

### **Alex Welk - Assignment 3 Report**

I checked for memory leaks by creating a block of memory at the global base and then iterating through each block and checking if the free value in each block is true or false (1 or 0). I then call that at the end of my main.

	3 malloc 5 calloc 7 realloc	4 malloc 2 calloc 3 realloc
First	1 leak	1 leak
Best	1 leak	1 leak
Worst	1 leak	1 leak

I am unsure if I am testing for this table properly, the way the instructions state could be interpreted in several different ways. Here I call each algorithm with a different number of malloc, calloc, and realloc which change each run. This resulted in one leak each time which will always happen based on how I have defined leaks here. I am not sure if I should be getting a different number of leaks each time, I call each function and then free it directly afterwards.

I implemented the block splitting and block merging in the first implementation with a singly linked list. I did this with a function named split\_block that is called in malloc. I implemented the block merging directly into free since the instructions did not state to make it a function.

First

```
welka@egr-v-cmsc312-1:~/assignment3$ ./func
Allocated memory address with malloc: 0x559ad85a8020
Allocated memory address with malloc: 0x559ad85a8047
Allocated memory address with malloc: 0x559ad85a806b
Freeing all memory locations
Allocated memory address with malloc: 0x559ad85a8020
Allocated memory address with malloc: 0x559ad85a8047
Freeing all memory locations
Allocated memory address with calloc: 0x559ad85a8020
Allocated memory address with calloc: 0x559ad85a8047
Allocated memory address with calloc: 0x559ad85a806b
Freeing all memory locations
Allocated memory address with calloc: 0x559ad85a8020
Allocated memory address with calloc: 0x559ad85a8047
Freeing all memory locations
Allocated memory address with malloc: 0x559ad85a84b6
Allocated memory address with malloc: 0x559ad85a84e4
Allocated memory address with malloc: 0x559ad85a806b
Allocated memory address with malloc: 0x559ad85a8020
Allocated memory address with malloc: 0x559ad85a8517
Reallocated to memory address: 0x559ad85a8542
Reallocated to memory address: 0x559ad85a84e4
Reallocated to memory address: 0x559ad85a8576
Reallocated to memory address: 0x559ad85a85b0
Reallocated to memory address: 0x559ad85a85e6
Freeing all memory locations
Allocated memory address with calloc: 0x559ad85a806b
Allocated memory address with calloc: 0x559ad85a8020
Allocated memory address with calloc: 0x559ad85a861e
Allocated memory address with calloc: 0x559ad85a8047
Allocated memory address with calloc: 0x559ad85a864b
Reallocated to memory address: 0x559ad85a866c
Reallocated to memory address: 0x559ad85a86a7
Reallocated to memory address: 0x559ad85a86de
Reallocated to memory address: 0x559ad85a8712
Reallocated to memory address: 0x559ad85a8743
Freeing all memory locations
Heap addresses:
Start of the heap: 0x559ad85a8000
End of the heap: 0x559ad85a8752
Checking for memory leaks...
Memory leak detected at address: 0x559ad85a8096
```

Best

```
welka@egr-v-cmsc312-1:~/assignment3$ ./best
Allocated memory address with malloc: 0x559d4b7fa020
Allocated memory address with malloc: 0x559d4b7fa047
Allocated memory address with malloc: 0x559d4b7fa06b
Freeing all memory locations
Allocated memory address with malloc: 0x559d4b7fa047
Allocated memory address with malloc: 0x559d4b7fa020
Freeing all memory locations
Allocated memory address with calloc: 0x559d4b7fa020
Allocated memory address with calloc: 0x559d4b7fa047
Allocated memory address with calloc: 0x559d4b7fa4b6
Freeing all memory locations
Allocated memory address with calloc: 0x559d4b7fa047
Allocated memory address with calloc: 0x559d4b7fa020
Freeing all memory locations
Allocated memory address with malloc: 0x559d4b7fa4e1
Allocated memory address with malloc: 0x559d4b7fa50f
Allocated memory address with malloc: 0x559d4b7fa542
Allocated memory address with malloc: 0x559d4b7fa020
Allocated memory address with malloc: 0x559d4b7fa56a
Reallocated to memory address: 0x559d4b7fa595
Reallocated to memory address: 0x559d4b7fa50f
Reallocated to memory address: 0x559d4b7fa5c9
Reallocated to memory address: 0x559d4b7fa603
Reallocated to memory address: 0x559d4b7fa639
Freeing all memory locations
Allocated memory address with calloc: 0x559d4b7fa671
Allocated memory address with calloc: 0x559d4b7fa047
Allocated memory address with calloc: 0x559d4b7fa699
Allocated memory address with calloc: 0x559d4b7fa020
Allocated memory address with calloc: 0x559d4b7fa6c6
Reallocated to memory address: 0x559d4b7fa6e7
Reallocated to memory address: 0x559d4b7fa722
Reallocated to memory address: 0x559d4b7fa759
Reallocated to memory address: 0x559d4b7fa78d
Reallocated to memory address: 0x559d4b7fa7be
Freeing all memory locations
Heap addresses:
Start of the heap: 0x559d4b7fa000
End of the heap: 0x559d4b7fa7cd
Checking for memory leaks...
Memory leak detected at address: 0x559d4b7fa096
welka@egr-v-cmsc312-1:~/assignment3$
```

Worst

```
weilka@egr-v-cmsc312-1:~/assignment3$ ./worst
Allocated memory address with malloc: 0x557824c49020
Allocated memory address with malloc: 0x557824c49047
Allocated memory address with malloc: 0x557824c4906b
Freeing all memory locations
Allocated memory address with malloc: 0x557824c4906b
Allocated memory address with malloc: 0x557824c49020
Freeing all memory locations
Allocated memory address with calloc: 0x557824c4906b
Allocated memory address with calloc: 0x557824c49020
Allocated memory address with calloc: 0x557824c494b6
Freeing all memory locations
Allocated memory address with calloc: 0x557824c4906b
Allocated memory address with calloc: 0x557824c49020
Freeing all memory locations
Allocated memory address with malloc: 0x557824c494e1
Allocated memory address with malloc: 0x557824c4950f
Allocated memory address with malloc: 0x557824c4906b
Allocated memory address with malloc: 0x557824c49020
Allocated memory address with malloc: 0x557824c49542
Reallocated to memory address: 0x557824c4956d
Reallocated to memory address: 0x557824c4950f
Reallocated to memory address: 0x557824c495a1
Reallocated to memory address: 0x557824c495db
Reallocated to memory address: 0x557824c49611
Freeing all memory locations
Allocated memory address with calloc: 0x557824c4906b
Allocated memory address with calloc: 0x557824c49020
Allocated memory address with calloc: 0x557824c49649
Allocated memory address with calloc: 0x557824c49047
Allocated memory address with calloc: 0x557824c49676
Reallocated to memory address: 0x557824c49697
Reallocated to memory address: 0x557824c496d2
Reallocated to memory address: 0x557824c49709
Reallocated to memory address: 0x557824c4973d
Reallocated to memory address: 0x557824c4976e
Freeing all memory locations
Heap addresses:
Start of the heap: 0x557824c49000
End of the heap: 0x557824c4977d
Checking for memory leaks...
Memory leak detected at address: 0x557824c49096
```