

Assignment 1: To Build a Better Malloc
Malay Shah mhs145
Hammad Iqbal hi60

In this project we made a better version of the already provided malloc and free commands. There are 3 files needed to run this program, **mymalloc.c**, **mymalloc.h**, and **memgrind.c**. To run the program, you have to call the Makefile, make will create a memgrind executable and a mymalloc.o (object file). Memgrind will run all the test cases from caseA to caseF, one after the other repeated 100 times, each having the time recorded and then taking the mean and printing out the time.

mymalloc.c:

This file contains the user created malloc and free commands. For malloc and free we use a node struct and void pointers; **mymalloc** calls the **initialize** command and this will set up and cast **myblock** as a node block. When allocating the memory needed, **mymalloc** will search through all the nodes to find the smallest block that can hold the amount of memory needed. If the unallocated block is greater in size than the size needed, the block is split in two, the first half being allocated and the second half unallocated. Also if no block is large enough for the size requested, **mymalloc** will create a new block of the size requested, by merging and allocate that block.

For **myfree**, the command will look for the inputted address or index to find out if the address exists or is not freed already. Each node contains a **free** variable, 0 if it is not free and 1 if it is free and a **size** variable. The **myfree** command will traverse through the blocks and when it finds the node it will set it to free.

memgrind.c:

This file contains the 4 workloads that was included in the assignment instructions and two workloads of our own. The workloads are run one after the other iterating a hundred times and averaging them out. Here are the results:

WorkloadA Time: 0.000003

WorkloadB Time: 0.000049

WorkloadC Time: 0.000022

WorkloadD Time: 0.000024

WorkloadE Time: 0.000003

(HELP THE POINTER IS NULL in the file - 'memgrind.c' : This occurs on line : 207)

(Not enough memory for 1 bytes in the file - 'memgrind.c' : This occurs on line : 197)

WorkloadF Time: 0.003211 (**Varies**)