**Buffer Manager**

Decision tree for buffer manager trying to find page P with RID contents:

1. Free pages?
   1. Yes
      1. Choose free page P (as tiebreaker, choose first free page ordered alphanumerically)
      2. Put RID contents on P
      3. Return P
   2. No
      1. Is RID already in buffer?
         1. Yes
            1. Special case for CLOCK: set reference bit for P
            2. Return P (already with RID contents)
         2. No
            1. Run buffer replacement algorithm to get some page P
            2. Put RID contents on P
            3. Return P

**CLOCK Replacement**

Buffer replacement algorithm

CLOCK\_bufferreplace() returns page P {

clockhand = clockhand->next

while (clockhand->reference == True) {

if (clockhand->pinned == False) {

clockhand->reference = False

}

clockhand = clockhand->next

}

evictcontents(clockhand)

return clockhand

}

Notes

* Clock hand starts on first page ordered alphanumerically
* Clock hand only moves when running buffer replacement algorithm
* When starting buffer replacement algorithm, the clock hand should start considering unsetting reference bits from the page *immediately following* the one it just replaced on the previous invocation.
* Reference bits of pinned pages are never changed.
* Unpinning a page sets the reference bit because unpin operation needs to find the page in the buffer (refer to line 1.2.1.1.1 above)