Name: _____ USC ID: _____

INF 551 – Spring 2018

Quiz 7: External Sorting (10 points), 15 minutes

Consider external-sorting a table R with 100 blocks, using 4 pages of memory.

1. [8 points] For each pass (sorting and merging), state the number of runs and the size of runs generated by the pass.

   Pass 0: Sort into 25 sorted runs of 4 blocks per run.
   Pass 1: Merge 3 runs into 1 run each time. After merging 24 runs into 8 runs, only one run is left so we keep it. Output: 8 runs of 12 blocks per run and 1 run of 4 blocks per run.
   Pass 2: Merge 3 runs into 1 run each time. Output: 2 runs of 36 blocks per run and 1 run of 28 blocks per run.
   Pass 3: Merge 3 runs into 1 run. Output: 1 run of 100 blocks per run. The task is finished.

2. [2 points] What is the total cost (measured by the number of block I/O's) of this external-sorting?

4 passes in total:

   Total cost: 4 * 2 * 100 = 800 blocks of I/O

   Or 792 blocks of I/O if we don't read and output the last run of length 4 in pass 1.