

## Lab 4 — Input & Output Redirection

```
#include <stdio.h>
#include <unistd.h>
#include <stdlib.h>
#include <string.h>
#include <errno.h>
#include <sys/wait.h>

#include <sys/types.h>
#include <sys/stat.h>
#include <fcntl.h>
#include <stdio.h>
#include <errno.h>

extern char **environ;

int main(int argc, char **argv) {
    int ret;
    int status;
    pid_t pid = fork();

    if(pid < 0) {
        printf("Fork error: %s\n",strerror(errno));
        exit(1);
        printf("Wait: %d\n", wait(&status));
    } else {
        //open input for reading
        int fin = open(argv[1], O_RDONLY | O_CREAT, 0777);
        if (fin < 0) {
            printf("Can't open input file: %s\n",strerror(errno));
            exit(1);
        }
        dup2(fin, 0);
        close(fin);

        //open output for writing
        int fout = open(argv[2], O_WRONLY | O_CREAT | O_TRUNC, 0777);
        if (fout < 0) {
            printf("Can't open output file: %s\n",strerror(errno));
            exit(1);
        }
        dup2(fout, 1);
        close(fout);

        ret = execve("copy", argv, environ);
        if (ret < 0) {
            printf("Execve failed: %s\n", strerror(errno));
            exit(1);
        }
    }

    wait(NULL);
    exit(0);
}
```

## copy.c

```
#include <sys/types.h>
#include <sys/stat.h>
#include <fcntl.h>
#include <stdio.h>
#include <errno.h>
#include <string.h>
#include <stdlib.h>
#include <unistd.h>

int main(int argc, char **argv) {
    int fin = 0;
    int fout = 1;
    int n = 1;
    char buffer[512];
    int ret;

    if(argc != 3) {
        printf("Usage: lab1 infile outfile\n");
        exit(1);
    }

    //get the process started
    while(n > 0) {
        n = read(fin, buffer, 512);
        if (n < 0) {
            printf("Error on read: %s\n",strerror(errno));
            exit(1);
        }

        ret = write(fout, buffer, n);
        if (ret < 0) {
            printf("Error on write: %s\n",strerror(errno));
            exit(1);
        }
    }

    close(fin);
    close(fout);
    exit(0);
}
```

## Makefile

```
CFLAGS = -Wall -g

.PHONY: all clean

all: copy lab4

copy: copy.o
    cc -o copy copy.o

lab4: lab4.o
    cc -o lab4 lab4.o

clean:
    rm copy copy.o lab4 lab4.o
```

## Output

```
martin@LAPTOP-U1043R56:/mnt/c/Users/larry/Documents/versusCode/systems/lab/4$ ls -al > in.txt
martin@LAPTOP-U1043R56:/mnt/c/Users/larry/Documents/versusCode/systems/lab/4$ cat in.txt
total 8
drwxrwxrwx 1 martin martin 512 Feb 22 23:32 .
drwxrwxrwx 1 martin martin 512 Feb 22 17:48 ..
-rwxrwxrwx 1 martin martin 154 Feb 19 16:20 Makefile
-rwxrwxrwx 1 martin martin 695 Feb 22 23:31 copy.c
-rwxrwxrwx 1 martin martin  0 Feb 22  2021 in.txt
-rwxrwxrwx 1 martin martin 1076 Feb 22 23:31 lab4.c
-rwxrwxrwx 1 martin martin 366 Feb 22 23:32 out.txt
martin@LAPTOP-U1043R56:/mnt/c/Users/larry/Documents/versusCode/systems/lab/4$ ./lab4 in.txt out.txt
martin@LAPTOP-U1043R56:/mnt/c/Users/larry/Documents/versusCode/systems/lab/4$ cat out.txt
total 8
drwxrwxrwx 1 martin martin 512 Feb 22 23:32 .
drwxrwxrwx 1 martin martin 512 Feb 22 17:48 ..
-rwxrwxrwx 1 martin martin 154 Feb 19 16:20 Makefile
-rwxrwxrwx 1 martin martin 695 Feb 22 23:31 copy.c
-rwxrwxrwx 1 martin martin  0 Feb 22  2021 in.txt
-rwxrwxrwx 1 martin martin 1076 Feb 22 23:31 lab4.c
-rwxrwxrwx 1 martin martin 366 Feb 22 23:32 out.txt
```