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CSCE 313 – Section 504

Machine Problem 1 – Report

Findings

The first thing that we had to figure was how to initialize memory in order to create a linked list. After we were able to do this, we used our knowledge of how a linked list worked to implement all of the functions. The main problem that we had with the first part was trying to implement the getopt function. I could not get it to properly work. I kept getting a segmentation fault, but then we were working on the second part I realized that it actually worked and I was just putting in the wrong number into the input line. For Part 2, the main part that we had to figure out was how to initialize the different tiers and how to move between them. After we figured out how to do this, all of the functions were similar to the first part. We just had to adjust a few things

Questions

- For part 1, do you notice any wastage of memory when items are deleted? If so, can your program avoid such wastage? How would you do so?
    - Yes, there is some wastage of memory. When we delete an item, we assign a value to the key, but nothing to data. We could assign a value to data to fill the wastage.
- Can you think of a scenario where there is space in the memory but no insertion is possible?
    - Yes, after deleting, and then inserting another key value. The linked list is full, but there is one block that doesn't have any data in it from deleting one of the key values. You can't insert another value until you have deleted one.
- What is the maximum size of the value when the pointers are 8 bytes?
    - 2^{64}-1
- For Part 2, derive a general expression for the range of numbers that go into the i-th tier of the list.
    - t = number of tiers, the ith tier will contain the following minimum and maximum values
    - Minimum value: (t-1)(INT_MAX/t)
    - Maximum value: INT_MAX which is 2,147,483,647