Algorithmics I – Assessed Exercise

Status and Implementation Reports

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November 14, 2022

Status report

My program work well and get the correct outputs as the document shows.

Implementation report

(a) In order to implement the word ladders, I add an int variable "count" in vertex to count the word ladders . For example, i set the first vertex's count as 0,then all the nodes in adjlist's count equals the parent vertex + 1 so the nodes of the first vertex's adjlist is 1.That means each vertex can get the right count In order to improve efficiency I just use the BFS algorithm and while the current is end node then quite the loop. In order to find the path, just use vertex.predecessor to find the last vertex.

(b) Create the weight to adjlistnode by using compare to find the distance between two words.Add a variable "count" to the vertex to store the shortest distance from the begin vertex to this vertex.Set the max interger as the inital value. The queue stores the vertex and then find the first node .After that find the vertex's adjlist and begin the loop.Create the int variable called "newdist" to store the shortest distance from the begin to the end vertex.If node.count is bigger than the newdist then remove the node from the queue to make sure to find the shorest distance from the parent vertex.After that reset the count and add the vertex to the path.

Empirical results

This section is part of the marking scheme "Outputs from test data: 2 marks".

If the program fails to terminate in, say, two minutes, simply report non-termination. To print your outputs you can use the verbatim environment:

```
size of dictionary = 1638
For wordladder:
word1=print
word2=paint
[print, paint]
```

```
shortest word ladder of length 1

Elapsed time: 87 milliseconds

word1=forty
word2=fifty
[forty, forth, firth, fifth, fifty]
shortest word ladder of length 4

Elapsed time: 87 milliseconds

word1=cheat
word2=solve
[cheat, chert, chart, charm, chasm, chase, cease, lease, leave, heave, helve, halve, salve, so
shortest word ladder of length 13

Elapsed time: 95 milliseconds

word1=worry
word2=happy
no word ladder exists

Elapsed time: 85 milliseconds

word1=smile
word2=frown
[smile, smite, spite, spice, slice, slick, click, clock, crock, crook, croon, crown, frown]
shortest word ladder of length 12

Elapsed time: 97 milliseconds

word1=small
word2=large
[small, shall, shale, share, shard, chard, charm, chasm, chase, cease, tease, terse, verse, ve
shortest word ladder of length 16

Elapsed time: 92 milliseconds

word1=black
word2=white
[black, blank, blink, brink, brine, trine, thine, whine, white]
shortest word ladder of length 8

Elapsed time: 92 milliseconds

word1=greed
word2=money
no word ladder exists
```

```
Elapsed time: 89 milliseconds
-----------------------------------------------
For dijkstra:
word1 blare
word2 blase
1
blare
blase

word1 blond
word2 blood
1
blond
blood

Elapsed time: 167 milliseconds

word1 allow
word2 alloy
2
allow
alloy

Elapsed time: 171 milliseconds

word1 cheat
word2 solve
96
cheat
chert
chart
charm
chasm
chase
cease
lease
leave
heave
helve
halve
salve
solve

Elapsed time: 204 milliseconds

word1 worry
word2 happy
```

```
no path exists

Elapsed time: 167 milliseconds

word1 print
word2 paint
17
print
paint

Elapsed time: 179 milliseconds

word1 small
word2 large
118
small
shall
shale
share
shard
chard
charm
chasm
chase
cease
tease
terse
verse
verge
merge
marge
large

Elapsed time: 181 milliseconds

word1 black
word2 white
56
black
blank
blink
clink
chink
think
thine
whine
white
```

```
Elapsed time: 174 milliseconds

word1 greed
word2 money
no path exists

Elapsed time: 181 milliseconds
```