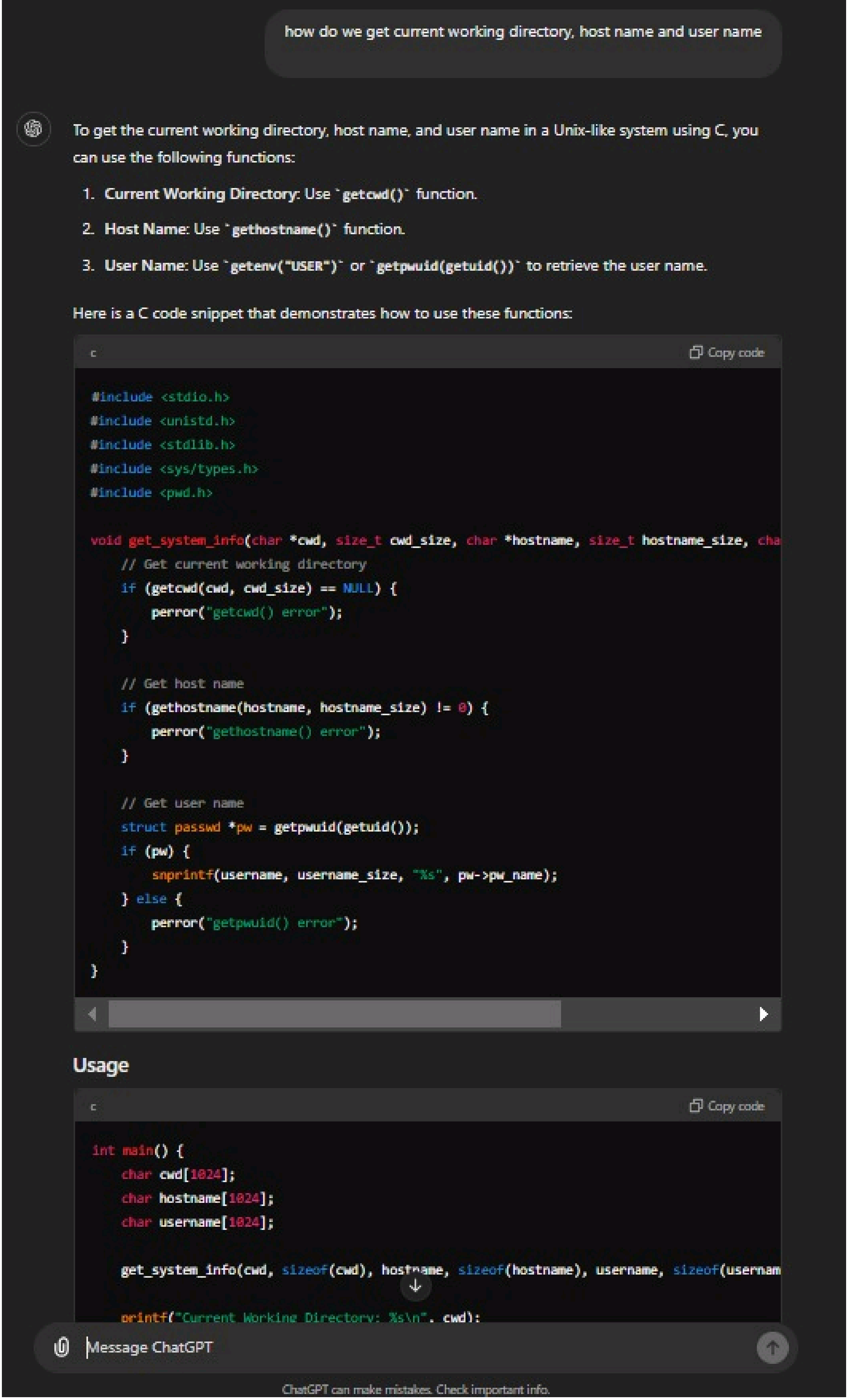

how do we get current working directory, host name and user name

To get the current working directory, host name, and user name in a Unix-like system using C, you can use the following functions:

1. **Current Working Directory:** Use `getcwd()` function.
2. **Host Name:** Use `gethostname()` function.
3. **User Name:** Use `getenv("USER")` or `getpwuid(getuid())` to retrieve the user name.

Here is a C code snippet that demonstrates how to use these functions:

```c
#include <stdio.h>
#include <unistd.h>
#include <stdlib.h>
#include <sys/types.h>
#include <pwd.h>

void get_system_info(char *cwd, size_t cwd_size, char *hostname, size_t hostname_size, cha
    // Get current working directory
    if (getcwd(cwd, cwd_size) == NULL) {
        perror("getcwd() error");
    }

    // Get host name
    if (gethostname(hostname, hostname_size) != 0) {
        perror("gethostname() error");
    }

    // Get user name
    struct passwd *pw = getpwuid(getuid());
    if (pw) {
        snprintf(username, username_size, "%s", pw->pw_name);
    } else {
        perror("getpwuid() error");
    }
}
```

Usage

```c
int main() {
    char cwd[1024];
    char hostname[1024];
    char username[1024];

    get_system_info(cwd, sizeof(cwd), hostname, sizeof(hostname), username, sizeof(usernam

    printf("Current Working Directory: %s\n", cwd);
```

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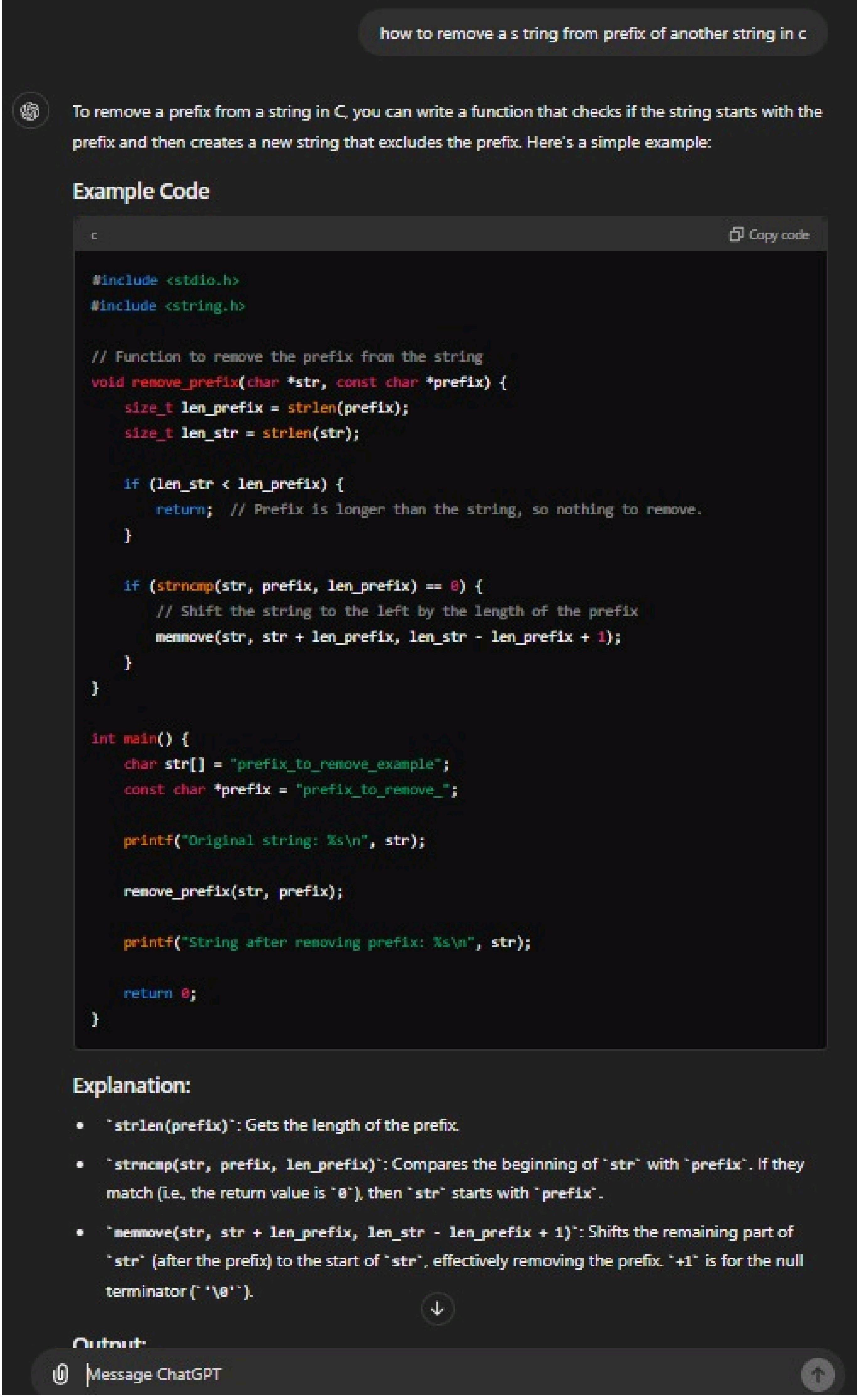


how to remove a s tring from prefix of another string in c

To remove a prefix from a string in C, you can write a function that checks if the string starts with the prefix and then creates a new string that excludes the prefix. Here's a simple example:

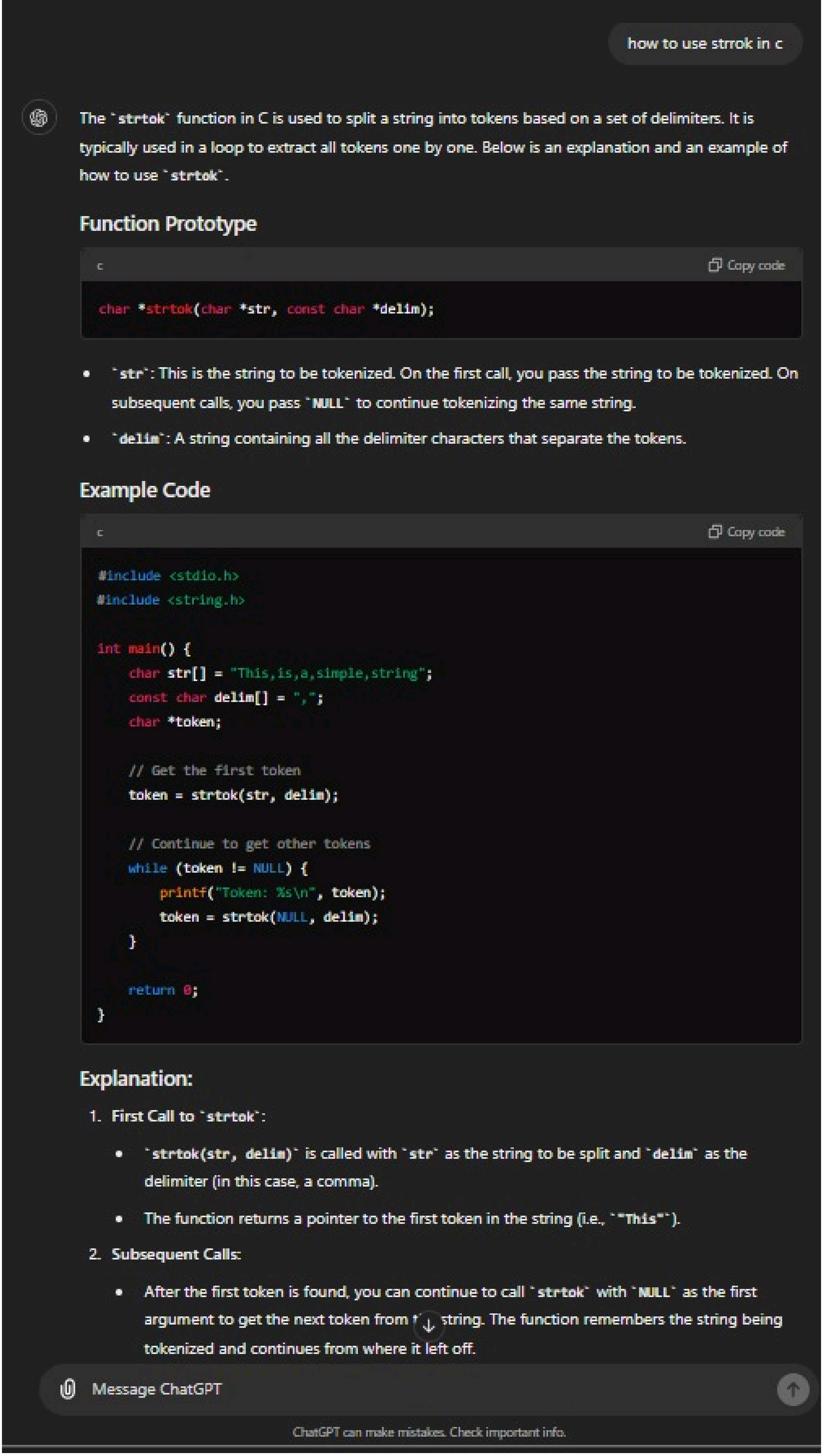
Example Code

```c
#include <stdio.h>
#include <string.h>

// Function to remove the prefix from the string
void remove_prefix(char *str, const char *prefix) {
    size_t len_prefix = strlen(prefix);
    size_t len_str = strlen(str);

    if (len_str < len_prefix) {
        return;  // Prefix is longer than the string, so nothing to remove.
    }

    if (strncmp(str, prefix, len_prefix) == 0) {
        // Shift the string to the left by the length of the prefix
        memmove(str, str + len_prefix, len_str - len_prefix + 1);
    }
}

int main() {
    char str[] = "prefix_to_remove_example";
    const char *prefix = "prefix_to_remove_";

    printf("Original string: %s\n", str);

    remove_prefix(str, prefix);

    printf("String after removing prefix: %s\n", str);

    return 0;
}
```

Explanation:

- `strlen(prefix)`: Gets the length of the prefix.
- `strncmp(str, prefix, len_prefix)`: Compares the beginning of `str` with `prefix`. If they match (i.e., the return value is `0`), then `str` starts with `prefix`.
- `memmove(str, str + len_prefix, len_str - len_prefix + 1)`: Shifts the remaining part of `str` (after the prefix) to the start of `str`, effectively removing the prefix. `+1` is for the null terminator (`'\0'`).

Output:



how to use strrok in c

The `strtok` function in C is used to split a string into tokens based on a set of delimiters. It is typically used in a loop to extract all tokens one by one. Below is an explanation and an example of how to use `strtok`.

Function Prototype

```c
char *strtok(char *str, const char *delim);
```

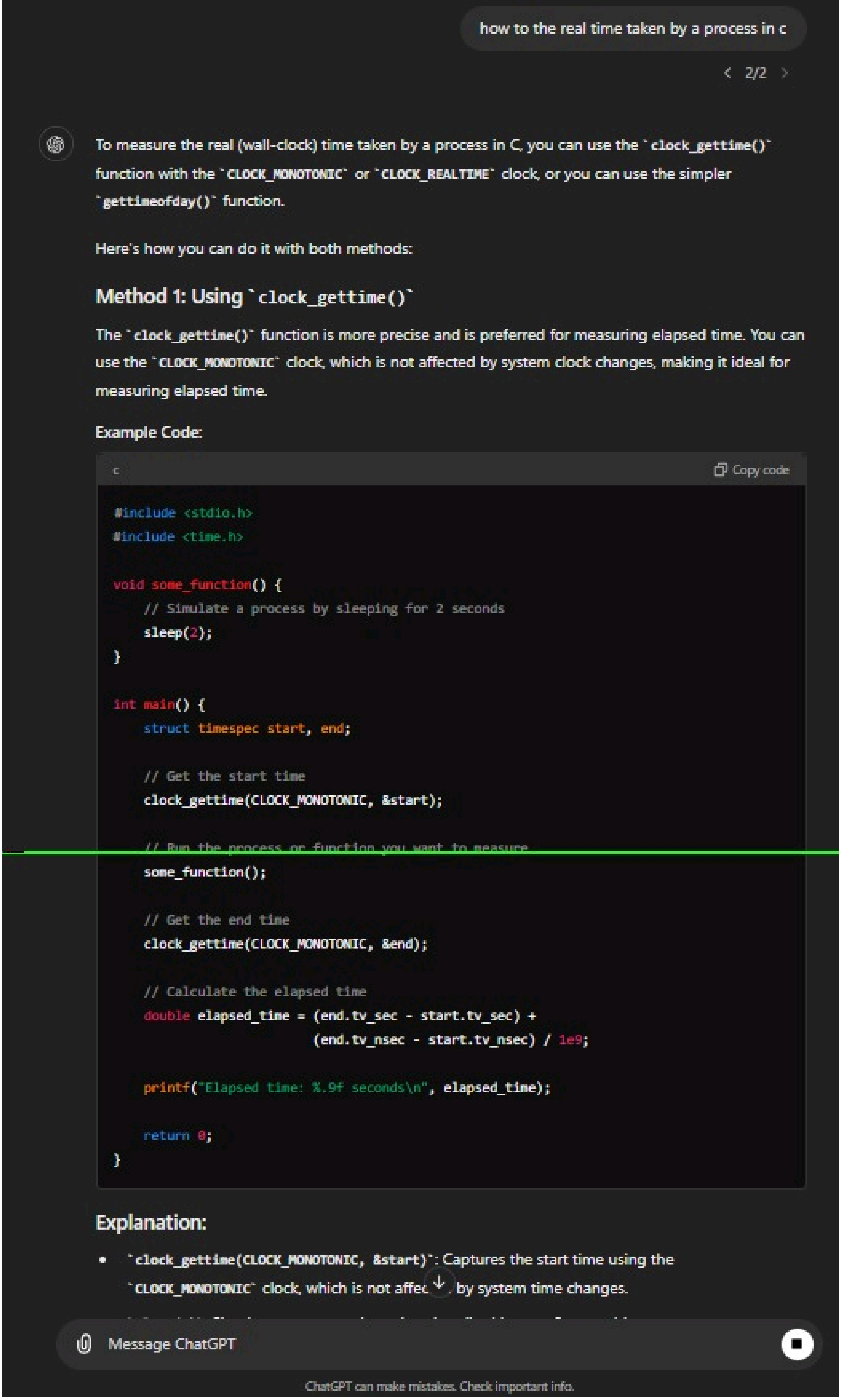
- `str`: This is the string to be tokenized. On the first call, you pass the string to be tokenized. On subsequent calls, you pass `NULL` to continue tokenizing the same string.
- `delim`: A string containing all the delimiter characters that separate the tokens.

Example Code

```c
#include <stdio.h>
#include <string.h>

int main() {
    char str[] = "This,is,a,simple,string";
    const char delim[] = ",";
    char *token;

    // Get the first token
    token = strtok(str, delim);

    // Continue to get other tokens
    while (token != NULL) {
        printf("Token: %s\n", token);
        token = strtok(NULL, delim);
    }

    return 0;
}
```

Explanation:

1. **First Call to `strtok`:**
   - `strtok(str, delim)` is called with `str` as the string to be split and `delim` as the delimiter (in this case, a comma).
   - The function returns a pointer to the first token in the string (i.e., `"This"`).
2. **Subsequent Calls:**
   - After the first token is found, you can continue to call `strtok` with `NULL` as the first argument to get the next token from t string. The function remembers the string being tokenized and continues from where it left off.



how to the real time taken by a process in c

To measure the real (wall-clock) time taken by a process in C, you can use the `clock_gettime()` function with the `CLOCK_MONOTONIC` or `CLOCK_REALTIME` clock, or you can use the simpler `gettimeofday()` function.

Here's how you can do it with both methods:

Method 1: Using `clock_gettime()`

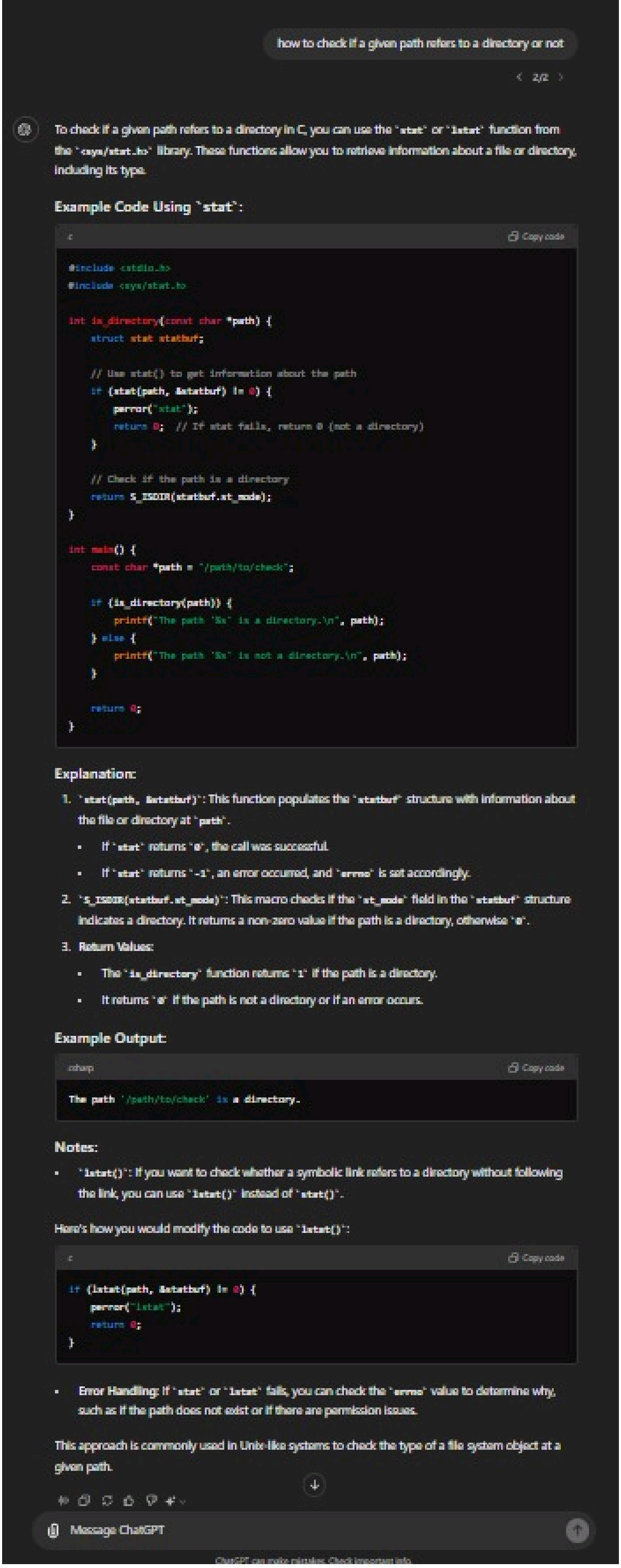
The `clock_gettime()` function is more precise and is preferred for measuring elapsed time. You can use the `CLOCK_MONOTONIC` clock, which is not affected by system clock changes, making it ideal for measuring elapsed time.

Example Code:

```c
#include <stdio.h>
#include <time.h>

void some_function() {
    // Simulate a process by sleeping for 2 seconds
    sleep(2);
}

int main() {
    struct timespec start, end;

    // Get the start time
    clock_gettime(CLOCK_MONOTONIC, &start);

    // Run the process or function you want to measure
    some_function();

    // Get the end time
    clock_gettime(CLOCK_MONOTONIC, &end);

    // Calculate the elapsed time
    double elapsed_time = (end.tv_sec - start.tv_sec) +
                          (end.tv_nsec - start.tv_nsec) / 1e9;

    printf("Elapsed time: %.9f seconds\n", elapsed_time);

    return 0;
}
```

Explanation:

- `clock_gettime(CLOCK_MONOTONIC, &start)`: Captures the start time using the `CLOCK_MONOTONIC` clock, which is not affec by system time changes.



how to check if a given path refers to a directory or not

To check if a given path refers to a directory in C, you can use the `stat` or `lstat` function from the `<sys/stat.h>` library. These functions allow you to retrieve information about a file or directory, including its type.

Example Code Using `stat`:

```c
#include <stdio.h>
#include <sys/stat.h>

int is_directory(const char *path) {
    struct stat statbuf;

    // Use stat() to get information about the path
    if (stat(path, &statbuf) != 0) {
        perror("stat");
        return 0;  // If stat fails, return 0 (not a directory)
    }

    // Check if the path is a directory
    return S_ISDIR(statbuf.st_mode);
}

int main() {
    const char *path = "/path/to/check";

    if (is_directory(path)) {
        printf("The path '%s' is a directory.\n", path);
    } else {
        printf("The path '%s' is not a directory.\n", path);
    }

    return 0;
}
```

Explanation:

1. `stat(path, &statbuf)`: This function populates the `statbuf` structure with information about the file or directory at `path`.
    - If `stat` returns `0`, the call was successful.
    - If `stat` returns `-1`, an error occurred, and `errno` is set accordingly.
2. `S_ISDIR(statbuf.st_mode)`: This macro checks if the `st_mode` field in the `statbuf` structure indicates a directory. It returns a non-zero value if the path is a directory, otherwise `0`.
3. Return Values:
    - The `is_directory` function returns `1` if the path is a directory.
    - It returns `0` if the path is not a directory or if an error occurs.

Example Output:

```
The path '/path/to/check' is a directory.
```

Notes:

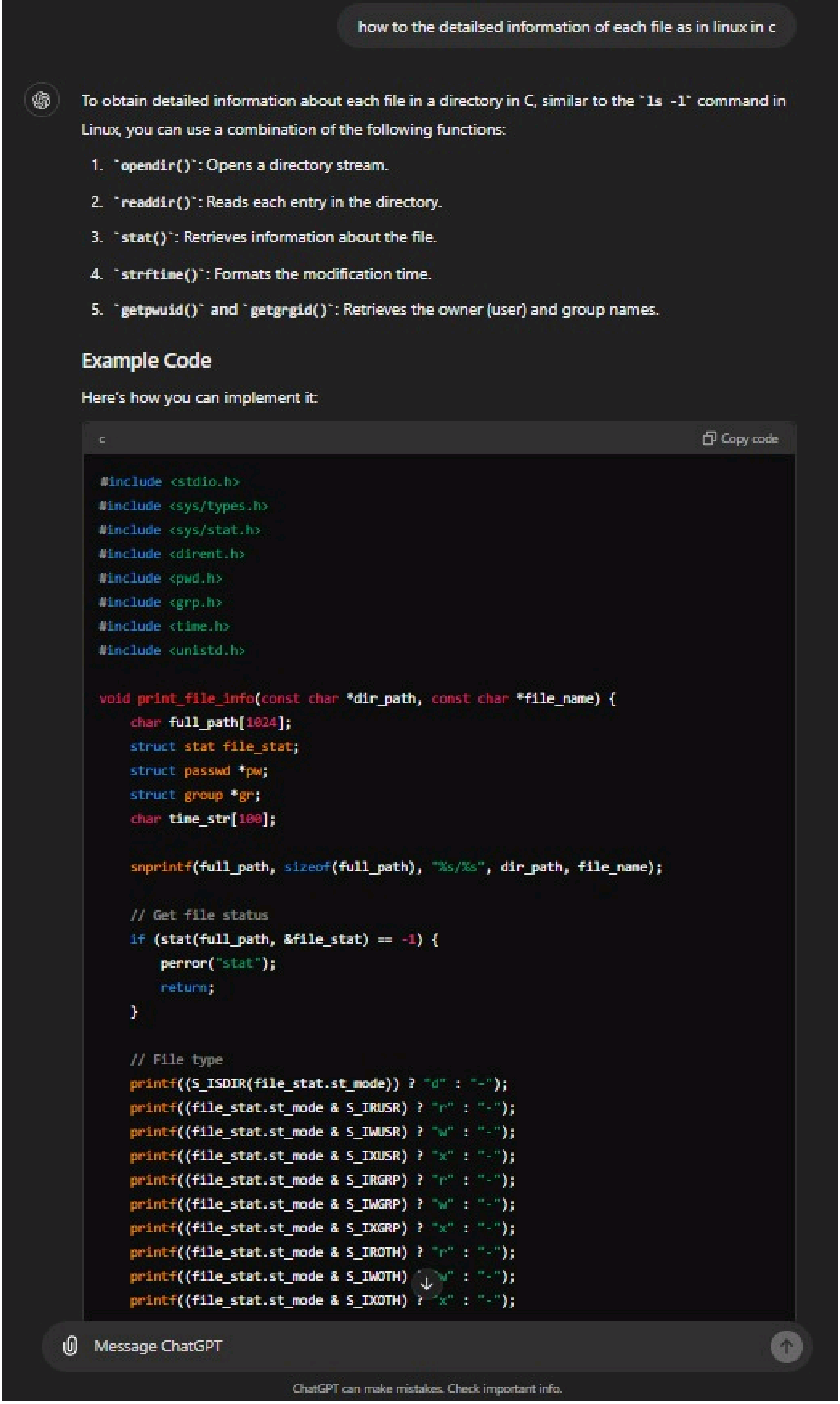
- `lstat()`: If you want to check whether a symbolic link refers to a directory without following the link, you can use `lstat()` instead of `stat()`.

Here's how you would modify the code to use `lstat()`:

```c
if (lstat(path, &statbuf) != 0) {
    perror("lstat");
    return 0;
}
```

- **Error Handling:** If `stat` or `lstat` fails, you can check the `errno` value to determine why, such as if the path does not exist or if there are permission issues.

This approach is commonly used in Unix-like systems to check the type of a file system object at a given path.



how to the detailsed information of each file as in linux in c

To obtain detailed information about each file in a directory in C, similar to the `ls -l` command in Linux, you can use a combination of the following functions:

1. `opendir()`: Opens a directory stream.
2. `readdir()`: Reads each entry in the directory.
3. `stat()`: Retrieves information about the file.
4. `strftime()`: Formats the modification time.
5. `getpwuid()` and `getgrgid()`: Retrieves the owner (user) and group names.

Example Code

Here's how you can implement it:

```c
#include <stdio.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <dirent.h>
#include <pwd.h>
#include <grp.h>
#include <time.h>
#include <unistd.h>

void print_file_info(const char *dir_path, const char *file_name) {
    char full_path[1024];
    struct stat file_stat;
    struct passwd *pw;
    struct group *gr;
    char time_str[100];

    snprintf(full_path, sizeof(full_path), "%s/%s", dir_path, file_name);

    // Get file status
    if (stat(full_path, &file_stat) == -1) {
        perror("stat");
        return;
    }

    // File type
    printf((S_ISDIR(file_stat.st_mode)) ? "d" : "-");
    printf((file_stat.st_mode & S_IRUSR) ? "r" : "-");
    printf((file_stat.st_mode & S_IWUSR) ? "w" : "-");
    printf((file_stat.st_mode & S_IXUSR) ? "x" : "-");
    printf((file_stat.st_mode & S_IRGRP) ? "r" : "-");
    printf((file_stat.st_mode & S_IWGRP) ? "w" : "-");
    printf((file_stat.st_mode & S_IXGRP) ? "x" : "-");
    printf((file_stat.st_mode & S_IROTH) ? "r" : "-");
    printf((file_stat.st_mode & S_IWOTH) ? "w" : "-");
    printf((file_stat.st_mode & S_IXOTH) ? "x" : "-");
```

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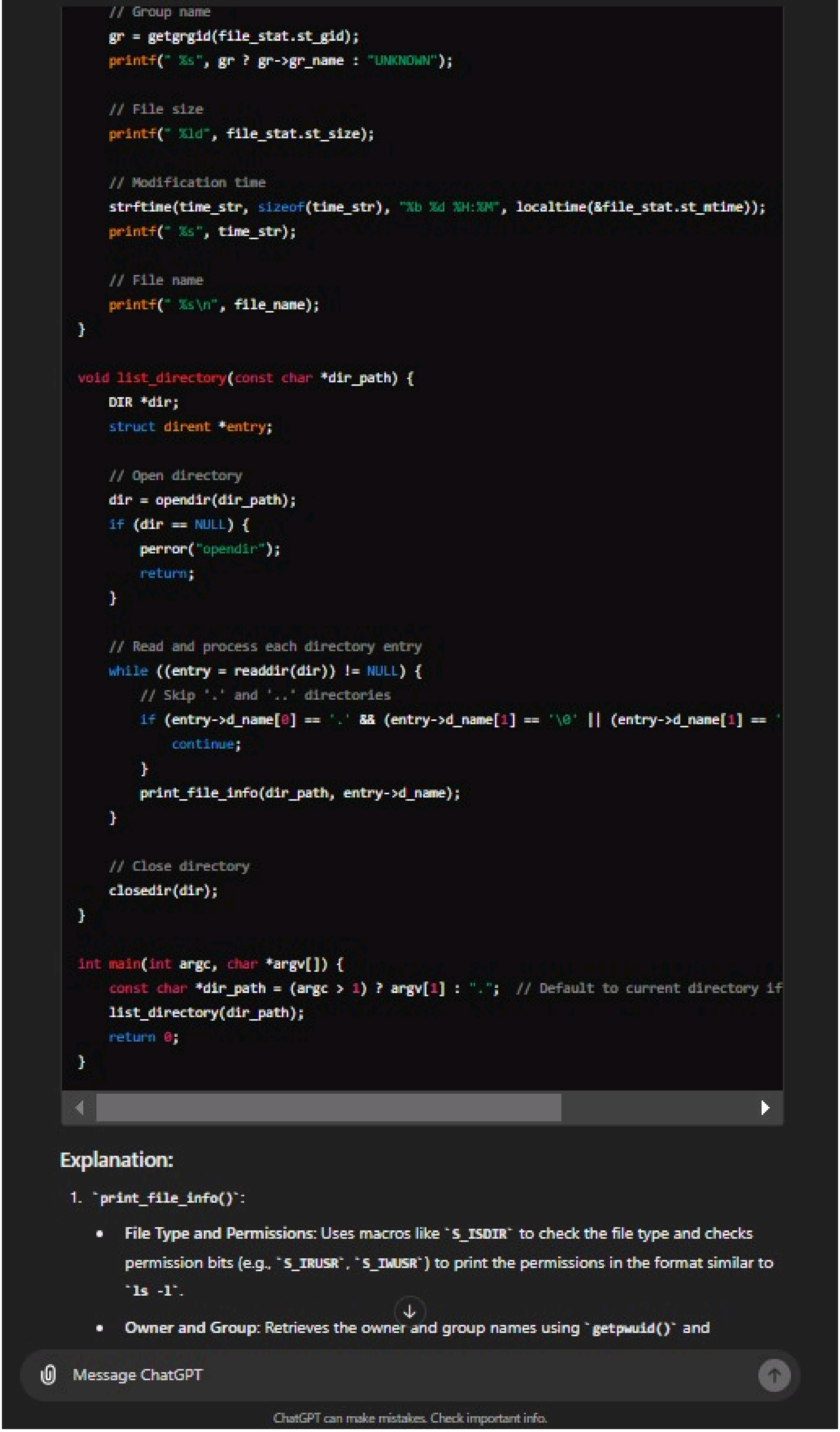

```
    // Group name
    gr = getgrgid(file_stat.st_gid);
    printf(" %s", gr ? gr->gr_name : "UNKNOWN");

    // File size
    printf(" %ld", file_stat.st_size);

    // Modification time
    strftime(time_str, sizeof(time_str), "%b %d %H:%M", localtime(&file_stat.st_mtime));
    printf(" %s", time_str);

    // File name
    printf(" %s\n", file_name);
}

void list_directory(const char *dir_path) {
    DIR *dir;
    struct dirent *entry;

    // Open directory
    dir = opendir(dir_path);
    if (dir == NULL) {
        perror("opendir");
        return;
    }

    // Read and process each directory entry
    while ((entry = readdir(dir)) != NULL) {
        // Skip '.' and '..' directories
        if (entry->d_name[0] == '.' && (entry->d_name[1] == '\0' || (entry->d_name[1] == '
            continue;
        }
        print_file_info(dir_path, entry->d_name);
    }

    // Close directory
    closedir(dir);
}

int main(int argc, char *argv[]) {
    const char *dir_path = (argc > 1) ? argv[1] : ".";  // Default to current directory if
    list_directory(dir_path);
    return 0;
}
```

Explanation:

1. `print_file_info()`:
    - **File Type and Permissions**: Uses macros like `S_ISDIR` to check the file type and checks permission bits (e.g., `S_IRUSR`, `S_IWUSR`) to print the permissions in the format similar to `ls -l`.
    - **Owner and Group**: Retrieves the owner and group names using `getpwuid()` and

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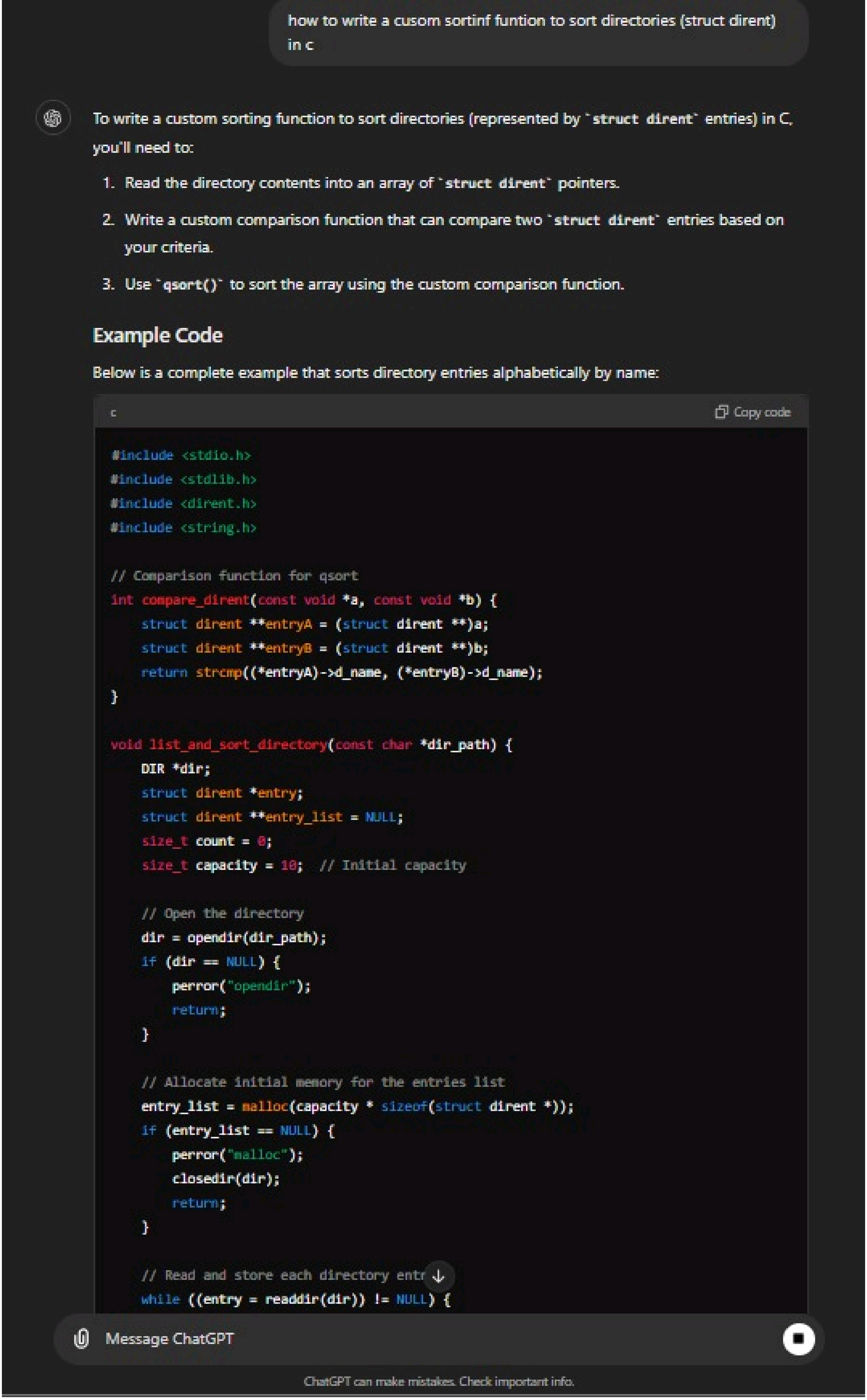

how to write a cusom sortinf funtion to sort directories (struct dirent) in c

To write a custom sorting function to sort directories (represented by `struct dirent` entries) in C, you'll need to:

1. Read the directory contents into an array of `struct dirent` pointers.
2. Write a custom comparison function that can compare two `struct dirent` entries based on your criteria.
3. Use `qsort()` to sort the array using the custom comparison function.

Example Code

Below is a complete example that sorts directory entries alphabetically by name:

```c
#include <stdio.h>
#include <stdlib.h>
#include <dirent.h>
#include <string.h>

// Comparison function for qsort
int compare_dirent(const void *a, const void *b) {
    struct dirent **entryA = (struct dirent **)a;
    struct dirent **entryB = (struct dirent **)b;
    return strcmp((*entryA)->d_name, (*entryB)->d_name);
}

void list_and_sort_directory(const char *dir_path) {
    DIR *dir;
    struct dirent *entry;
    struct dirent **entry_list = NULL;
    size_t count = 0;
    size_t capacity = 10;  // Initial capacity

    // Open the directory
    dir = opendir(dir_path);
    if (dir == NULL) {
        perror("opendir");
        return;
    }

    // Allocate initial memory for the entries list
    entry_list = malloc(capacity * sizeof(struct dirent *));
    if (entry_list == NULL) {
        perror("malloc");
        closedir(dir);
        return;
    }

    // Read and store each directory entr
    while ((entry = readdir(dir)) != NULL) {
```

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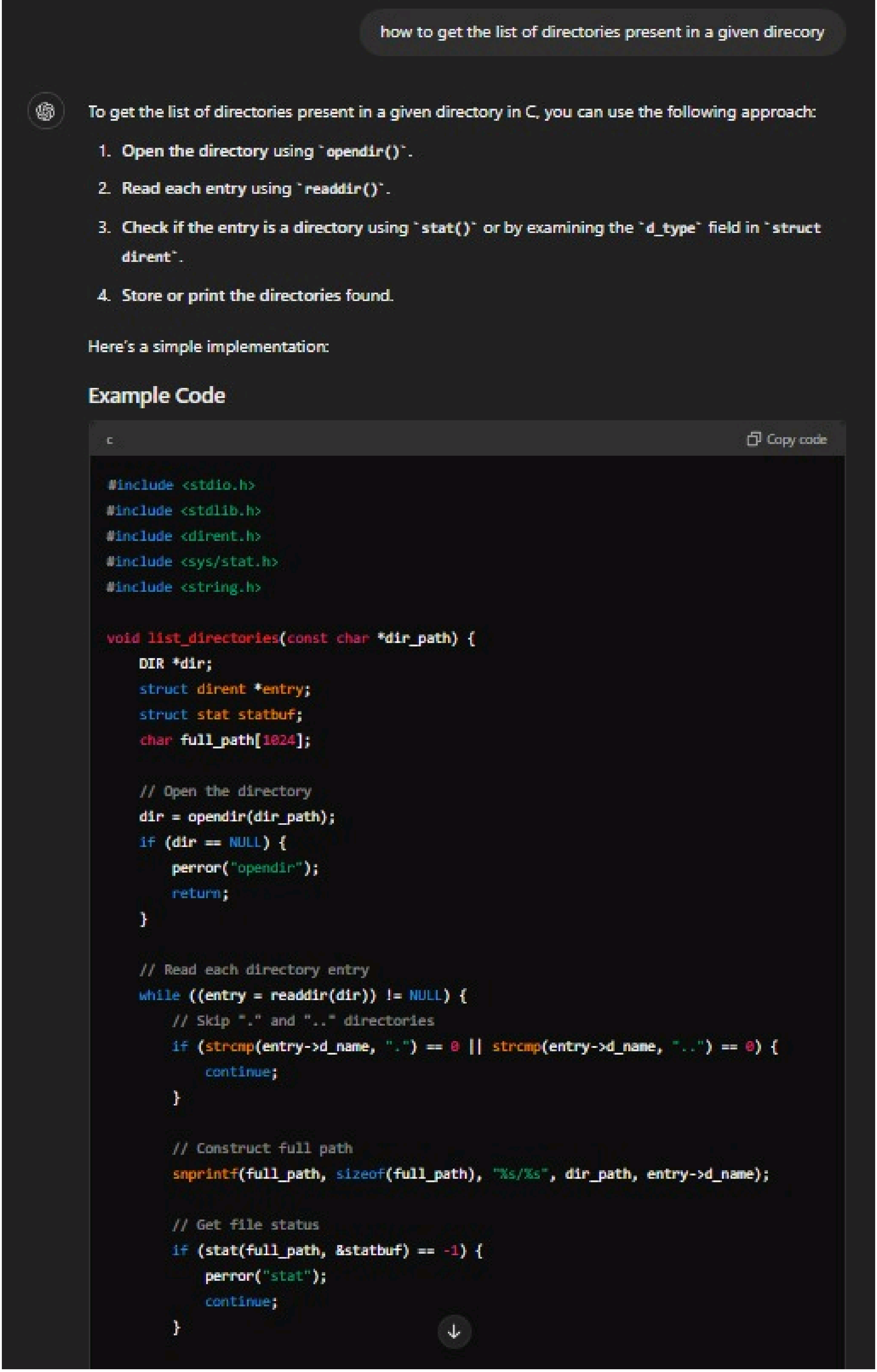


how to get the list of directories present in a given direcory

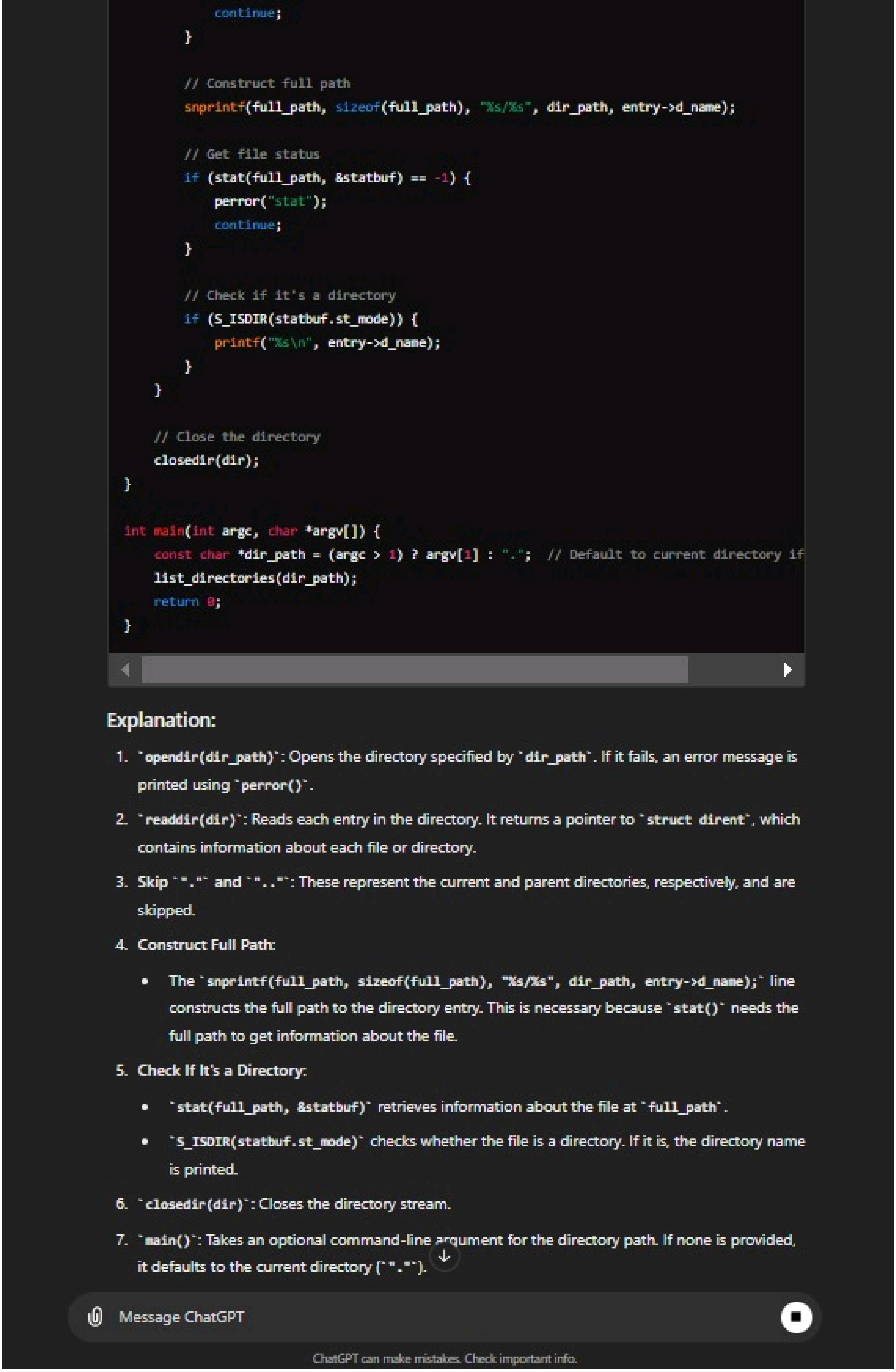
To get the list of directories present in a given directory in C, you can use the following approach:

1. Open the directory using `opendir()`.
2. Read each entry using `readdir()`.
3. Check if the entry is a directory using `stat()` or by examining the `d_type` field in `struct dirent`.
4. Store or print the directories found.

Here's a simple implementation:

Example Code

```c
#include <stdio.h>
#include <stdlib.h>
#include <dirent.h>
#include <sys/stat.h>
#include <string.h>

void list_directories(const char *dir_path) {
    DIR *dir;
    struct dirent *entry;
    struct stat statbuf;
    char full_path[1024];

    // Open the directory
    dir = opendir(dir_path);
    if (dir == NULL) {
        perror("opendir");
        return;
    }

    // Read each directory entry
    while ((entry = readdir(dir)) != NULL) {
        // Skip "." and ".." directories
        if (strcmp(entry->d_name, ".") == 0 || strcmp(entry->d_name, "..") == 0) {
            continue;
        }

        // Construct full path
        snprintf(full_path, sizeof(full_path), "%s/%s", dir_path, entry->d_name);

        // Get file status
        if (stat(full_path, &statbuf) == -1) {
            perror("stat");
            continue;
        }
```



```
            continue;
        }

        // Construct full path
        snprintf(full_path, sizeof(full_path), "%s/%s", dir_path, entry->d_name);

        // Get file status
        if (stat(full_path, &statbuf) == -1) {
            perror("stat");
            continue;
        }

        // Check if it's a directory
        if (S_ISDIR(statbuf.st_mode)) {
            printf("%s\n", entry->d_name);
        }
    }

    // Close the directory
    closedir(dir);
}

int main(int argc, char *argv[]) {
    const char *dir_path = (argc > 1) ? argv[1] : ".";  // Default to current directory if
    list_directories(dir_path);
    return 0;
}
```

Explanation:

1. `opendir(dir_path)`: Opens the directory specified by `dir_path`. If it fails, an error message is printed using `perror()`.
2. `readdir(dir)`: Reads each entry in the directory. It returns a pointer to `struct dirent`, which contains information about each file or directory.
3. Skip `"."` and `".."`: These represent the current and parent directories, respectively, and are skipped.
4. Construct Full Path:
    - The `snprintf(full_path, sizeof(full_path), "%s/%s", dir_path, entry->d_name);` line constructs the full path to the directory entry. This is necessary because `stat()` needs the full path to get information about the file.
5. Check If It's a Directory:
    - `stat(full_path, &statbuf)` retrieves information about the file at `full_path`.
    - `S_ISDIR(statbuf.st_mode)` checks whether the file is a directory. If it is, the directory name is printed.
6. `closedir(dir)`: Closes the directory stream.
7. `main()`: Takes an optional command-line argument for the directory path. If none is provided, it defaults to the current directory (`"."`).

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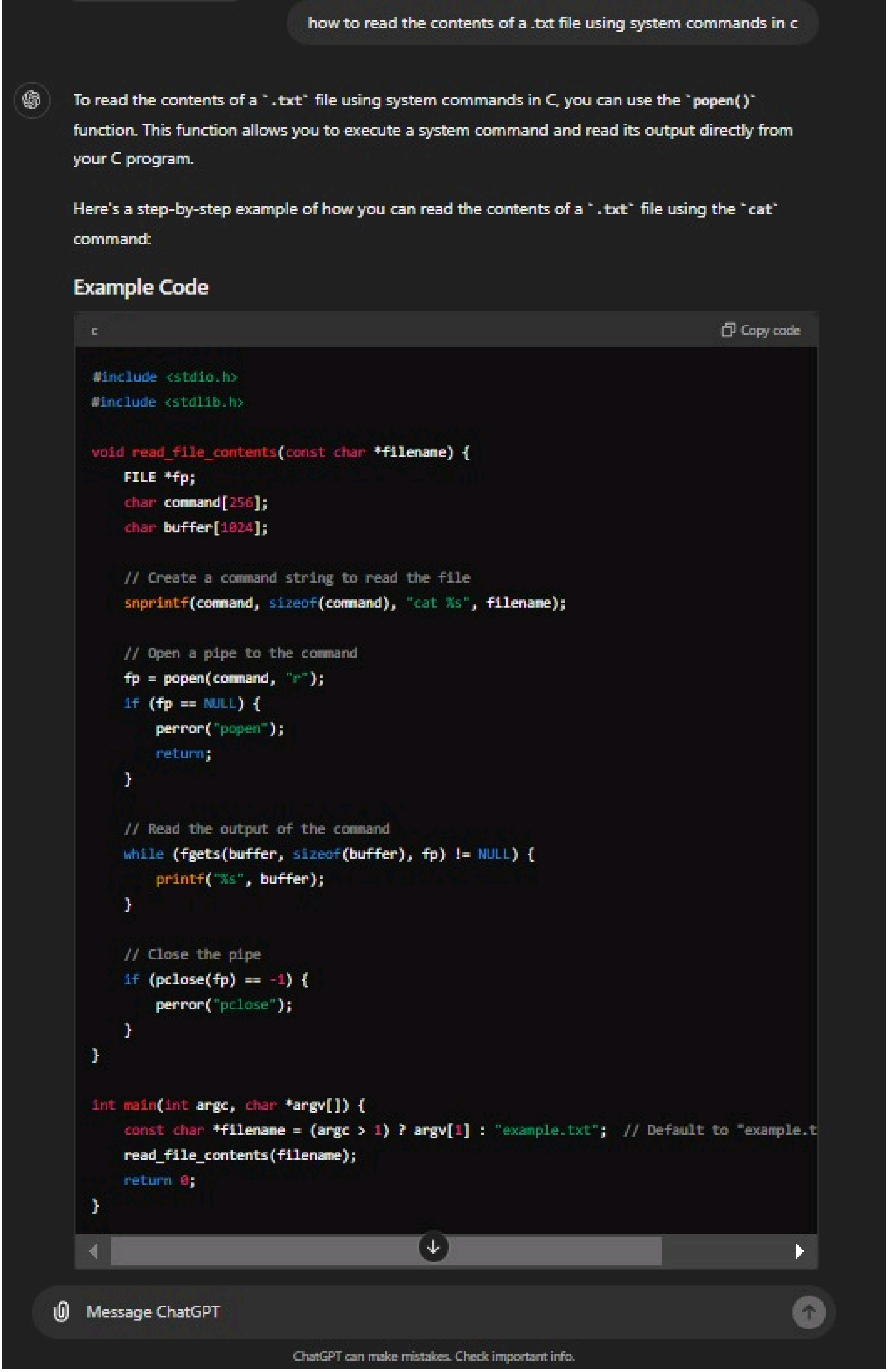

how to read the contents of a .txt file using system commands in c

To read the contents of a `.txt` file using system commands in C, you can use the `popen()` function. This function allows you to execute a system command and read its output directly from your C program.

Here's a step-by-step example of how you can read the contents of a `.txt` file using the `cat` command:

Example Code

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

void read_file_contents(const char *filename) {
    FILE *fp;
    char command[256];
    char buffer[1024];

    // Create a command string to read the file
    snprintf(command, sizeof(command), "cat %s", filename);

    // Open a pipe to the command
    fp = popen(command, "r");
    if (fp == NULL) {
        perror("popen");
        return;
    }

    // Read the output of the command
    while (fgets(buffer, sizeof(buffer), fp) != NULL) {
        printf("%s", buffer);
    }

    // Close the pipe
    if (pclose(fp) == -1) {
        perror("pclose");
    }
}

int main(int argc, char *argv[]) {
    const char *filename = (argc > 1) ? argv[1] : "example.txt";  // Default to "example.t
    read_file_contents(filename);
    return 0;
}
```

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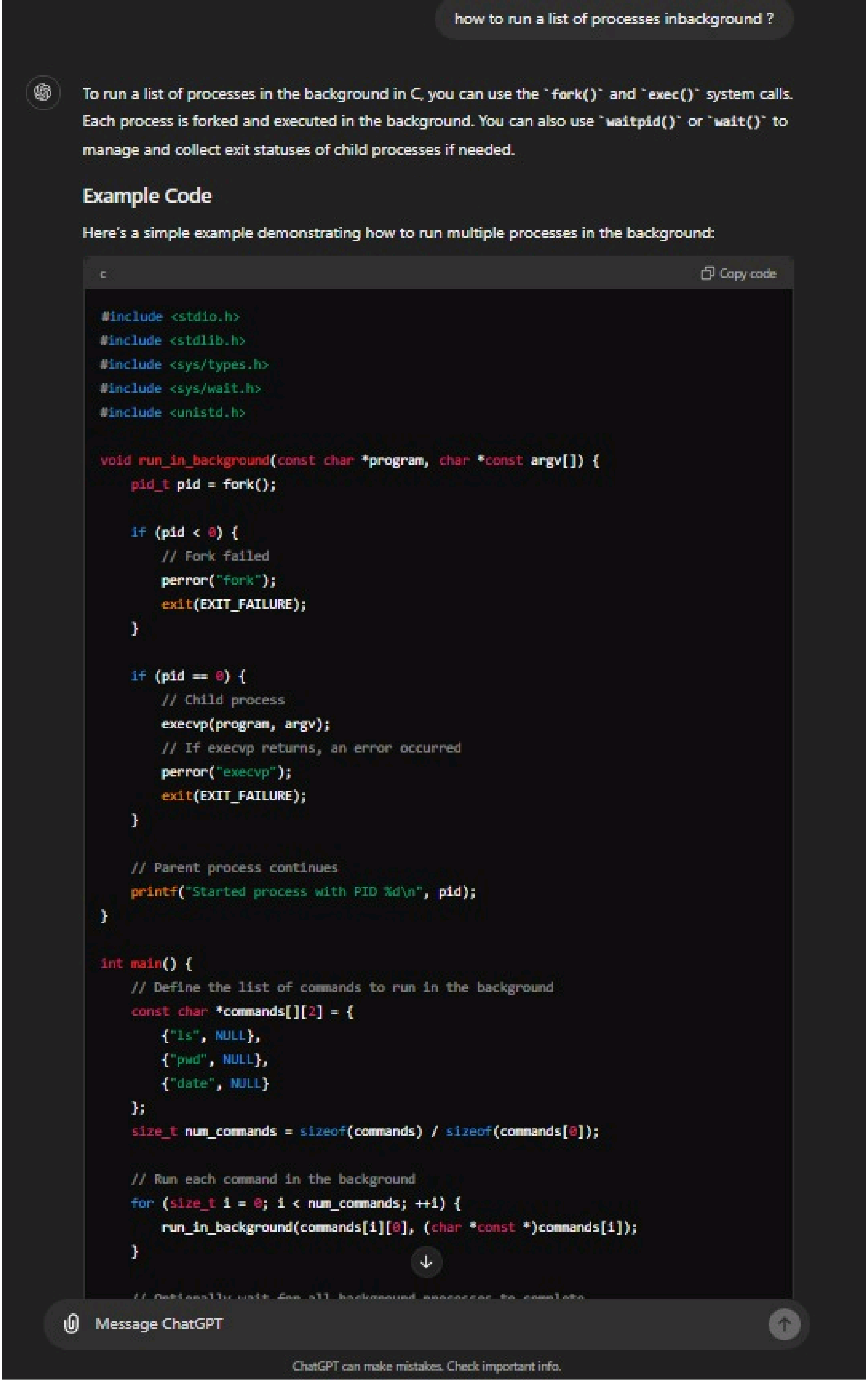


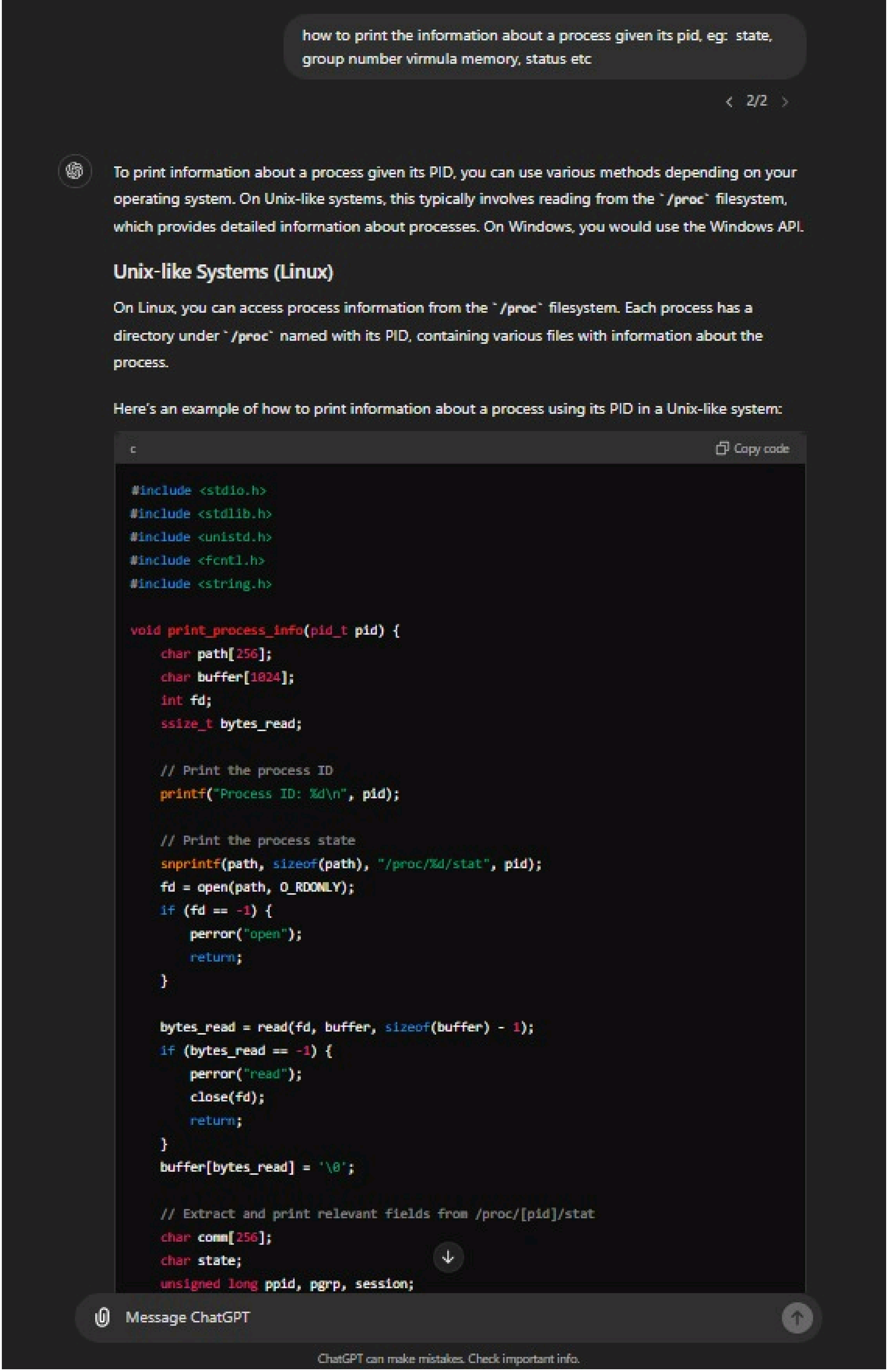
how to run a list of processes inbackground ?

To run a list of processes in the background in C, you can use the `fork()` and `exec()` system calls. Each process is forked and executed in the background. You can also use `waitpid()` or `wait()` to manage and collect exit statuses of child processes if needed.

Example Code

Here's a simple example demonstrating how to run multiple processes in the background:

```c
#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <sys/wait.h>
#include <unistd.h>

void run_in_background(const char *program, char *const argv[]) {
    pid_t pid = fork();

    if (pid < 0) {
        // Fork failed
        perror("fork");
        exit(EXIT_FAILURE);
    }

    if (pid == 0) {
        // Child process
        execvp(program, argv);
        // If execvp returns, an error occurred
        perror("execvp");
        exit(EXIT_FAILURE);
    }

    // Parent process continues
    printf("Started process with PID %d\n", pid);
}

int main() {
    // Define the list of commands to run in the background
    const char *commands[][2] = {
        {"ls", NULL},
        {"pwd", NULL},
        {"date", NULL}
    };
    size_t num_commands = sizeof(commands) / sizeof(commands[0]);

    // Run each command in the background
    for (size_t i = 0; i < num_commands; ++i) {
        run_in_background(commands[i][0], (char *const *)commands[i]);
    }
```



how to print the information about a process given its pid, eg: state, group number virmula memory, status etc

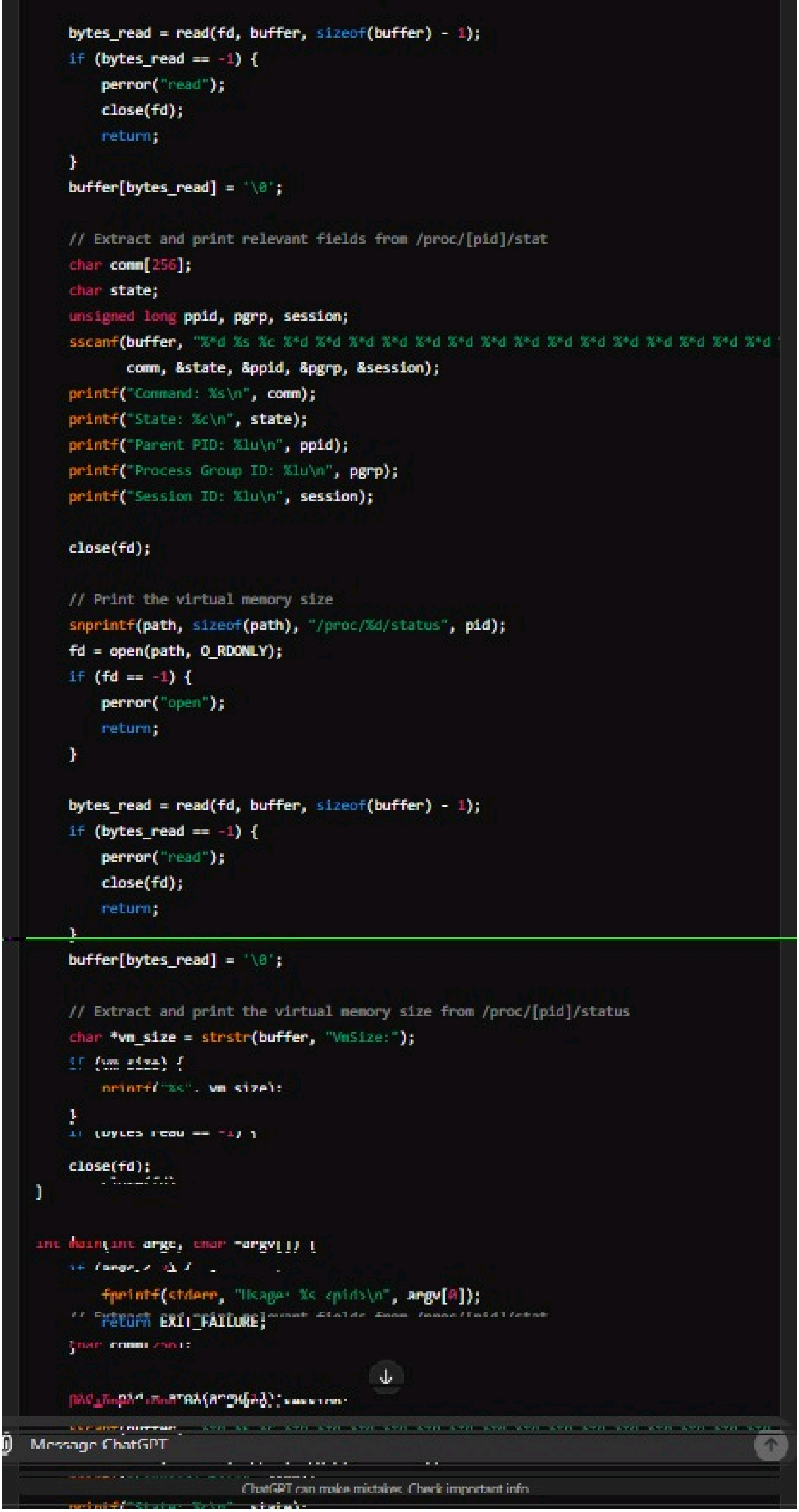
To print information about a process given its PID, you can use various methods depending on your operating system. On Unix-like systems, this typically involves reading from the `/proc` filesystem, which provides detailed information about processes. On Windows, you would use the Windows API.

Unix-like Systems (Linux)

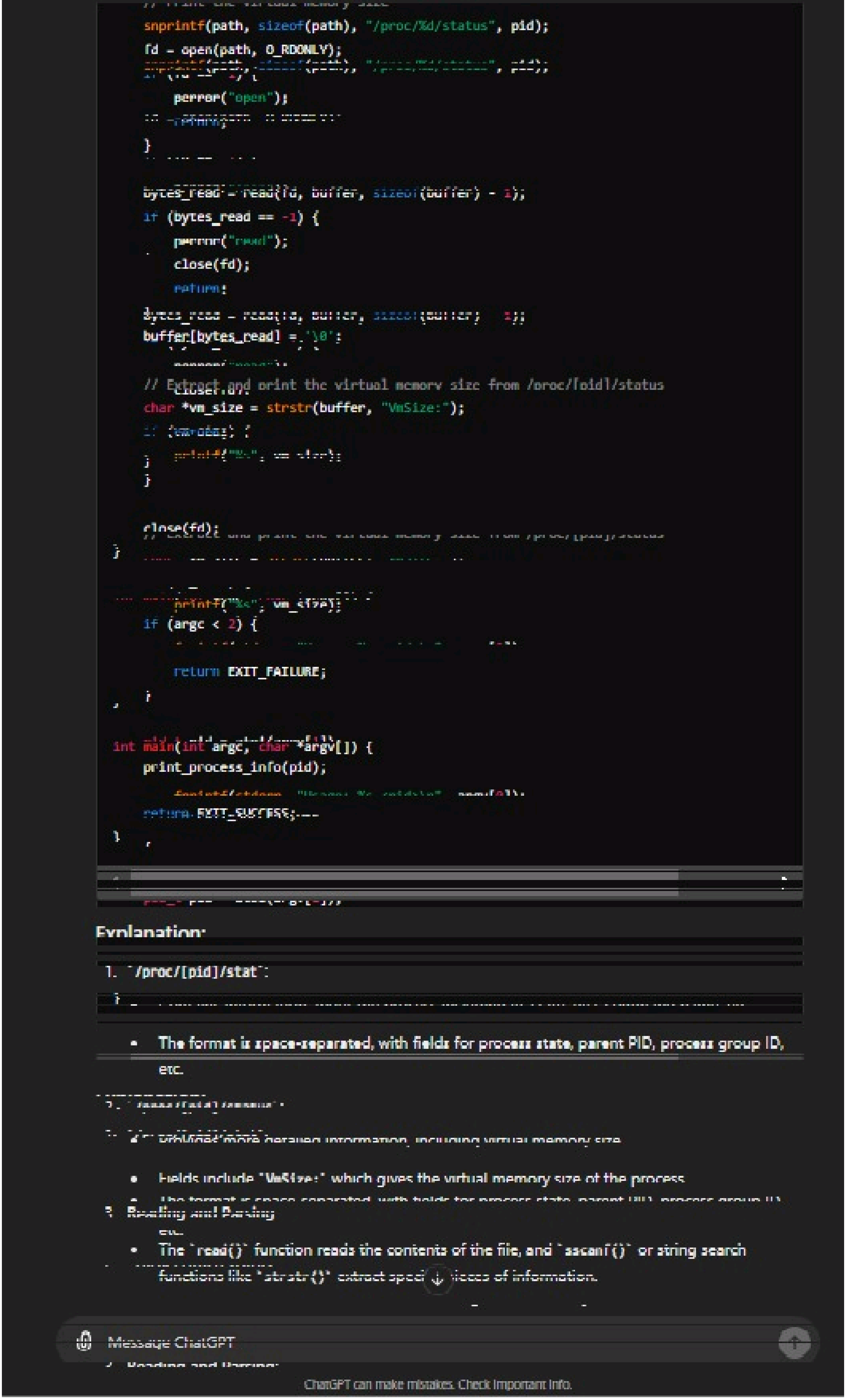
On Linux, you can access process information from the `/proc` filesystem. Each process has a directory under `/proc` named with its PID, containing various files with information about the process.

Here's an example of how to print information about a process using its PID in a Unix-like system:

```c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <fcntl.h>
#include <string.h>

void print_process_info(pid_t pid) {
    char path[256];
    char buffer[1024];
    int fd;
    ssize_t bytes_read;

    // Print the process ID
    printf("Process ID: %d\n", pid);

    // Print the process state
    snprintf(path, sizeof(path), "/proc/%d/stat", pid);
    fd = open(path, O_RDONLY);
    if (fd == -1) {
        perror("open");
        return;
    }

    bytes_read = read(fd, buffer, sizeof(buffer) - 1);
    if (bytes_read == -1) {
        perror("read");
        close(fd);
        return;
    }
    buffer[bytes_read] = '\0';

    // Extract and print relevant fields from /proc/[pid]/stat
    char comm[256];
    char state;
    unsigned long ppid, pgrp, session;
```



```
    bytes_read = read(fd, buffer, sizeof(buffer) - 1);
    if (bytes_read == -1) {
        perror("read");
        close(fd);
        return;
    }
    buffer[bytes_read] = '\0';

    // Extract and print relevant fields from /proc/[pid]/stat
    char comm[256];
    char state;
    unsigned long ppid, pgrp, session;
    sscanf(buffer, "%*d %s %c %*d %*d %*d %*d %*d %*d %*d %*d %*d %*d %*d %*d %*d %*d %*d 
           comm, &state, &ppid, &pgrp, &session);
    printf("Command: %s\n", comm);
    printf("State: %c\n", state);
    printf("Parent PID: %lu\n", ppid);
    printf("Process Group ID: %lu\n", pgrp);
    printf("Session ID: %lu\n", session);

    close(fd);

    // Print the virtual memory size
    snprintf(path, sizeof(path), "/proc/%d/status", pid);
    fd = open(path, O_RDONLY);
    if (fd == -1) {
        perror("open");
        return;
    }

    bytes_read = read(fd, buffer, sizeof(buffer) - 1);
    if (bytes_read == -1) {
        perror("read");
        close(fd);
        return;
    }
    buffer[bytes_read] = '\0';

    // Extract and print the virtual memory size from /proc/[pid]/status
    char *vm_size = strstr(buffer, "VmSize:");
    if (vm_size) {
        printf("%s", vm_size);
    }
    close(fd);
}

int main(int argc, char *argv[]) {
    if (argc != 2) {
        fprintf(stderr, "Usage: %s <pid>\n", argv[0]);
        return EXIT_FAILURE;
    }

    pid_t pid = atoi(argv[1]);
```

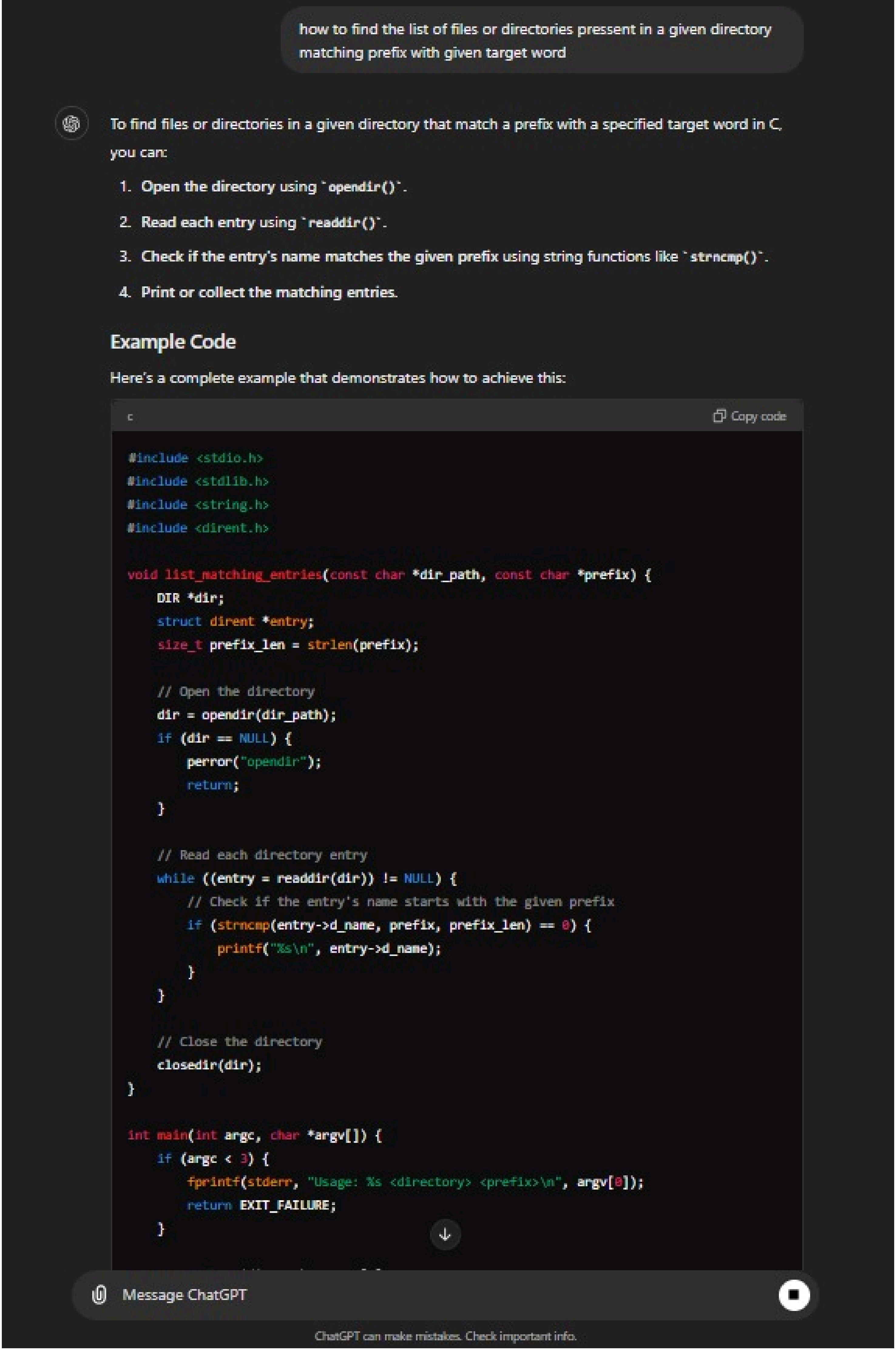


```
    snprintf(path, sizeof(path), "/proc/%d/status", pid);
    fd = open(path, O_RDONLY);
    if (fd == -1) {
        perror("open");
        return;
    }

    bytes_read = read(fd, buffer, sizeof(buffer) - 1);
    if (bytes_read == -1) {
        perror("read");
        close(fd);
        return;
    }
    buffer[bytes_read] = '\0';

    // Extract and print the virtual memory size from /proc/[pid]/status
    char *vm_size = strstr(buffer, "VmSize:");
    if (vm_size) {
        printf("%s", vm_size);
    }

    close(fd);
}

    if (argc < 2) {

        return EXIT_FAILURE;
    }

int main(int argc, char *argv[]) {
    print_process_info(pid);

    return EXIT_SUCCESS;
}
```

Explanation:

1. `/proc/[pid]/stat`:
   - The format is space-separated, with fields for process state, parent PID, process group ID, etc.
2. `/proc/[pid]/status`:
   - Provides more detailed information, including virtual memory size.
   - Fields include "VmSize:" which gives the virtual memory size of the process.
3. Reading and Parsing:
   - The `read()` function reads the contents of the file, and `sscanf()` or string search functions like `strstr()` extract specific pieces of information.

ChatGPT can make mistakes. Check important info.



how to find the list of files or directories pressent in a given directory matching prefix with given target word

To find files or directories in a given directory that match a prefix with a specified target word in C, you can:

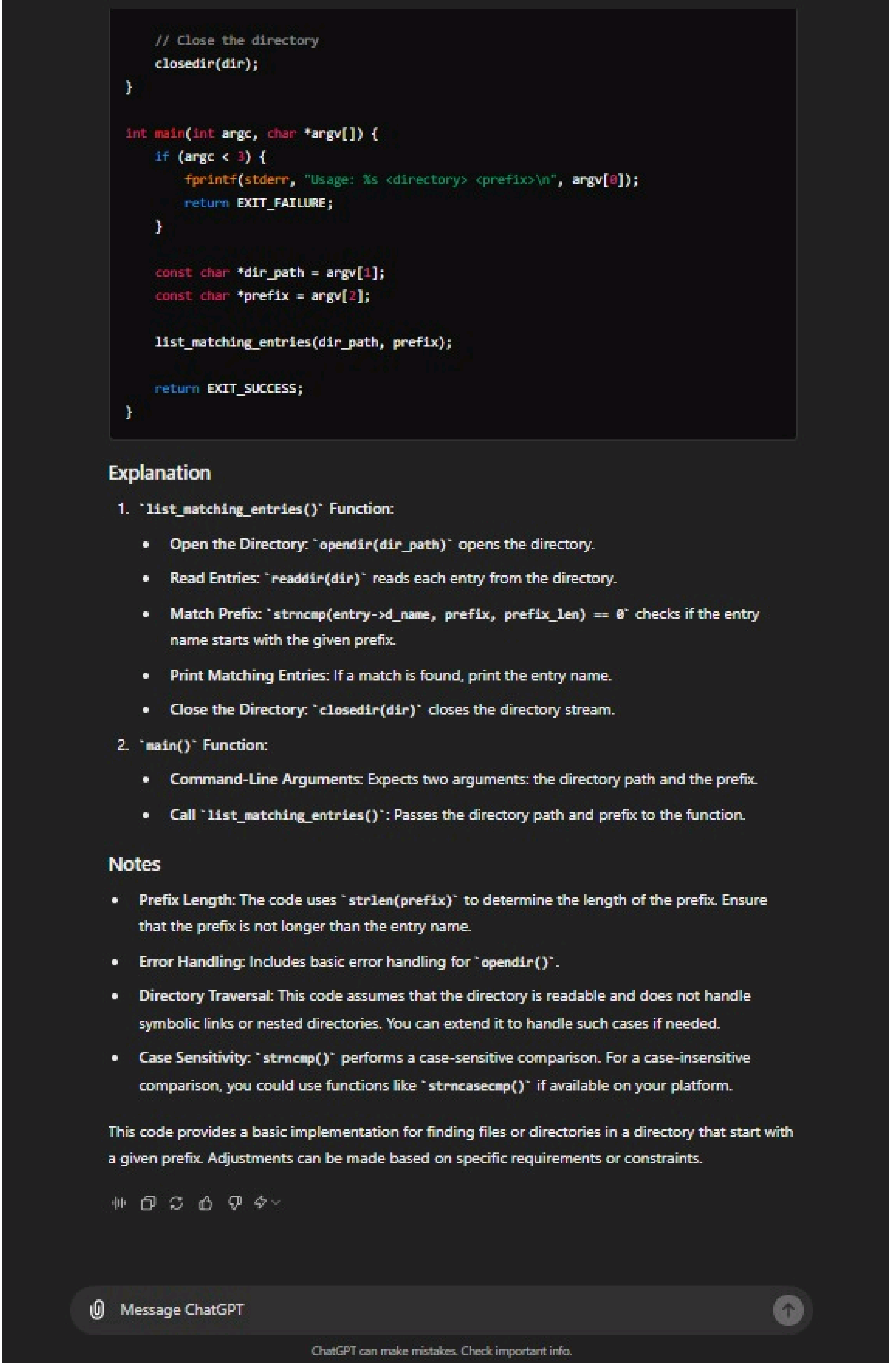
1. Open the directory using `opendir()`.
2. Read each entry using `readdir()`.
3. Check if the entry's name matches the given prefix using string functions like `strncmp()`.
4. Print or collect the matching entries.

Example Code

Here's a complete example that demonstrates how to achieve this:

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <dirent.h>

void list_matching_entries(const char *dir_path, const char *prefix) {
    DIR *dir;
    struct dirent *entry;
    size_t prefix_len = strlen(prefix);

    // Open the directory
    dir = opendir(dir_path);
    if (dir == NULL) {
        perror("opendir");
        return;
    }

    // Read each directory entry
    while ((entry = readdir(dir)) != NULL) {
        // Check if the entry's name starts with the given prefix
        if (strncmp(entry->d_name, prefix, prefix_len) == 0) {
            printf("%s\n", entry->d_name);
        }
    }

    // Close the directory
    closedir(dir);
}

int main(int argc, char *argv[]) {
    if (argc < 3) {
        fprintf(stderr, "Usage: %s <directory> <prefix>\n", argv[0]);
        return EXIT_FAILURE;
    }
```

ChatGPT can make mistakes. Check important info.



```
    // Close the directory
    closedir(dir);
}

int main(int argc, char *argv[]) {
    if (argc < 3) {
        fprintf(stderr, "Usage: %s <directory> <prefix>\n", argv[0]);
        return EXIT_FAILURE;
    }

    const char *dir_path = argv[1];
    const char *prefix = argv[2];

    list_matching_entries(dir_path, prefix);

    return EXIT_SUCCESS;
}
```

Explanation

1. `list_matching_entries()` Function:
    - **Open the Directory:** `opendir(dir_path)` opens the directory.
    - **Read Entries:** `readdir(dir)` reads each entry from the directory.
    - **Match Prefix:** `strncmp(entry->d_name, prefix, prefix_len) == 0` checks if the entry name starts with the given prefix.
    - **Print Matching Entries:** If a match is found, print the entry name.
    - **Close the Directory:** `closedir(dir)` closes the directory stream.
2. `main()` Function:
    - **Command-Line Arguments:** Expects two arguments: the directory path and the prefix.
    - **Call `list_matching_entries()`:** Passes the directory path and prefix to the function.

Notes

- **Prefix Length:** The code uses `strlen(prefix)` to determine the length of the prefix. Ensure that the prefix is not longer than the entry name.
- **Error Handling:** Includes basic error handling for `opendir()`.
- **Directory Traversal:** This code assumes that the directory is readable and does not handle symbolic links or nested directories. You can extend it to handle such cases if needed.
- **Case Sensitivity:** `strncmp()` performs a case-sensitive comparison. For a case-insensitive comparison, you could use functions like `strncasecmp()` if available on your platform.

This code provides a basic implementation for finding files or directories in a directory that start with a given prefix. Adjustments can be made based on specific requirements or constraints.