Assignment - 3

Program Structure and Algorithms

Pranav Agarwal

NUID - 001099801

1. Unit Test -

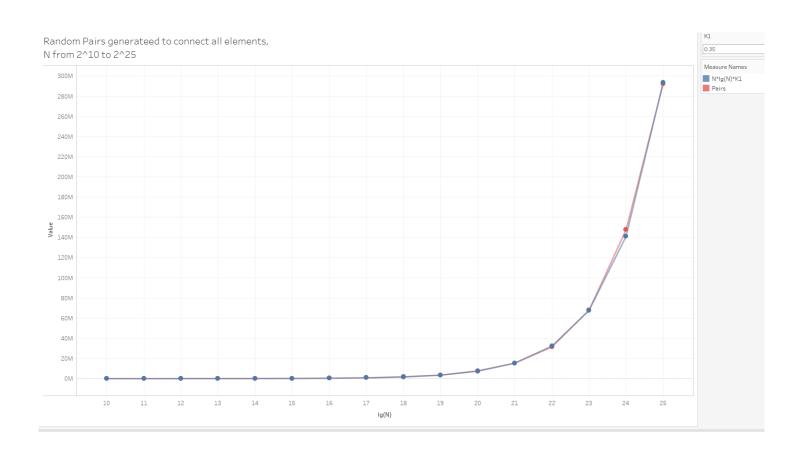
```
UF_HWQUPC_Test

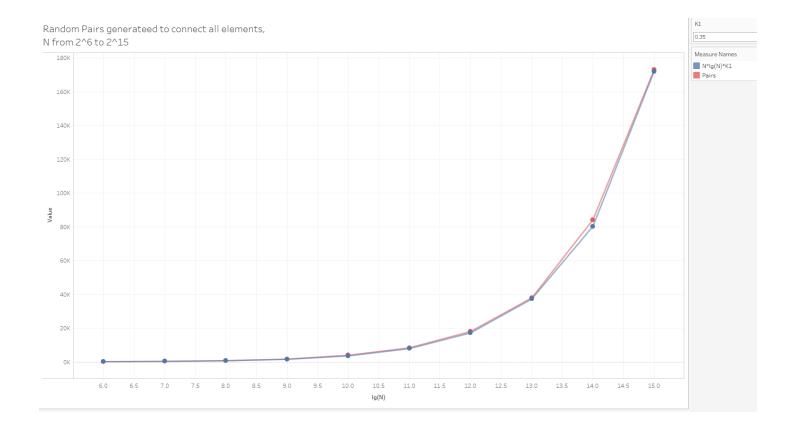
    Errors: 0
 Runs: 13/13
                                    x Failures: 0
🗸 🏣 edu.neu.coe.info6205.union_find.UF_HWQUPC_ 📃 Failure Trace
     testlsConnected01 (0.037 s)
     testlsConnected02 (0.001 s)
     testlsConnected03 (0.008 s)
     ₩ testFind0 (0.001 s)
     testFind1 (0.000 s)
     testFind2 (0.000 s)
     testFind3 (0.003 s)
     testFind4 (0.005 s)
     # testFind5 (0.002 s)
     testToString (0.002 s)
     testConnect01 (0.002 s)
     testConnect02 (0.001 s)
     testConnected01 (0.025 s)
```

2. Results -

# data.csv	# data.csv Pairs	=# Calculation N*Ig(N)*K1
64	158	134.40
128	356	313.60
256	752	716.80
512	1,606	1,612.80
1,024	3,961	3,584.00
2,048	8,375	7,884.80
4,096	18,056	17,203.20
8,192	37,901	37,273.60
16,384	84,206	80,281.60
32,768	173,043	172,032.00

(K1 = 0.35)





3. Observations from table and graphs-

The number of random pairs needed to connect all elements grows with N as –
 Pairs = N*lg(N)*0.35

4. Notes regarding assignment -

- Graphs have been shown for 2 ranges of N, 2^10 to 2^25 and 2^6 to 2^15.
- Each cell in the table is the average pairs needed in 10 runs.
- Output of the assignment is stored in results/union_find/data.csv
- You can edit the parameters of the run by changing the constants in the assignment file.
- Assignment file is Assignment3.java, in the union find folder.