

CSC 458: Operating Systems

Program 3: File System

April 12, 2024

The purpose of this project is to copy files from a disk image to your current working directory. You are given the disk image and the data structures for the superblock, inode, and directory entries. You will write a program to list the contents of the root directory on the disk image, and another program to copy files from the disk image to your local directory.

1 Project Description

You are to create a program named `dils` (Disk Image List) that shows the contents of the top level directory in the disk image file. The program must accept one required command-line argument, the name of the disk image file, and one optional command line argument `-l`, which causes a “long” listing.

You will then create a program named `dicpo` (Disk Image Copy Out) that copies a file from the disk image to your current working directory. The program will have two required arguments. The first argument is the name of the disk image file. The second argument is the name of the file to be copied out of the disk image. The file will be copied from the disk image to a file in your current working directory with the same file name.

1.1 Part A: Short Listing

Without the `-l` option, your program is to print the names of each file in the root directory of the disk image. Each file name should appear on a line by itself. Note that you will not need to read the inodes of all of the files for this part of the project.

1.2 Part B: Long Listing

For this part of the project, you will print the file names and also information from the inode for each file. If the `-l` option is given then for each file in the directory, your program is to print out

- the permissions,
- the number of links to the file (the refcount),
- the UID of the owner,
- the UID of the group,

- the size of the file,
- the time that the file was last accessed, and
- the filename.

Your output should look very similar to the output produced by running `ls -al` at the shell prompt.

1.3 Part C: Copy File From the Disk Image

You are to create a program named `dicpo` (Disk Image Copy Out) that copies a file from the disk image to your current working directory. The program will have two required arguments. The first argument is the name of the disk image file. The second argument is the name of the file to be copied out of the disk image. The file will be copied from the disk image to a file in your current working directory with the same file name.

2 Scoring

Part A will be worth 50 points, and parts B and C are each worth 25 points.

2.1 Extra Credit

For up to 100 extra points, create a program named `dicpi` (Disk Image Copy In) which accepts two arguments; the name of the disk image file, and the name of a file in the current working directory. Your program will copy the local file onto the disk image, correctly updating all data structures, including the free block and free inode bitmaps. For testing, multiple will copy multiple files into the disk image.