Error Detecting Malloc() and Free() Project Documentation

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Error Detecting Malloc() and Free()

For this project, we have created three files, main.c, malloc-free.c, and malloc-free.h, that will take care of error checking for memory usage and memory leakage for any data set and any number of inputs from the program.

Functions

*We have identified some of the core components of our implementation for the program.

malloc-Free.c

allocate(int size, char IS_LARGE)

For this method, we first receive an input from the user, and check with a message from the user if the input is large (usually referred to as a n for no or y for yes. If n, then we go over with an array to track the array size and check for the chunk of memory that we will create for the input. Once the tracking is done, and we allocated the space, we return size. If IS_LARGE is not n, then we still track for the array location and its input with a char array, but its not at the beginning of our tracking system. The run time analysis regards to this method is O(n) depending on the initial input by the user.

my_malloc(size_t t)

For this method, we initially error check for the following cases such as checking for maximum memory usage (out of memory), and not enough memory for the allocation process. Each "not enough memory.." error checks using different methods such as too big allocation, too small memory size or too large memory to allocate. The run time analysis regards to this method is 0(n) depending on the users $size_t of t$.

my_free(void* ptr)

Initially notifies the user of the address of the ptr and the address of the memory, depending on the input. We also error check for the size_of_chunk array and the is_alloc array. Once all error checking is finished, this method will create an offset for memory to be used as a tracking system for the array. The run time analysis of this method is $0(n^2) depending on the array and pointer$.

print_memory()

This is user created, and all it does is print out the memory's size, and the is_alloc: characters in the array, and $size_o f_c hunk : decimals of the array. This runs at a 0(n) time for printing, for all arrays$.

Using Our 'main.c'

Our main.c file is mainly there to test out cases for which we will be using malloc-free.c and malloc-free.h for. As of now, main.c is just a platform for inputs and checking for memory leakage or any errors. As of now, you can manually edit the main.c if need be for usage if you wanted to use our main.c instead of your own files. It will print out several steps before the memory is freed from a given input by the user.