This lab assignment is a bit different from previous weeks:

* You are allowed to write your program in C or Java. Please choose whichever language your feel more comfortable with.
* You have one week to finish this. The due date for this is next week before the start of your lab. *You must submit your code to D2L before the deadline. No exceptions whatsoever. I recommend you submit your code (even if it is not working properly) before the deadline.*
* Assuming you submitted your code to D2L before the deadline: You are required to show me your program in person next week during the lab. We will run some test cases on it together. Each student is expected to take about 5 minutes to show their program.

For this lab, you will be implementing a simple memory manager. Your memory manager should be able to run these algorithms: First fit, Best fit and Worst fit.

Your program would take a file as the input (command line argument). The file is of this format:

The first line is a number between 1 and 3:

* 1 = First fit
* 2 = Best fit
* 3 = Worst fit

The second line of the input has the total size of the memory in KBs.

After the first two lines, each line is of one of these formats:

1. A PID MEMORY\_SIZE
2. D PID
3. P

The first one is a request for process with id: *PID* to be *allocated*. *Size* of the memory required for this process is: *MEMORY\_SIZE*. The unit would be KB.

The second one is *deallocating* memory for process with id *PID*.

The third one is asking your program to *print out the current state of memory* (allocations and free spaces).

A sample input file:

2

16384

A 1 210

A 2 1450

A 3 8000

D 2

P

A 2 900

D 1

D 3

A 4 800

P

**Note**:

Your program might need to do **compaction** if asked to allocate a block of memory for a process while no large enough block of memory exists.

**Note**:

In order for your program to pass my test cases (which could be very large input files), your program will need to choose and implement efficient data structures. For example, for best fit, you might need to keep a sorted list of free memory blocks and do a binary search. Having said that, you are free to choose any data structure/algorithm you want to use.

**Deliverable**:

Please upload to D2L: your C or Java source code before the due date. No late submissions. Please do not ask for an extension.

*It goes without saying: You are allowed to run ideas by your friends. You are also allowed to get help from other students. But every student is* ***required to write their own code****. During your in-person presentation (following week****): I will ask questions about your code****.*