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Lab9
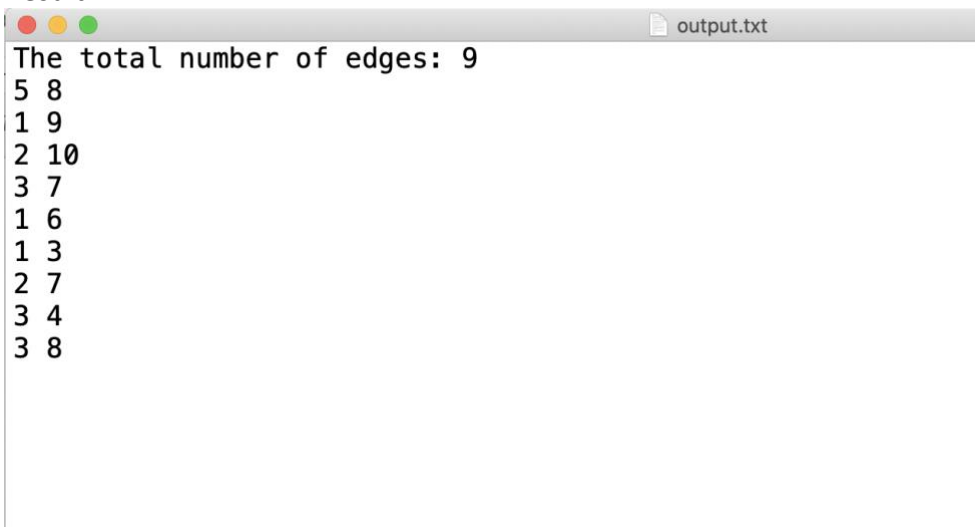
1. For Mandatory part 1 MST:
   (1) I take https://www.geeksforgeeks.org/kruskals-minimum-spanning-tree-algorithm-greedy-algo-2/ as a reference
   (2) To run "EE595_Lab9_9817961224_part1.py", the following command should be entered:
   python3 EE595_Lab9_9817961224_part1.py
   (3) Result:

```
output.txt
The total number of edges: 9
5 8
1 9
2 10
3 7
1 6
1 3
2 7
3 4
3 8
```

2. For Mandatory part 2 Simulated Annealing:
   (1) I take https://blog.csdn.net/tyhj_sf/article/details/53447731 and
   https://blog.csdn.net/breeze_blows/article/details/102992740 as a reference.
   (2) To run "EE595_Lab9_9817961224_part2.cpp", the following command should be entered:
   g++ -o EE595_Lab9_9817961224_part2.cpp
   ./a.out
   (3) For different beta:
   a. Beta = 0.9
      Distance sum:
      37536.7 37536.7 36691.1 37536.7 37439
      Total number of iterations:
      150961 88709 11367 10928 84516
   b. Beta = 0.92
      Distance sum:
      36691.1 37327.4 36691.1 36691.1 37536.7

Total number of iterations:
80929 94110 84591 187441 80648

c. Beta = 0.95
Distance sum:
36691.1 37439 37327.4 36691.1 37327.4
Total number of iterations:
119406 84237 84571 99078 11100

d. Beta = 0.97
Distance sum:
36691.1 37327.4 37327.4 3669.1 3669.1
Total number of iterations:
87018 22834 130362 33091 176332

e. Beta = 0.99
Distance sum:
37536.7 36691.1 36691.1 36691.1 37327.4
Total number of iterations:
222678 89056 79008 80169 16001

	Max final distance	Min final distance	Avg final distance
beta = 0.9	37536.7	36691.1	30749.28
beta = 0.92	37536.7	36691.1	36987.5
beta = 0.95	37439	36691.1	37095.2
beta = 0.97	37536.7	36691.1	36945.62
beta = 0.99	37536.7	36691.1	36987.5

(4) From the result and table above, we can see that as beta increases, the min final distance appears more frequently. Therefore, we can conclude that higher beta contributes to better solution.