

PROJECT REPORT

Project Title: File Tally

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1. Project Overview:

1.1 Project Title:

File Tally: File and Folder Counting System

1.2 Purpose:

The primary objective of this project is to create a program that scans specified drives on a system, enumerates all files and folders, and provides a count of both. This project is aimed at understanding file system navigation, recursive directory traversal, and statistical reporting using C programming.

2. Features:

- **Drive Scanning:** The program can scan both C: and D: drives.
- **File and Folder Count:** It counts the number of files and folders recursively, including nested directories.
- **Error Handling:** It handles inaccessible drives and skips over problematic directories.
- **Cross-Platform Compatibility:** Designed primarily for Windows systems using backslashes for file paths.
- **Informative Output:** Displays a summary of total files and folders found.

3. Tools and Technologies Used:

- **Programming Language:** C
- **Compiler:** GCC or MinGW (for Windows)
- **Libraries:**
 - `stdio.h`: Standard I/O operations
 - `stdlib.h`: Memory allocation and process control
 - `dirent.h`: Directory handling
 - `sys/stat.h`: File status information
 - `string.h`: String manipulation

4. Code Explanation:

4.1 Main Components:

4.1.1 Function: `inside(const char *path)`

- **Purpose:**
 - Recursively traverses directories to count files and folders.
- **Key Operations:**
 - Opens a directory using `opendir()`.
 - Iterates over directory entries using `readdir()`.
 - Differentiates between files and folders using `stat()` and mode checking (`S_ISREG`, `S_ISDIR`).
 - Recursive call for subdirectories.

4.1.2 Main Function (`main()`)

- **Purpose:**
 - Initializes the scanning process.
 - Specifies the drives to scan (C:\, D:\).
 - Calls the `inside()` function for each drive.
 - Handles inaccessible drives gracefully.

4.2 Program Flow:

1. Display a welcome message with ASCII art for better aesthetics.
2. Enumerate specified drives (C and D).
3. Count files and folders recursively using the `inside()` function.
4. Display the total counts of files and folders.

4.3 Code Snippet:

```
file_tally.c X
C:\Users\HP > Documents > MCA > C > file_tally.c
1  #include <stdio.h>
2  #include <stdlib.h>
3  #include <dirent.h>
4  #include <sys/stat.h>
5  #include <string.h>
6
7  int dir_count = 0;
8  int file_count = 0;
9
10 void inside(const char *path) {
11     struct dirent *entry;
12     DIR *dp = opendir(path);
13
14     if (dp == NULL) {
15         // perror("opendir failed");
16         return; // Unable to open directory
17     }
18
19     while ((entry = readdir(dp)) != NULL) {
20         // Skip the current and parent directory entries
21         if (strcmp(entry->d_name, ".") == 0 || strcmp(entry->d_name, "..") == 0) {
22             continue;
23         }
24
25         char full_path[1024];
26         snprintf(full_path, sizeof(full_path), "%s\\%s", path, entry->d_name); // Use backslash for Windows
27
28         struct stat statbuf;
29
30         if (stat(full_path, &statbuf) == 0) {
31             if (S_ISREG(statbuf.st_mode)) {
32                 // It's a file
33                 file_count++;
34             } else if (S_ISDIR(statbuf.st_mode)) {
35                 // It's a directory
36                 dir_count++;
37                 inside(full_path); // Recursively count inside the directory
38             } else {
39                 //perror("stat failed");
40             }
41         }
42
43         closedir(dp);
44     }
45
46 int main() {
47     // Check both C: and D: drives
48     const char *drives[] = {"C:\\", "D:\\"};
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```

5. Sample Output:

```
C:\Users\HP\Documents\MCA\C>gcc file_tally.c -o file_tally
C:\Users\HP\Documents\MCA\C>file_tally

FILE TALLY

File and Folder Counting System,
Please wait till the program enumerate all the directories.....

Scanning drive C:\...
Scanning drive D:\...
The total number of files is: 475788
The total number of folders is: 130111

C:\Users\HP\Documents\MCA\C>
```

6. Applications:

- **File Management Tools:** Can be integrated into file management systems for summarizing folder statistics.
- **System Auditing:** Helps administrators track file and folder usage across drives.
- **Backup and Archiving:** Assists in identifying the number of files and folders for backup purposes.
- **Educational Use:** Serves as a learning tool for students studying file system operations and recursion.
- **Diagnostics:** Can be used for analyzing disk usage or troubleshooting file system-related issues.

7. Challenges Faced:

- **Handling Inaccessible Drives:** Used error handling (`opendir()` and `perror()`) to gracefully skip inaccessible drives.
- **Path Buffer Size:** Ensured the buffer size was sufficient for long file paths using `snprintf()`.
- **Cross-Platform Compatibility:** Focused on Windows-specific paths with backslashes.

8. Learning Outcomes:

- Mastered directory traversal using the dirent.h library.
- Learned to differentiate between files and folders using stat().
- Enhanced problem-solving skills by handling recursion and edge cases.
- Gained experience in creating user-friendly terminal outputs with ASCII art and formatted messages.

9. Future Enhancements:

- **Cross-Platform Support:** Modify the program to support Unix-based systems by handling forward slashes (/).
- **GUI Integration:** Add a graphical interface for better user experience.
- **Custom Drive Selection:** Allow users to specify drives or directories to scan.
- **Detailed Reports:** Provide an option to save the file and folder statistics in a text or CSV file.
- **Performance Optimization:** Optimize recursion for faster directory traversal in systems with large file volumes.

10. Conclusion:

The File Tally project successfully demonstrates the capability of a C program to traverse a file system, count files and folders, and provide statistical results. This project not only fulfills its objectives but also serves as a foundation for more complex file system management tools.