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12/10/21

CS4310

**Assignment 5**

**Ideas and experimental procedures: Explain your main ideas and hardware/software configurations for the experiment.**

I am running it on my laptop using the java compiler. For software, it is written in java.

**Include one example output of running your program, as shown above.**

C:\Users\ellio\Desktop\CS4310\Assignment 5>java A5.java

Enter the Source Name:

MIKALAMAZOO N

Enter the Destination Name:

MIANN ARBOR N

Searching from: 39087(MIKALAMAZOO N) to 39059(MIANN ARBOR N)

1: 39087(MIKALAMAZOO N) -> 39123() , U131 BARK ST , 1.11mi.

2: 39123(null) -> 39122() , O94 BALAMAZOO AV , 0.38mi.

3: 39122(null) -> 39121() , O94 BALAMAZOO AV , 0.21mi.

4: 39121(null) -> 39119() , O94 BALAMAZOO AV , 0.16mi.

5: 39119(null) -> 39156() , O94 BMVET MEMORIAL PKWY , 1.23mi.

6: 39156(null) -> 39206() , O94 BMVET MEMORIAL PKWY , 1.82mi.

7: 39206(null) -> 39217(MI I94 MP081) , O94 BMVET MEMORIAL PKWY , 0.82mi.

8: 39217(MI I94 MP081) -> 39213() , I94 , 0.37mi.

9: 39213(null) -> 39212() , I94 , 2.32mi.

10: 39212(null) -> 39193() , I94 , 8.57mi.

11: 39193(null) -> 39194() , I94 , 0.05mi.

12: 39194(null) -> 39196(MI I94 MP092) , I94 , 0.08mi.

13: 39196(MI I94 MP092) -> 39236() , I94 , 5.01mi.

14: 39236(null) -> 39222(MIBATTLE CREEK S) , I94 , 1.14mi.

15: 39222(MIBATTLE CREEK S) -> 39152() , I94 , 2.93mi.

16: 39152(null) -> 39146() , I94 , 0.68mi.

17: 39146(null) -> 39103(MI I94 MP104) , I94 , 1.72mi.

18: 39103(MI I94 MP104) -> 39112(MIMARSHALL NW) , I94 , 4.59mi.

19: 39112(MIMARSHALL NW) -> 39108() , I69 , 0.07mi.

20: 39108(null) -> 39127() , I94 , 1.72mi.

21: 39127(null) -> 39160() , I94 , 1.48mi.

22: 39160(null) -> 39163() , I94 , 0.21mi.

23: 39163(null) -> 39162() , I94 , 0.4mi.

24: 39162(null) -> 39228(MIALBION N) , I94 , 9.31mi.

25: 39228(MIALBION N) -> 39230() , I94 , 2.0mi.

26: 39230(null) -> 39232(MI I94 MP124) , I94 , 0.46mi.

27: 39232(MI I94 MP124) -> 39218() , I94 , 11.54mi.

28: 39218(null) -> 39219(MIJACKSON WNW) , I94 , 0.35mi.

29: 39219(MIJACKSON WNW) -> 39220() , I94 , 1.23mi.

30: 39220(null) -> 39215() , I94 , 0.69mi.

31: 39215(null) -> 39198(MIJACKSON NW) , I94 , 0.66mi.

32: 39198(MIJACKSON NW) -> 39202() , I94 , 1.13mi.

33: 39202(null) -> 39201(MIJACKSON N) , I94 , 0.06mi.

34: 39201(MIJACKSON N) -> 39187() , I94 , 1.08mi.

35: 39187(null) -> 39179() , I94 , 1.18mi.

36: 39179(null) -> 39178(MIJACKSON NE) , I94 , 0.07mi.

37: 39178(MIJACKSON NE) -> 39176(MI I94 MP145) , I94 , 1.99mi.

38: 39176(MI I94 MP145) -> 39167() , I94 , 0.95mi.

39: 39167(null) -> 39109() , I94 , 8.96mi.

40: 39109(null) -> 39120() , I94 , 5.4mi.

41: 39120(null) -> 39107() , I94 , 6.52mi.

42: 39107(null) -> 39105() , I94 , 1.1mi.

43: 39105(null) -> 39149() , I94 , 3.87mi.

44: 39149(null) -> 39139() , S14 , 0.45mi.

45: 39139(null) -> 39100(MIANN ARBOR C-N) , S14 , 2.9mi.

46: 39100(MIANN ARBOR C-N) -> 39059(MIANN ARBOR N) , U23 B , 1.52mi.

It takes 100.48998 from MIKALAMAZOO N to MIANN ARBOR N

**Analysis: How did you represent the graph and how did you implement the priority queue? What packages/libraries did you use? Why did you do that way? What is the asymptotic complexity of your run time? What is the experimental run time?**

The graph is represented in an ArrayList of vertex’s. The priority queue is implemented using java’s built in PriorityQueue. I am using import java.io.\* and import java.util.\*. This is because it is the most simple way in my opinion to approach this assignment. The asymptotic complexity is O(ElogV) because that is the complexity of dijkstra’s algorithm, which is the most complex part of my program. The experimental run time of my program was 4 seconds.

**Conclusion: what did you learn from this homework assignment?**

This assignment was not only a huge refresher on coding in java, but data structures as a whole. This uses arraylists,, priority queues, and stacks. All these pieces working together is something that I find fascinating. Overall, I think this assignment made me more comfortable in java again.