CSN-232 OPERATING SYSTEM

LRU Page Replacement Algorithm

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Implement the following algorithms in C or C++ without using existing/predefined classes.

i. LRU - Counter Method

ii. LRU - Stack Method

iii. LRU - Aging Register Method

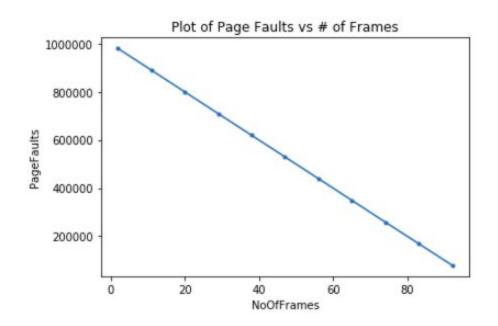**iv. Approximate LRU - Clock Method**

Compare and contrast the results by testing the algorithms with different corner cases.
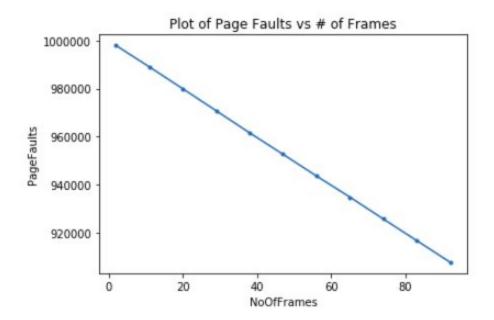
Draw the graph for the number of frames vs. the number of page faults.

Test Data Generation:
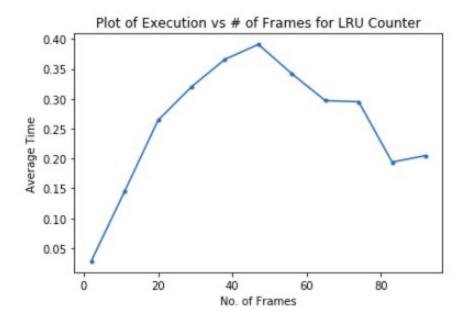
10^6 Pages are generated randomly from 1 to 100.

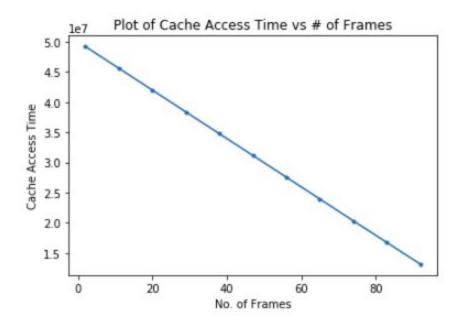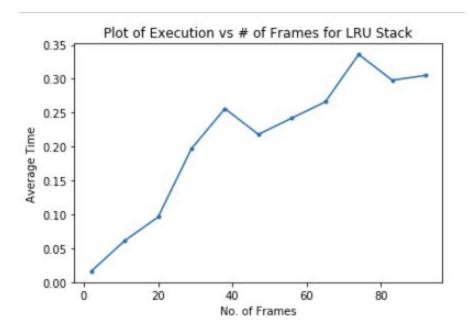No. of frames is varied from 2 to 100.

Plot of Page Faults vs # of Frames

Draw the graph for the average time taken to execute the algorithms for different corner cases.

i. LRU - Counter Method
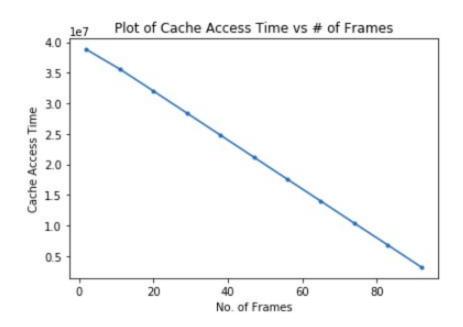
Plot of Execution vs # of Frames for LRU Counter

Plot of Cache Access Time vs # of Frames

ii. LRU - Stack Method

Plot of Execution vs # of Frames for LRU Stack

Plot of Cache Access Time vs # of Frames

iii. LRU - Aging Register Method

Plot of Execution vs # of Frames for LRU Ageing

Plot of Cache Access Time vs # of Frames

iv. Approximate LRU - Clock Method

Plot of Execution vs # of Frames for LRU Clock

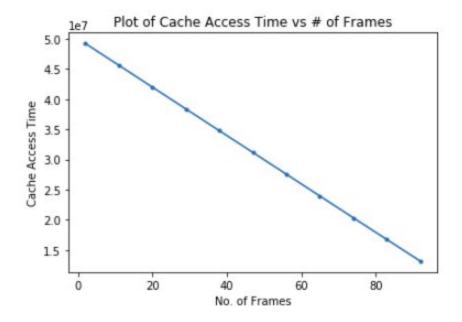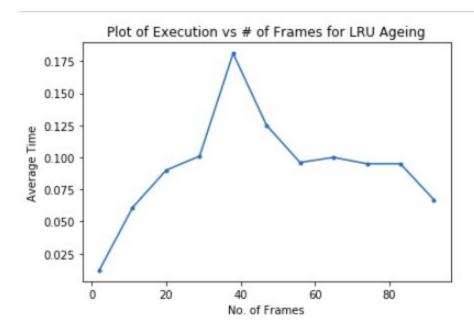Plot of Cache Access Time vs # of Frames
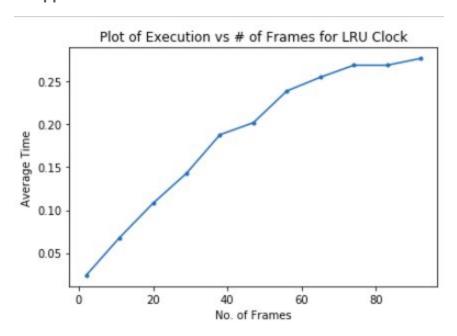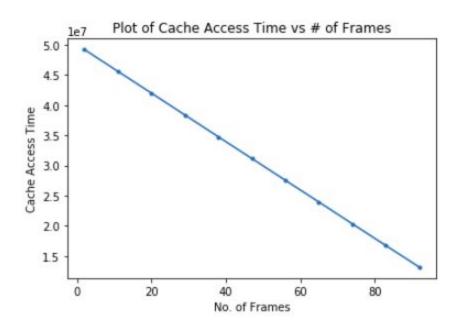
Perform the complexity analysis.

i. LRU - Counter Method

ii. LRU - Stack Method

iii. LRU - Aging Register Method

iv. Approximate LRU - Clock Method

1. **LRU - Counter Method :**

   Complexity:

   O(Capacity)

2. **LRU - Stack Method :**

   Complexity:

   O(Capacity)

3. **LRU - Aging Register Method :**

   Complexity:

   O(Capacity / T)

4. **Approximate LRU - Clock Method :**

   Complexity:

   O(Capacity)

Write your comments/critical analysis/study report on your results and complexity.

Choosing of the algorithm depends on three factors:

1. Scalability : According to the size metrics, the algorithm should be chosen which depends on the size of the inputs and the complexity of the algorithm. For a particular set of input size depends on the complexity and constants. A worse algorithm may perform better depending on the size of the inputs and the constant factors.
2. Input : The algorithm also depends on the input data type i.e. the input data contains repetitive pages, or many different types of pages are used.
3. Hardware : The hardware available is also a factor for the choosing the right algorithm.