HÁSKÓLINN Í REYKJAVÍK
REYKJAVIK UNIVERSITY

Fall 2017

T-301-REIR, Reiknirit

X1: Percolation

Name of Student

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Group 1

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Directions on performing the assignment are showed here in italics (like this). These should not be included in the report you submit.

1 Introduction

State the objective(s) of the exercise. Ask yourself: Why did I perform the experiment? What did I aim to achieve? Provide background about the subject matter, as needed (what are union-find data structures good for?). Include the purpose of the different equipment and steps.

1.1 Setup and Methods

Describe how you performed the exercise. Write about what you actually did rather than what you were supposed to do. Be concise. Only give the necessary details a person in the same field needs to perform the exercise. Write in narrative form (i.e., telling a story) rather than a numbered list format. Describe both the set-up (hardware, OS, software, tools) and the testing process. Refer to the classes written, but do not include them in the report.

1.2 Implementation

Describe how you implemented Percolation.java. How did you check whether the system percolates?

2 Results

Describe the experimental results briefly in words, referring to the tables.

2.1 Results With Quick-Find

Using Percolation with `QuickFindUF.java`, fill in the table below such that the N values are multiples of each other. Also fill in the second table, using a fixed, relevant value of N

Table 1: Caption for both

(a) Insert caption (T fixed)

N	Running time
...	...
...	...
...	...
...	...
...	...
...	...

(b) Insert caption (N fixed)

T	Running time
...	...
...	...
...	...
...	...
...	...
...	...

Refer to these table in the text!

Time complexity

Give a formula (using tilde notation) for the running time (in seconds) of `PercolationStats.java` *as a function of both N and T. Be sure to give both the coefficient and exponent of the leading term. Your coefficients should be based on empirical data and rounded to two significant digits, such as $5.3 * 10^{-8} \cdot N^5.0T^{1.5}$.*

Running time as a function of N and T: $\sim$

Explain briefly how you come up this running time

2.2 Results with Weighted Quick-Union

Repeat the previous question, but use WeightedQuickUnionUF.java.

Table 2: Caption for both

(a) Insert caption (T fixed)

N	Running time
...	...
...	...
...	...
...	...
...	...
...	...

(b) Insert caption (N fixed)

N	Running time
...	...
...	...
...	...
...	...
...	...
...	...

Time complexity

Give a formula (using tilde notation) for the running time (in seconds) of `PercolationStats.java` *as a function of both N and T. Be sure to give both the coefficient and exponent of the leading term. Your coefficients should be based on empirical data and rounded to two significant digits, such as $5.3 * 10^{-8} \cdot N^5.0T^{1.5}$.*

Running time as a function of N and T: $\sim$

Explain briefly how you come up this running time

2.3 Memory Usage

How much memory (in bytes) does a `Percolation` *object use to store an N-by-N grid? Use the 64-bit memory cost model from Section 1.4 of the textbook and use tilde notation to simplify your answer. Briefly justify your answers.*

Include the memory for all referenced objects (deep memory).

3 About This Solution

Have you taken (part of) this course before:
Hours to complete assignment (optional):

3.1 Quiz on Collaboration

1. How much help can you give a fellow student taking REIR?

   (a) None. Only the TAs can help.

   (b) You can discuss ideas and concepts but students can get help debugging their code only from a TA, or student who has already passed REIR.

   (c) You can help a student by discussing ideas, selecting data structures, and debugging their code.

   (d) You can help a student by emailing him/her your code.

   Answer:

2. What is the expectation when partnering?

   (a) You and your partner split the assignment between you and solve it individually.

   (b) You and your partner discuss all the problems together, but code individually.

   (c) You and your partner discuss the problems and write all the code together.

   Answer:

3.2 Known Bugs / Limitations.

3.3 Help Received

Describe whatever help (if any) that you received. Don't include readings, lectures, and classes, but do include any help from people (including course staff, lab TAs, classmates, and friends) and attribute them by name.

3.4 Problem Encountered

Describe any serious problems you encountered.

3.5 Comments

List any other comments here. Feel free to provide any feedback on how much you learned from doing the assignment, and whether you enjoyed doing it.