Homowork for External Sorting

Suppose you have a file with 10,000 pages and you have three buffer pages. Answer the following questions for each of these scenarios, assuming that our most general external sorting algorithm is used:

(a) A file with 10,000 pages and three available buffer pages.

(b) A file with 20,000 pages and five available buffer pages.

(c) A file with 2,000,000 pages and 17 available buffer pages.

1. How many runs will you produce in the first pass?

**(a) ⎡10000/3⎤ =3334**

**(b) ⎡20000/5⎤ =4000**

**(c) ⎡2000000/17⎤ = 117648**

2. How many passes will it take to sort the file completely?

**(a) ⎡log2 3334⎤ + 1 = 13**

**(b) ⎡log4 4000⎤ + 1 = 17**

**(c) ⎡log16 117648⎤ + 1 = 6**

3. What is the total I/O cost of sorting the file?

**(a) 2\*10000\*13 = 260000**

**(b) 2\*20000\*7 = 280000**

**(c) 2\*2000000\*6 = 24000000**

4. How many buffer pages do you need to sort the file completely in just two passes?

Pass 0 = ⎡N/B⎤ , Pass 1 = B − 1 ≥ ⎡N/B⎤

**(a) B =100 이면 99 ≥ 100로 만족을 못하므로 B = 101 일때, 100 ≥ ⎡100⎤ =100 이므로**

**=> 101 buffer pages 필요**

**(b) B =141 이면 140 ≥ ⎡141.8xxx⎤ = 142로 만족을 못하고 B = 142 일때, 141 ≥ ⎡140.8xxx⎤ =141 이므로**

**=> 142 buffer pages 필요**

**(c) B =1414 이면 1413 ≥ ⎡1414.4xxx⎤ = 1414 만족 못하므로 B = 1415 일때, 1414 ≥ ⎡1413.4xxx ⎤ =1413 이므로**

**=> 1415 buffer pages 필요**