File Copy Program - Systems Programming

Project Description

In this project I implement a file copy program in C using Linux system calls only, running in a WSL environment.

The program copies the contents of a source file to a destination file without using the standard C library, using only system calls provided by the Linux kernel.

The program:

- receives 2 command line arguments: source file and destination file
- copies the source file to destination file
- checks if the destination file exists and asks for overwritee conformation(y/n)
- handles errors properly
- uses buffered I/O

System Calls Used

The program uses:

- open()
    - source file: O_RNDONLY
    - destination file: O_WRONLY, O_CREAT, O_TRUNC with permission 0644
- read()
    - reads data from source to buffer
- write()
    - writes buffered data to destination file
- close()
    - closes open file descriptors
- access()
    - check whether the destination file already exists

Program Flow

- validates that 2 arguments are provided
- check if destination file exists
- if exists, ask if user wants to overwrite
- open the source file for reading
- open/create destination file for writing
- copy file using loop of read() and write()
- close both files and exit

Buffer Management and Efficiency

This program uses a fixed buffer size of 4069 bytes. This buffer size:

- reduces the amount of system calls
- matches the Linux memory page size
- improves performance

Error Handling

The program checks the return value of every system call. If an error occurs, a clear error message is printed and the program exits safely.

Makefile

A makefile is included to simplify compiling the program.

The makefile:

- uses the gcc compiler
- complies my_copy.c into an executable called “copy_my”
- allows building the program using only the command “make”

using a makefile ensures consistent and easy compilation with out typing the whole compilation command.