

Project One Two-Phase Multiway Merge-Sort

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In this project, we implement a Two-Phase Multiway Merge-Sort program. This project includes two parts, in phase 1 we need to divide the provided data into several sorted lists. And in phase 2, we need to merge the previous sorted lists into a complete sorted file, this procedure maybe contains several rounds depends on the member of buffers and the size of buffer.

At the beginning, we need to get the size of main memory and to decide the number and size of input buffer and output buffer. After many attempts, we choose 5 input buffers and 1 output buffers for phase2, the size of input buffer and output buffer is different and can be changed. For phase1 we use whole size of main memory.

Phase 1

We have to use up all of the buffer space, we read each data in the provided file, and put it in the buffer, until we fill the entire buffer. Then we use Merge-sort algorithm to sorted these numbers, write them in a sorted list. We keep doing this until we read all of data in the provided file. Finally, several sorted lists, we will use them to do phase2.

Phase 2

In phase2, we will merge all the sorted list into a final sorted list, but in this procedure, we might do the phase 2 many times, so we need to calculate the number of times first. I mentioned it before, we have 5 input buffers and 1 output buffer. For example, after phase1 we got 7 sorted list, when we call phase2 first time, we merge first 5 sorted lists into one list, we merge last 2 sorted lists into another list. We do some optimal in this process, when we merge last 2 sorted list we use all 5 input buffers not only 2 input buffers. Now we get 2 new sorted list, we do phase 2 again, and get final results, finally we do phase2 2 times.

The method we merge sorted lists is same with method mentioned in slide. Actually, all these processes we did it in dynamic, we do not talk it too detail. If you want to see it more detail you can see our code.