CSE 247 Data Structures and Algorithms Spring Semester 2019

Lab 13 Pre-Lab

Assigned: 4/17/2019 *Due Date: 4/23/2019*

Introduction

This pre-lab is designed to help prepare you to complete the programming component of Lab 13.

Because the pre-lab section is designed to help you plan your implementation, it is strongly recommended for you to complete this section **before** writing any code. However, it is also natural for your understanding of the implementation requirements and your own strategy to evolve as you complete the code, so feel free to update your answers to the pre-lab section during/after the coding phase of the lab, up to the pre-lab deadline.

Questions

1. Given a `Vertex` object x, what Java code is needed to enumerate its outgoing edges?

2. Given a `VertexAndDist` object x and a new distance d, what Java code is needed to create an updated object with the same vertex as x but with distance d?

3. Looking at the code in `run()` that sets the start vertex's distance to 0, you'll see that we create a new `VertexAndDist` object at this point. Suppose we instead could directly modify the distance field of the object returned by the Decreaser's `getvalue()` method. (Assume that this field is made non-final to permit such changes.)

   What would happen when we called `Decreaser.decrease()` on the modified object to ensure that it is moved to the correct location in the heap? Is this the behavior you want?

4. For simplicity of implementation, we use HashMaps to map vertices to handles/parents and edges to weights. How could you modify the `Vertex` and/or `Edge` classes, as well as the maps themselves, to implement the maps using ordinary arrays, with no hashing? Be sure to address both the vertex and edge maps in your answer. (*Hint*: consider the `Vertex`'s "id" field for inspiration.)