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COM S 363

Homework 2

* 1. Worst case, it’s P = (200 students \* 20 assignments) / 40 records per page = 100, then its **100 pages \* D** for cost. On average, it’s 0.5 \* P, so **50 pages \* D**
     1. I/O cost of a multi-way merge sort is measured by the cost of reading/writing to the page multiplied by 3 phases of the merge sort. So if we use the value from 1a, it’s **3\*(100 + 100) = 600 + D** total cost.
     2. First, we have to find how many searchKeys that a page can store. The SearchKeySize is 2 bytes, the PointerSize is 2 bytes, and the PageSize is 200 bytes. Therefore, I can store **(2\*n) + (2\*(n+1)) = 200,** therefore **n = 49**. With 4000 total pages, that means that we need **4000 / 49 = 82** **pages**, + 1 for the directory node so **83** **pages.**
     3. Root node + read data + read pages = **1+1+20** **= 22**. Since each student can have at most 20 assignments, plus 1 read for root node and each data entry.
  2. We only need to read **6 pages** because there are 200 records and we can fit 49 keys per page.
     1. Since assignment\_id is sorted, and there are 100 pages, and the max keys per page is 49, we need **2 pages**.
     2. Read index + read pages = **1 + 3 = 4**.

1. Since I am scanning and updating the whole file, it would be a cost of **100 to read** and **100 to write**, making it a **cost of 200**.