Design:
I ran test.sh to test rename and cross partition copy…
Here's the bash script in test.sh:

```
#!/bin/bash

dd if=/dev/zero of=file.txt count=100 bs=1048576

for i in {1..5}
do
  ./test file.txt ~/Documents -m >> move_data.csv
  ./test ~/Documents/file.txt . -m >> move_data.csv
done

for i in {1..5}
do
  ./test file.txt filedir/file.txt >> rename_data.csv
done
```

The test.sh generates a 100MB gibberish file, runs ./test executable and collects the data and pipe the result to a csv file.
./test executable takes two arguments and an optional flag.

(1) rename()
When it does not see the -m flag, it treats the second arguments as the new filename (which is in the same partition as the file). The program renames the file to a new filename 200 times, calculate the average of doing rename and print to the console.

(2) Copy file to another partition
When the program sees -m flag, it treats the first argument as a file/directory path and the second argument as a destination directory path (which is in a different partition), moves the file/directory under the destination and prints the time of moving the file to the console.

(3) Estimate of the time of my own program
I made a copy of my MQP folder (3.4 GB) and use my ./rm to move it to my dumpster (which is in another partition). I used /bin/time to time my ./rm and compared with the estimation I made based on the data from (1) and (2)

Results:

(1)

RENAME A FILE IN THE SAME PARTITION	
0.992975	milliseconds
0.694485	milliseconds
0.720465	milliseconds
0.828855	milliseconds
0.73943	milliseconds
Average	Standard Deviation
0.795242	0.108707613

(2)

MOVE A FILE TO A DIFFERENT PARTITION				
FILESIZE: 100 MB / 104857600 BYTES			THROUGHPUT	
9233.9	milliseconds		11355721.85	bytes/second
9111.66	milliseconds		11508067.68	bytes/second
9567.12	milliseconds		10960205.37	bytes/second
8904.76	milliseconds		11775454.93	bytes/second
6993.93	milliseconds		14992657.92	bytes/second
8211.11	milliseconds		12770210.12	bytes/second
6624.72	milliseconds		15828231.23	bytes/second
7948.06	milliseconds		13192854.61	bytes/second
6788.09	milliseconds		15447290.77	bytes/second
7727.31	milliseconds		13569741.6	bytes/second
Average	Standard deviation		Average	Standard deviation
8111.066	1019.966625		13140043.61	1696085.926

(3)

Size of my MQP folder = 3.4 GB = 4617089843.2 bytes
According to the average throughput in (2), which is 13140043.61 bytes/seconds
Moving my MQP folder needs (4617089843.2 bytes) / (13140043.61 bytes/seconds) seconds = 351.38 seconds = 5.8 minutes
The real time I got is 5m33.748s

Analysis:
Moving files and directories in the same partition is really fast because we are just renaming them but does not move the data around in the disk.
However, copying directories and files to another partition because we actually are reading the files in a partition and writing the content to another partition. It was the reading and writing being really slow.