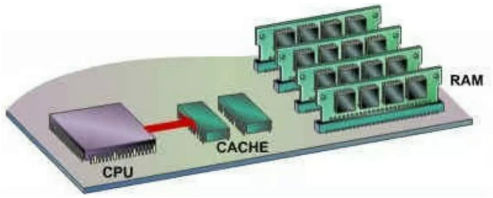
Due: May 28, 2018

Assignment-3: An implementation of a simple Cache Memory



In this assignment, you are asked to design and develop the Cache memory that

- uses the Least Recently Used scheme
- has fixed size
- stores references to the most recently used object
- store any comparable object that has a key value

What is Cache Memory?

Remember from the Computer Architecture class, cache memory is a very high-speed memory that is placed between the CPU and main memory. It is used to reduce the average time to access data from the main memory. Whenever an application requires a data item, it attempts to get it from the cache first.

Cache Hit: If the object is already in the cache, it is called cache hit. In case of cache hit, the cache returns a reference to the object and object gets moved to the first position in the cache (the most recently used object).

Cache Miss: If the object is not found in the cache, then it is called cache miss. If it is a cache miss, then the application needs to read the object from the source and then puts the object into the first position of the cache.

Please note that, if the cache is full, the last entry (the least recently used one) in the cache will be removed before a new object can be added. The removed object doesn't need to be written back.

TODO:

- Design a data structure for the cache memory management.
- Cache should be able to store any object
- The cache memory provides the following operations:
    - get: searches an object based on the key provided
    - put: puts and object (using its key) into the cache
    - clear: empties the cache
    - getHitRatio: returns the ratio of the number of cache hits to the number of lookups

  - getMissRatio: returns the ratio of the number of cache misses to the number of lookups
  - contains: checks if the element is in the cache
- In case of cache miss, the cache needs to be able read from a Source object, which might be a file, database or network.

Submission:

Please submit the following deliverables as a single zip file to CANVAS.

- Source code for Cache
- Junit Test cases for testing