

Operating Systems

CSCI 5806

Spring Semester 2025 — CRN 22968

Term Project — Steps 7 / 8 — Directory Access

Target completion date: Friday, April 25

Goals

- Provide functions to traverse a file path and copy a file to the host.

Details

In these steps, we provide the final steps to copy a file from the VDI file to the host system.

File Paths

A file path consists of the sequence of directories to follow from the root directory to the desired file. For example, this document has the path

/home/bob/School/Courses/5806.Course/Projects/Ext2Copy/ext2-cp-7.base.tex.

The goal in step 7 is to split the path into its component names and then search the sequence of directories for the inode number corresponding to the file at the end of the path.

Searching a Directory

To search a directory, you'll want to create a function

uint32_t searchDir(struct Ext2File *f, uint32_t iNum, char *target) with the following parameters:

- **f**
Pointer to an opened Ext2File
- **iNum**
Inode number of the directory to be searched
- **target**
C-string with the name of the file to look for

The function should return the inode number of the target file if found, or 0 otherwise.

Splitting a Path

Create a function **uint32_t traversePath(Ext2File *f, char *path)** that takes a full path and returns the inode number of the file at the end of the path. The algorithm for the function follows.

Algorithm 1 Traversing a directory path

```
1: procedure TRAVERSEPATH(Ext2File *f, char * path)
2:   start ← 1
3:   len ← strlen(path)
4:   iNum ← 2

5:   while start < len and iNum ≠ 0 do
6:     end ← location of next '/'
7:     path[end] ← 0
8:     iNum ← searchDir(f, iNum, path + start)
9:     start ← end + 1
10:  end while

11:  return iNum
12: end procedure
```

Copying the file

Step 8 is copying the file out of the VDI disk image and onto the host system.

Your program should get the names of the VDI file, the file in the virtual disk and the destination file. Open the destination file like a normal file — use the **open()** system call with **O_WRONLY|O_CREAT** parameters and mode 0666 — and loop through all of the blocks in the file on the virtual disk and copy the data into the destination file.