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CS214 Assignment 6

Malloc - Free

Overview

In program we implement our own version of malloc() and free(). The advantages of our program is that it lets us detect common dynamic memory errors. We implemented a static char array for the dynamic memory.

The static char array contains our dynamic memory however we also have an array that contains void pointers to memory access. We initialized all the cells in our array to 0 in order to keep track of memory which has been malloc'ed for error detection.

When malloc() is used space a specific amount of space is given based on the request. MemAccess contains a header that lets us deal with how much space is used. The pointer of the MemAccess struct is located in the first index of the MemAccess array. When free() is used, the memory size of MemAccess is taken off from the address which the pointer is stored to and is then validified with our MemAccess array.

Error Detection

-Freeing non-allocated pointers

-Freeing a NULL pointer

-Freeing an already free'ed pointer

-Freeing a pointer that isn't in the address returned by malloc

-Insufficient memory space

-Allocation for a 0 byte block

Efficiency

Allocate memory is of size n which gives us O(n)

Number of malloc and free entries are m which gives us O(m)