Batch: B2   Roll No.:   110

Experiment / assignment / tutorial
No.____6___

Grade: AA / AB / BB / BC / CC / CD /DD

Signature of the Staff In-charge with date

TITLE: Implementation of LRU Page Replacement Algorithm.

AIM: The LRU algorithm replaces the least recently used that is the last accessed memory block from user.

Expected OUTCOME of Experiment: (Mention CO/CO's attained here)

CO3- Learn and evaluate memory organization and cache structure

Books/ Journals/ Websites referred:
3.   Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", Fifth Edition, TataMcGraw-Hill.
4.   William Stallings, "Computer Organization and Architecture: Designing for Performance", Eighth Edition, Pearson.

Pre Lab/ Prior Concepts:

It follows a simple logic, while replacing it will replace that page which has least recently used out of all.

a) A hit is said to be occurred when a memory location requested is already in the cache.

  b) When cache is not full, the number of blocks is added.

  c) When cache is full, the block is replaced which is recently used

Algorithm:

1.   Start
2.   Get input as memory block to be added to cache
3.   Consider an element of the array
4.   If cache is not full, add element to the cache array
5.   If cache is full, check if element is already present
6.   If it is hit is incremented
7.   If not, element is added to cache removing least recently used element
8.   Repeat step 3 to 7 for remaining elements
9.   Display the cache at very instance of step 8
10.   Print hit ratio
11.   End

Example:

[1]
[2, 1]
[3, 2, 1]
[5, 3, 2, 1]
[1, 5, 3, 2]
[4, 1, 5, 3]
[4, 1, 5, 3]
2

SIZE = 4
memory = []
hit = 0

def add(a):
    global hit

    if (len(memory) == SIZE):

        if (a in memory):
            hit = hit + 1
            memory.remove(a)
        else:
            memory.pop(-1)

```
    memory.insert(0, a)
    print(memory)


add(1)
add(2)
add(3)
add(5)
add(1)
add(4)
add(4)
print(hit)
```

Post Lab Descriptive Questions

1. Define hit rate and miss ratio?

Hit rate = number of times page was present in cache / total number of accesses

miss ratio = number of times page was not present in cache / total number of accesses

2. What is the need for virtual memory?
Virtual memory is a technique by which memory space can be increased without physically increasing the memory size. By using virtual memory we can utilize the space in Secondary memory for Primary memory requirements

Conclusion
Thus we understood what LRU algorithm is. It replaces the least recently used page in the virtual memory with the new page. Using this algorithm we can manage pages in Cache or virtual memory.