

**CS4375 Operating Systems Concepts**  
**Fall 2022. Homework Assignment 2**  
**Due: 10/31/2022 11:59PM MDT**  
**Group assignment**

This third assignment is about utilizing the `mmap` and `munmap` system calls to implement the `malloc`, `calloc`, `realloc` and `free` family of functions for memory management.

It is to be done by the same group of 3 students who already worked together on the other homework assignments. Even though it is a team assignment, the instructor will determine each student's **individual** involvement. **Your grade will depend on your individual performance.**

For this assignment, you have to turn in an archive containing:

- the source file `memory.c`,
- the source file `implementation.c`,
- your report (as a PDF) explaining the design decisions you took, the choices you made, the issues you encountered and the testing campaign you ran.

## 1 Memory management

Implement the `malloc`, `calloc`, `realloc` and `free` family of functions for memory management by completing what is needed in the provided boilerplate file `implementation.c`, using also the provided file `memory.c`. Base your implementation solely on the two system calls `mmap` and `munmap`. Read and follow the instructions given in these two files. Once everything works, run a testing campaign, as described in the two C files. Write a report where you describe the design decisions you took, the choices you made, the issues you encountered and the testing campaign you ran.

**Start working early on this assignment. Don't get frustrated too easily.** It can be done: your instructor implemented everything he asks you for before he asked. It took him about 6 hours, testing included. Depending on your proficiency in C, debugging skills and knowledge of data-structures like ordered linked-lists, it may take you longer.