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CS416 – Operating Systems
Project 4

Total number of blocks used when running benchmark:

- For simple_test, we also added functions to test sub directory and directory deleting, so the results might be different, but we had 17 blocks used. Removing the remove directory test cases, we still had 123 blocks used.
- For test_case, we had 123 blocks used.

Time to Run: Both test_case and simple_test took around 2ms to run

How We Implemented: We implemented by filling in the functions as was recommended in the write up. We started with mkfs, init, and destroy as they were in fact the easiest, since all we had to do was initialize our variables. We then went down the list, the helper functions, the bitmap operations, and readi and writei were relatively simple, but the directory operations took us the longest. There was a lot of trial and error involved, and we were continuously getting a error for bio write, that it was a bad address. Once we got those issues resolved, we were able to do bug fixing and checking. It did mean we had to go back to the beginning with mkfs and init to add more variable initializations and initialize some things differently.

Additional Steps for Compilation: We don't believe there should be any additional steps needed to compile. All we do for compilation is "make && ./rufs -s -d /tmp/<NETID>/mountdir" and run our benchmarks or do testing.

Difficulties: This was a very difficult project, but we thought that the hardest part was bug fixing. This is because we didn't have traditional access to gdb, and a lot of segfaults were showing up in random places and we couldn't track them down. In addition, we at some point were getting an error with malloc, inside of the malloc library, which we could not understand in the slightest, as even with gdb there was no trace back to our code that we could concretely say was the cause.

Collaboration and References: We used the project write up, FAQs, and the Piazza as our first sources. However, there were many issues that could not be resolved with just that. We also had to use Google, Stack Overflow, and ChatGPT for some of the conceptual questions. This is because it was our first time trying to implement a file system so we had a lot of questions about how certain things should be implemented. Questions such as what the mode should be for files, what direct/indirect pointers are and how they should be implemented, etc. There was no code copied or looked at from any of the latter sources, we only used them for conceptual questions that we had.