TA's Guide to Cachesim

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Cachesim requires you to create a complex program that requires you to keep track of a lot of details. Here are some tips for how to approach the assignment if you are unsure of where to start:

0. Useful resources from the Caches lecture to have handy while working:

- The "Cache behavior summary" slide
- The "Mapping Addresses to Sets" slides

1. Read through all the instructions and details to get a general overview of the program.

2. Reread the instructions, and while you're reading, create a checklist of all the details of your program. Think about why these details are important and how they would translate to code.

Examples of such details to keep track of and to think about how they would be used in code:

- the command line arguments
- the tracefile format
- write-through and write-no-allocate cache
- LRU replacement algorithm
- exit with status of 0

The next few steps are messy and should not necessarily be followed linearly. You may find it useful to refer to the Hilton Method for algorithm design to organize your design process.

3. There are two overarching tasks that you will need to do:

a. initialize the cache based on the specifications
b. read the tracefile to execute the store/load commands.

4. Break these large tasks down into subtasks, and keep breaking the subtasks down until you have subtasks that are tractable to code.

Examples of subtask (these sample tasks can and should be broken down further):

- parse the given memory address
- check access is a hit or a miss in the cache
- update and keep track of LRU

5. Organize and translate your tasks into data structures and algorithms. Make notes on how to implement the details in your checklist in code.

6. Code each task, and test your code after coding each task. Consider edge cases and include code for error-handling. Create print methods specifically for debugging (e.g. having methods to print your cache and specific blocks of your memory could be very helpful).

7. If you have any questions, especially when reading through the instructions, make sure to ask either on the forum or in office hours!