CSC 452/552 Operations Systems

Project 4 Threads

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1. Project Overview
    a) This project was to implement the buddy system. This buddy system has functions to allocate, free, reallocate, initialize, and destroy. This buddy system does it efficiently while also keeping aligned and minimizing fragmentation. I also added tests in order to prove this.
2. Project Management Plan
    a) Task 3: Implement the buddy system
        i. I implemented the buddy system and was able to debug my code using the tests provided and printf lines to see the list after each action. This made it easier in the end to find the problems.
    b) Task 4: Add new tests for more coverage
        i. I added 5 new tests to make sure that the buddy system created was behaving as it should. Here are the tests I created:

1. Test to reallocate to larger and smaller sizes
2. Test to allocate more than the pool size
3. Test for multiple allocations and deallocations
4. Test fragmentation
5. Testing reused memory

3. Project Deliveries
    a) How to compile and use my code?
        i. To compile the project, run make. This will build the main program (myprogram). Run make check to run the tests in the test-lab.c file.
    b) Any self-modification?
        i. I removed the -fsanitize=address flag in the make file while generating because it was coming up with addresssantizer:deadlysignal errors all the time.
    c) Summary of Results.
        i. The results showed all of the 8 tests to pass!
4. Self-Reflection of Project
    a) This project was very challenging and required me to really understand the buddy system. I definitely didn't know it well enough starting out, but now I do. One thing that was essential in debugging was printf statements to see what the lists looked like. I spent over 6 hours trying to figure out

what was wrong with my free function, and it turned out I needed to clear the smaller free blocks at the end of the free block or else we are not truly clearing the block. I also found a few issues when creating my own tests, and learned a lot about how testing can benefit and fix your problems in your code but testing different scenarios that you wouldn’t normally think about.