PRACTICE PROBLEMS
Usage of the system call interface

Problem 1: Implement wc (word count) using file descriptors

Write a program that takes a filename as input and prints:

- Number of lines

- Number of words

- Number of characters

using only **open, read, and close** system calls (no ifstream, no fopen, fread, fwrite etc.).

To check, run the **wc** utility on Linux/wsl.
You can also try to execute the **wc** utility via the **exec** family of system calls.

Problem 2: Implement tee command

Write a program that reads from **STDIN** and writes to both **STDOUT** and a file.

- File name should be passed as a command-line argument.

- Use only system calls **(read, write, open)**.

- Usage: **$tee <outputfilename>**

Problem 3: Controlled Cat: File and Stream Redirection with exec

Write a program **mycat.c** which reads input characters from fd 0 and writes to fd 1.
Write a program **q2.c** that takes as input argument an integer.

- If the input argument is **0** the input should be from a file **input.txt** and its contents should be written to the output terminal/console.
- If the input argument is **1**, input should be from the terminal and write the input stream to a file called **output.txt**.
- If the input argument is **2**, read from **input.txt** and write the contents to a file **foo.txt**. Then input from the file **foo.txt** and write the output to **output.txt.**

It is key to ensure that for all input/output operation strictly **mycat.c** should be used.

The program in **q2.c** should use the binary executable of **mycat.c** via **exec** for this functionality. Note that there is only one version of mycat.c, the specified output behaviour needs to be controlled from q2.c.

Sample output

```
$ls
q2.c q2 mycat.c mycat input.txt
$cat input.txt
To err is human, to forgive is canine.
$./q2 0
To err is human, to forgive is canine.
$./q2 1
To err is human, to debug is divine.
$cat output.txt`
To err is human, to debug is divine.
$./q2 1
Line1
Line2
$cat output.txt
Line1
Line2

$./q2 2
$cat foo.txt
To err is human, to forgive is canine
$cat output.txt
To err is human, to forgive is canine
```