**Assignment 2**

Implementing C/Rust Code that mimics “ls -al” Linux command

**C Program:**

#include <stdio.h>

#include <sys/stat.h>   // File information (struct stat)

#include <dirent.h>     // Directory handling (opendir, readdir, closedir)

#include <pwd.h>        // User ID to username conversion (getpwuid)

#include <grp.h>        // Group ID to group name conversion (getgrgid)

#include <time.h>       // Formatting time (strftime, localtime)

/\* this will store file permission bits and print charachters accordingly\*/

void print\_permissions(mode\_t mode) {

    char perms[] = "rwxrwxrwx";   //permission characher array

    for (int i = 0; i < 9; i++)

        printf("%c", (mode & (1 << (8 - i))) ? perms[i] : '-'); //checks if the permission bit is set

}

int main() {

    struct dirent \*entry;   // Pointer to directory entry

    struct stat file\_stat;  // Structure to store file metadata

    DIR \*dir = opendir("."); //open the currect directory

    if (!dir) {

        perror("opendir");

        return 1;

    }

    while ((entry = readdir(dir)) != NULL) {

        if (stat(entry->d\_name, &file\_stat) == -1) {

            perror("stat");  // Print error if stat fails

            continue;

        }

        printf("%c", S\_ISDIR(file\_stat.st\_mode) ? 'd' : '-'); // File type

        print\_permissions(file\_stat.st\_mode);                 // Permissions

        printf(" %2lu %s %s %6ld ", file\_stat.st\_nlink,

               getpwuid(file\_stat.st\_uid)->pw\_name, //Converts user ID to username.

               getgrgid(file\_stat.st\_gid)->gr\_name,  //Converts group ID to group name.

               file\_stat.st\_size);

        char time\_str[16];

        strftime(time\_str, sizeof(time\_str), "%b %d %H:%M", localtime(&file\_stat.st\_mtime));

        printf("%s %s\n", time\_str, entry->d\_name);

    }

    closedir(dir);

    return 0;

}

**Output:**

**A screen shot of a computer

AI-generated content may be incorrect.**