



In the general case heap sort is faster than bubble sort, however there are conditions under which bubble sort might be faster

- If the array is already sorted bubble sort terminates after one scan (in  $O(n)$  time), while the heap sort still requires  $O(n \log n)$ .
- Depending on the implementation, creating the heap might have an overhead, so for small inputs bubble sort might be faster.

Some general comments about the implementation question:

- Unless required otherwise, the times that are reported should be the average of several runs. This creates smoother graphs, without humps and other weird phenomena which require your explaining.
- Do not report zero running times. If the algorithm terminates too fast on small inputs, then for a sufficiently large  $N$  measure  $N$  runs of the algorithm together. You can divide the total time by  $N$ , to obtain the average time of one run.
- Don't forget to analyze the graphs. In particular, if your results stray from what you expected, try to explain why it happened.