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CS2420 Assignment-11-Heaps

Write a half page description of the most important properties of a heap, summarizing what you have learned about them based on your analysis. Include a brief description of where priority queues can be used both "abstractly" in the real world, and "concretely" in a computer system.

1. Timing Experiment

Overview

Based on your experience analyzing data structures up to this point, we leave it up to you to define interesting criteria about the performance of the Heap algorithm (and if you attempted the "advanced work", the heap building and sorting). *(Hint: run time and the number of core operations (comparisons and/or data assignments/moves are usually important to discuss.)*

Design and conduct an experiment to verify your prediction.

Create figures (plots) to illustrate the results of your experiment. Since the organization of your plot(s) is not specified here, the labels and titles of your plots(s), as well as, your interpretation of the plots is critical.

Once you have validated that the Heap does indeed meet your expected Big O complexity, determine the constants associated with inserting and deletion.

Again, for advanced work, apply the same criteria to the build\_heap and heap\_sort methods.

Write Up

On a page (or max two) write paragraphs describing what it is you are attempting to determine empirically and what the Mathematical analysis says you should expect about Heap performance.

Follow these with a description carefully describing your experiment, so that anyone reading this document could replicate your results.

Follow this with your graphs and a summary of what they show, along with the discussion of how well the data fits the expected behavior, and what the constants are.

1. Software Engineering

Briefly discuss how much time the assignment took, any significant problems you had, and any interesting non-heap but programming ideas that you learned as you completed the assignment. Answer each of the following questions in a separate, short, paragraph:

Describe the purpose behind the compare method and what "magic" it is doing.

Describe why the heap returns an array of Objects instead of any array of "Type". Related to this, what is, and why do we use: SupressWarnings("unchecked");

Give a reason why we generate the "DOT code" in the toString instead of in the generateDotFile method.

Why is "test\_lots\_of\_insertions\_deletions\_peeks" a powerful testing tool?