**Mock Project: Cache Replacement Polices**

**Grading:** It will be graded on the scale of 100.

**Objective:**

In this project, you are implementing a cache manager with a limited number of slots. Your cache manger needs to store the cached valued and replaces with the new values when it is full. You are also going evaluate the performance of different cache replacement policies.

**Requirements:**

You are required to implement the following three cache replacement polices: LRU, FIFO and LFU.

We provide three memory access history cases for evaluation. For simplicity, we only provide the key of the key-valued pair in the history.

If a key is not found in the cache, it is considered as a cache miss. When cache miss, we assume the external system will fetch the value from other storage space and immediately store into the cache for the upcoming access. You do not need to implement the fetching and only required to implement the storing of the cached value.

For example, “A A B B C” would have 3 cache misses when using a cache manager with size 2. The first A and B are missed and final C is missed as well. Based on the policy, you would need to decide which key to discard when storing C.

**Reports: Provide the statistics for report 1 and provide your analysis**

Report 1: Miss rate of each policy with cache size = 10

|  |  |  |  |
| --- | --- | --- | --- |
|  | LRU | FIFO | LFU |
| Case 1 |  |  |  |
| Case 2 |  |  |  |
| Case 3 |  |  |  |

**Deliverables**

**Cover page (1 pt):** should contain the following in the exact order as specified:

a. Status of this assignment: Complete or Incomplete. If incomplete, state clearly what is incomplete.  
b. Time spent on this assignment. Number of hours.  
c. Things you wish you had been told prior to being given the assignment.

**Design Document (10 pts):** The design document should be written prior to coding. There should not be any code in your design document. No specific template is provided to you for your design. You may draw a diagram to show the architecture and the flow of the software components, and provide the write-up of your design decisions.

**A working data structure implementation, Reports & Analysis of Results (89 pts):**   
A working system, satisfying the requirements. Results should be used to provide a good analysis of your engine. Thus, you are expected to provide a good analysis along with your results. You may be asked to give a demo of your system, demonstrating that all requirements are implemented and are functional, and answering the questions.