAILURE);
    } else {
        printf("Directory '%s' created successfully.\n", dir_name);
    }
}

// Function to create a file inside a directory
void create_file(const char *dir_name, const char *file_name) {
    char path[256];
    FILE *file;

    // Construct the full path for the file
    snprintf(path, sizeof(path), "%s/%s", dir_name, file_name);
```

```
    // Create and open the file for writing
    file = fopen(path, "w");
    if (file == NULL) {
        perror("Error creating file");
        exit(EXIT_FAILURE);
    }

    fprintf(file, "This is file: %s\n", file_name);
    fclose(file);
    printf("File '%s' created successfully in directory '%s'.\n", file_name, dir_name);
}

// Function to list the files in a directory
void list_files(const char *dir_name) {
    DIR *dir;
    struct dirent *entry;

    // Open the directory
    dir = opendir(dir_name);
    if (dir == NULL) {
        perror("Error opening directory");
        exit(EXIT_FAILURE);
    }

    printf("\nListing files in directory '%s':\n", dir_name);

    // Read and list the files in the directory
    while ((entry = readdir(dir)) != NULL) {
        if (entry->d_type == DT_REG) {  // Regular file
            printf("%s\n", entry->d_name);
        }
    }

    closedir(dir);
}

int main() {
    // Create the root directory
    create_directory(ROOT_DIRECTORY);

    // Subdirectory names
    const char *subdirs[] = {"subdir1", "subdir2", "subdir3"};

    // Create subdirectories within the root directory
    for (int i = 0; i < 3; i++) {
        char subdir_path[256];
        snprintf(subdir_path, sizeof(subdir_path), "%s/%s", ROOT_DIRECTORY, subdirs[i]);
        create_directory(subdir_path);

        // Create files inside each subdirectory
        for (int j = 1; j <= 3; j++) {
```

```
            char file_name[256];
            snprintf(file_name, sizeof(file_name), "file%d.txt", j);
            create_file(subdir_path, file_name);
        }

        // List files inside each subdirectory
        list_files(subdir_path);
    }

    return 0;
}
```

Output:

Output

```
Directory 'root_directory' created successfully. 192372048
Directory 'root_directory/subdir1' created successfully.
File 'file1.txt' created successfully in directory 'root_directory
    /subdir1'.
File 'file2.txt' created successfully in directory 'root_directory
    /subdir1'.
File 'file3.txt' created successfully in directory 'root_directory
    /subdir1'.

Listing files in directory 'root_directory/subdir1':
file1.txt
file2.txt
file3.txt

Directory 'root_directory/subdir2' created successfully.
File 'file1.txt' created successfully in directory 'root_directory
    /subdir2'.
File 'file2.txt' created successfully in directory 'root_directory
    /subdir2'.
File 'file3.txt' created successfully in directory 'root_directory
    /subdir2'.

Listing files in directory 'root_directory/subdir2':
file1.txt
file2.txt
file3.txt
```