Student: Lucas Castro
Project: Cache Simulator
Language used: Java SE 8
IDE used: Eclipse

Difficulties:

The first difficulty was to figure out how to split the address, TAG, SET and OFFSET. We, Brazilians, took a time together to figure out how we will do that. After that, we keep working by individual, however, sharing the targets and ideas.

With TAG, OFFSET and SET defined, I have started to review and study how cache associativity works, each one. To do that, I've started searching at Computer Science pages, such as; College Berkeley (plus Illustrated version), and the College of Engineering "UMassAmherst" and even Wikipedia (It has a very good content). After some days studying I've figured out how associativity works (1,2,4,8,direct,fully, etc). Moreover, I already took Computer Architecture in Brazil and I've remembered that cache memory has many ways to optimize the "replacement". So, I spent some hours to learn more about that and I have taken one.

My last difficulty was figure out how "MOD" works for the 2-4-8 ways. I've read some websites as I talked and then figured out how do that.

General Tots:

As I used Java as a language to do the cache simulator, I used many data structures (ArrayList and LinkedList), Both come by the List Interface, which is used to create array and linked list easily.

Finally, I tried to model a good way the struct for the cache (Sets and Blocks) as a Object Oriented project. (Set_Model.java and Block_Model.java). Moreover, I as said, I used a algorithm to take the oldest one block when all the blocks contains data (valid) and we have to chose a block to work. So, every time that we need take a old block the cache simulator is going to take always the oldest one (last used) that increases a little the hit hate.

How use it:

Linux: Just browse to extracted folder using the Terminal. First, give the permissions using chmod and then execute the .jar.
Step 1) $ chmod u+x Cache_Simulator.jar
Step 2) $ ./Cache_Simulator -size 8kb -assoc…...

Windows: Just browse to extracted folder using the CMD, and then execute it using the jar command.
Step 1) java -jar Cache_Simulator.jar -size 8kb -assoc……

PS: Make sure to have the JRE Java (at least, or better, JDK) previous installed on the machine.

Sources:

Book: Structured Computer Organization (5th Edition) - by Andrew S. Tanenbaum

Websites:

http://www.ecs.umass.edu/ece/koren/architecture/Cache/tutorial.html
http://en.wikipedia.org/wiki/CPU_cache
https://cseweb.ucsd.edu/classes/su07/cse141/cache-handout.pdf
http://cs.stackexchange.com/questions/13356/how-to-calculate-the-tag-index-and-offset-fields-of-different-caches
http://www.ccs.neu.edu/course/com3200/parent/NOTES/cache-basics.html