EXTERNAL MERGE SORT

Suppose we have a file of 5GB data and we want to sort it, but the problem is we have only 1GB Ram. Here, the best sorting technique is External Merge sort

STEP 1:

Split 5GB of data into small files of same size using given formula:

$$\text{No of files} = \frac{Storage\ of\ Data}{Storage\ of\ Ram} = \frac{5}{1} = 5$$

So we have five files of name:

File1 1GB
File2 1GB
File3 1GB
File4 1GB
File5 1GB

STEP 2:

Sort each file individually using any sorting algorithm and save to hard disk

File1 1GB → Ram → Sort → File1_S
File2 1GB → Ram → Sort → File2_S
File3 1GB → Ram → Sort → File3_S
File4 1GB → Ram → Sort → File4_S

File5 1GB → Ram → Sort → File5_S

STEP 3:

1. Divide Ram into 3:1 means 750MB : 250MB
2. Use 750MB to store values of each sorted files
3. $\frac{750MB}{no.of\ files}$ = $\frac{750MB}{5}$ = 150MB

4. Get 150MB of Each sorted files and save it into 750MB of RAM
5. Sort them in K-way merge
6. And store the result in 250MB
7. When storage of result = 250MB, write result in Disk as output file and erase that 250MB of RAM
8. Then, Get next 150MB of each sorted files
9. Repeat above 4 steps until all files are merge

In the end you get output files like:

Output1
Output2
Output3
…
…
Outputn

STEP 4:

Combine all the files sequentially and you get the large file of sorted values