

Assignments

Write a shell

Memory allocation

System calls

C programming

Assignments / System calls

Due @ 18:00 on 10 Feb 2023

Write a program that performs some system calls.

For this assignment, you must write a C program that performs system calls requested by command-line arguments. You should save your work in a file called `syscalls.c`, which the autograder will compile to an executable binary and execute with command-line arguments such as:

```
$ ./syscalls help
Usage: syscalls <command> [arguments]
```

```
$ ./syscalls read a-filename.txt
These are the contents of a-filename.txt, which is a text file I uploaded
alongside of the autograder.
```

Results and errors

If no errors occur, the program should exit with return code 0. If an error occurs, the program should exit with return code 1 and print an error message to the standard error stream (FD 2).

help command

```
$ ./syscalls help
Usage: syscalls <command> [arguments]
```

Arguments

none

Output

A usage string that tells the user how to correctly run the program. At minimum, this string should contain the string `Usage:`.

read command

```
$ ./syscalls read a-filename.txt
These are the contents of a-filename.txt, which is a text file I uploaded
alongside of the autograder.
```

Arguments

path

Output

The contents of the file whose path is given by the first argument. This content should then be written to the standard output stream.

Errors

- If the file cannot be opened: a string containing `Failed to open {path}`
- If the file cannot be read: a string containing `Failed to read {path}`
- If the path is missing: a string containing `missing argument`

write command

```
$ ./syscalls write something.txt "One line" "and another line"
Wrote 26 B
```

Arguments

path line_of_text [line_of_text..]

Behaviour

This command should write lines of text (specified by separate command-line arguments) to an output file specified by path. If the file does not already exist, it should be created.

Output

The string `Wrote N B`, where `N` is the number of bytes written to the file.

Errors

- If the path is missing, or if no lines of content are specified: an error message containing (at least) the string `missing argument`
- If the file cannot be opened: a string containing `Failed to open {path}`
- If the file cannot be written: a string containing `Failed to write to {path}`

mkdir command

```
$ ./syscalls mkdir foo/bar
```

Arguments

path

Behaviour

This command should create a directory specified by path, which may include nested subdirectories.

Errors

- If the path is missing, or if no lines of content are specified: an error message containing (at least) the string `missing argument`
- If the directory cannot be created: a string containing `Failed to create {path}`
- If the path (or any of its parent directories) already exists: a string containing `{existing_path} already exists`

Invalid commands

If an invalid command is specified, the program should exit with return code 1 and output an error message containing (at least) the string `invalid command`.

No command

If no command is specified, the program should exit with return code 1 and output an error message containing (at least) the string `missing command`.

