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25. Construct a C program to implement the I/O system calls of UNIX (`fcntl`, `seek`, `stat`, `opendir`, `readdir`)

Aim:

To implement a C program that demonstrates the usage of UNIX I/O system calls like `fcntl`, `seek`, `stat`, `opendir`, and `readdir`.

Algorithm:

1. Open a file using `open` system call.
2. Use `fcntl` to manipulate file descriptor properties.
3. Use `lseek` to reposition the file offset.
4. Use `stat` to retrieve file status information.
5. Use `opendir` to open a directory and `readdir` to read its contents.
6. Display the results of each operation.

Procedure:

1. Include the necessary headers (`fcntl.h`, `unistd.h`, `sys/stat.h`, etc.).
2. Use appropriate system calls to perform file and directory operations.
3. Handle errors appropriately (e.g., check return values).
4. Display the results of the operations.

Code:

```
#include <fcntl.h>

#include <unistd.h>

#include <sys/stat.h>

#include <dirent.h>

#include <stdio.h>
```

```
int main() {
```

```
    int fd;
```

```
struct stat fileStat;

DIR *dir;

struct dirent *entry;


fd = open("testfile.txt", O_RDWR | O_CREAT, 0644);

if (fd == -1) return 1;


if (fcntl(fd, F_SETFL, O_APPEND) == -1) return 1;


off_t offset = lseek(fd, 10, SEEK_SET);

if (offset == -1) return 1;


if (stat("testfile.txt", &fileStat) == -1) return 1;


dir = opendir(".");

if (!dir) return 1;


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

    printf("%s\n", entry->d_name);

}


closedir(dir);

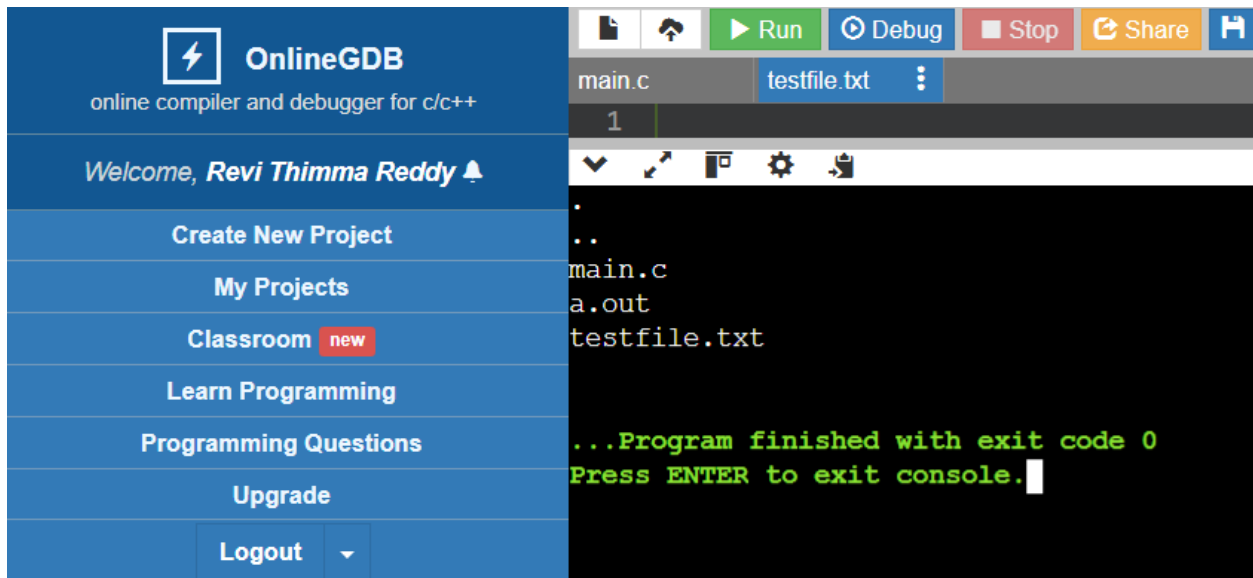
close(fd);
```

```
return 0;  
  
}
```

Result:

1. A file named `testfile.txt` is created or opened.
2. File descriptor properties are modified using `fcntl`.
3. The file offset is repositioned using `lseek`.
4. File details like size and permissions are fetched using `stat`.
5. Directory contents are listed using `opendir` and `readdir`.

Output:



The screenshot shows the OnlineGDB web interface. The sidebar on the left contains the following links: "Create New Project", "My Projects", "Classroom" (with a "new" badge), "Learn Programming", "Programming Questions", "Upgrade", and "Logout". The top toolbar includes buttons for "Run", "Debug", "Stop", "Share", and a file icon. The file explorer shows two files: "main.c" and "testfile.txt". The console output displays the following text:

```
..  
..  
main.c  
a.out  
testfile.txt  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```