**Advanced Databases**

**Project 3**

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Implemented Least recently used algorithm instead of Clock algorithm in postgresql.

The files in the Zip folder are bufmgr.c and freelist.c

All the changes are commented with my Unumber in the files along with the reasons for the changes.

**freelist.C :**

The main functions that are changed in freelist.c are StrategyGetBuffer() and StrategyFreeBuffer(). **StrategyGetBuffer** has 4 cases,

Case 1: To get the buffer from the ring if present.

Case 2: To get the buffer from the head of the free list which is pointed by firstFreeBuffer and check if reference count is zero as someone else might have accessed it before we do. (reference count is pincount)

Case3: When there is no buffer in the free list, then we must go through all the buffers to check if there is any buffer whose reference count is zero and unpinned. Return that buffer.

Case 4: Return elog, when all the buffers are pinned.

We do not use clock sweep tick function even though it is a helper routine for Strategygetbuffer as this is not clock algorithm to always go to the next element in circle. For LRU, we use for loop to check all the buffers in order from first to last. It doesn’t save the last state/position.

**StrategyFreeBuffer**

When clock algorithm was implemented the code was in LIFO method, where the free buffer is added at the head and removed from the head(stack). In LRU, we implement FIFO method(queue). Therefore, we need to add free buffer at the tail and the buffer is removed from the head in StrategyGetBuffer. The code has been modified to implement this.

Also changed the code to eliminate usage count as usage count is not used in LRU.

**bufmgr.c**

The main function that is changed in bufmgr.c is UnpinBuffer()

In UnpinBuffer, the reference count (pin count) is reduced by 1 when a process doesn’t need access to this buffer. When this reference count is equal to zero, the buffer is no longer used by any process and must be returned to the freelist. Hence called StrategyFreeBuffer() when ref->refcount=0.