COP4610
Introduction to Operating Systems
Project #3: Implementing a FAT32 File System

Outline

- Program commands
  - `rm FILENAME`
  - `cp FILENAME TO`
- Extra credit commands
  - `rmdir DIRNAME`
  - `cp -r FROM TO`

Program Commands

`rm FILENAME`

- Deletes a file located in the current directory
- Returns an error if:
  - The file does not exist
  - The entry is a directory

Program Commands

`rm FILENAME`

Steps:

- Find the entry corresponding to the file within the current directory
- Get the first cluster
- Traverse the FAT and deallocate all clusters
  - Start at file's first cluster, deallocate
  - Move to next cluster, repeat

Program Commands

`rm FILENAME`

Steps (2):

- Delete the DIRENTRY in the current directory
  - If last entry, set first byte at 0x0
  - Set first byte at 0xE5 otherwise
- Don’t care about the content of the clusters

Program Commands

`cp FILENAME TO`

- Copies a file FILENAME to a directory TO or create a copy of the file naming it TO
- Return an error if:
  - FILENAME does not exist
  - FILENAME is not a file

Program Commands

`cp FILENAME TO`

Steps:

- Find the entry for FILENAME and TO
- Create a copy of FILENAME's entry
  - Don't store it yet!
- Traverse the FAT for FILENAME
  - For each cluster belonging to FILENAME
    - Allocate a new cluster in the FAT
    - Copy the contents from the original cluster to the new one
      - Hint: memcpy()

Program Commands

`cp FILENAME TO`

Steps (2):

- Set the index of the first cluster allocated in the DIRENTRY created
- If TO directory does not exist:
  - Set DIR_Name as TO
  - Store the DIRENTRY in the current directory
- If not:
  - Store the DIRENTRY in the TO directory

Extra credit!

Program Commands

`rmdir DIRNAME`

- Deletes an empty directory from current directory
- Returns an error if:
  - DIRNAME does not exist
  - DIRNAME is not a directory
  - DIRNAME is not empty

Program Commands

`rmdir DIRNAME`

Steps:

- Very similar to `rm`
- Find the DIRENTRY corresponding to DIRNAME
- Get the first cluster number
- Traverse the FAT and deallocate all clusters
- Delete the DIRENTRY from the current directory (set first byte at 0x0 or 0xE5)

Program Commands

`cp -r FROM TO`

- Recursively copy directory FROM into directory TO
- Return an error if
  - FROM does not exist
  - FROM is not a directory
  - TO exists and is a file
- If TO does not exist, copy to current directory
  - Assign name TO

Program Commands

`cp -r FROM TO`

Steps:

- Find the entry for FROM and TO
- Create a copy of FROM's entry
  - Don't store it yet!
- Traverse the FAT for FROM
  - For each cluster belonging to FROM
    - Allocate a new cluster in the FAT
    - Copy the contents from the original cluster to the new one

Program Commands

`cp –r FROM TO`

Steps (2):

- Set the index of the first cluster allocated in the DIRENTRY created
- If TO directory does not exist:
  - Set DIR_Name as TO
  - Store the DIRENTRY in the current directory
- If not:
  - Store the DIRENTRY in the TO directory

Program Commands

`cp FROM TO`

Steps (3):

- For every DIRENTRY in FROM
  - If it is a file, copy the file to directory TO
  - If it's a directory, recursively copy it to directory TO
- Hint: implement a recursive function

Questions?