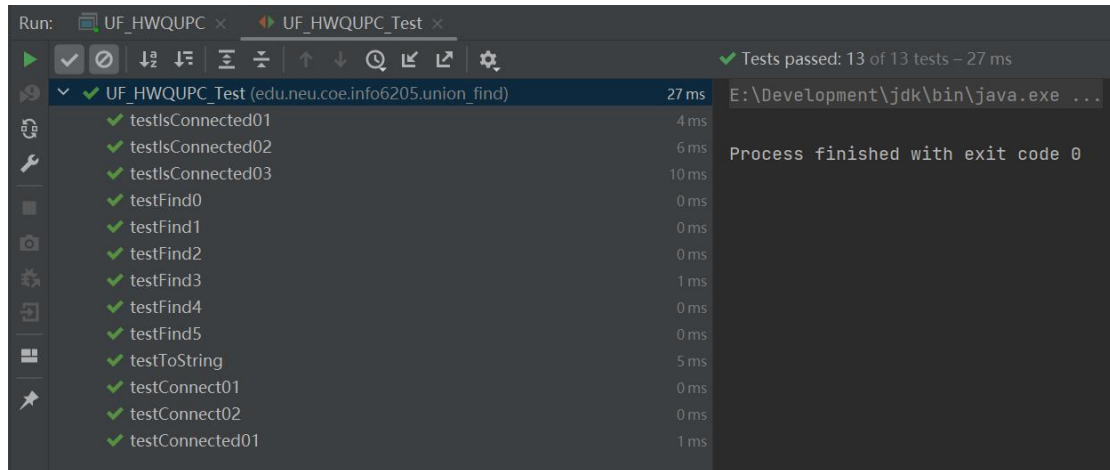# WQUPC

1. Unit Tests

```
E:\Development\jdk\bin\java.exe ...
Enter the number of sites
1000
the number of connections generated :3648
============================================================
Enter the number of sites
2000
the number of connections generated :8085
============================================================
Enter the number of sites
4000
the number of connections generated :17772
============================================================
Enter the number of sites
8000
the number of connections generated :38145
============================================================
Enter the number of sites
16000
the number of connections generated :82333
============================================================
Enter the number of sites
32000
the number of connections generated :182197
============================================================
Enter the number of sites
64000
the number of connections generated :380775
============================================================
Enter the number of sites
128000
the number of connections generated :821607
============================================================
Enter the number of sites
256000
the number of connections generated :1687658
============================================================
Enter the number of sites
512000
the number of connections generated :3536425
============================================================
Enter the number of sites
1024000
the number of connections generated :7416381
============================================================
```

2. Relationship Conclusion

The relationship between the number of objects (n) and the number of pairs (m) generated to accomplish this (i.e. to reduce the number of components from n to 1) is(Each result is an average of 50 runs) :
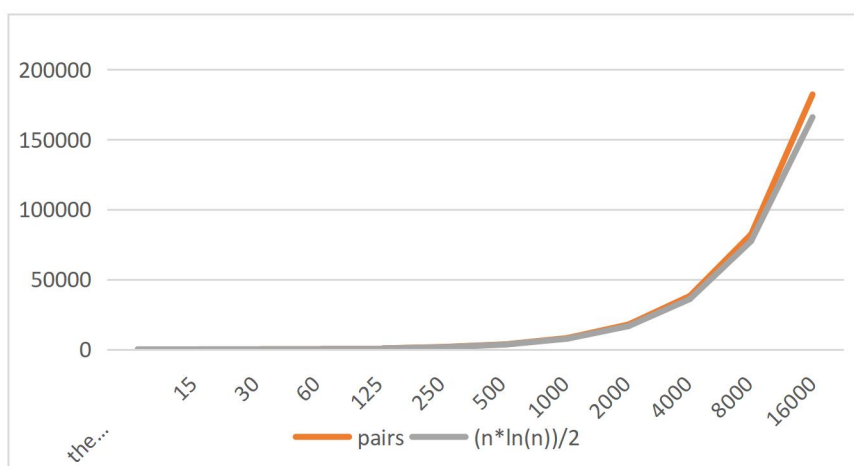
$$m=0.5*n*\ln(n);$$

3. Evidence to support the conclusion

N values ranging from 15 to 32000.
Each result is an average of 50 runs.

	A	B	C
	the number of sites	pairs	$(n*\ln(n))/2$
1			
2	15	24	20.31037651
3	30	61	45
4	60	139	123
5	125	334	302
6	250	758	690
7	500	1777	1554
8	1000	3648	3454
9	2000	8085	7600
10	4000	17772	16588
11	8000	38145	35,949
12	16000	82333	77,443
13	32000	182197	165,976

```
Run:    UF_HWQUPC  ×

    E:\Development\jdk\bin\java.exe ...
    Enter the number of sites
    15
    the number of connections generated :24
    ==============================================================
    Enter the number of sites
    30
    the number of connections generated :61
    ==============================================================
    Enter the number of sites
    60
    the number of connections generated :139
    ==============================================================
    Enter the number of sites
    125
    the number of connections generated :334
    ==============================================================
    Enter the number of sites
    250
    the number of connections generated :758
    ==============================================================
    Enter the number of sites
    500
    the number of connections generated :1777
    --------------------------------------------------------------
```

```
E:\Development\jdk\bin\java.exe ...
Enter the number of sites
1000
the number of connections generated :3648
===============================================================
Enter the number of sites
2000
the number of connections generated :8085
===============================================================
Enter the number of sites
4000
the number of connections generated :17772
===============================================================
Enter the number of sites
8000
the number of connections generated :38145
===============================================================
Enter the number of sites
16000
the number of connections generated :82333
===============================================================
Enter the number of sites
32000
the number of connections generated :182197
===============================================================
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Enter the number of sites
256000
the number of connections generated :1687658
===============================================================
Enter the number of sites
512000
the number of connections generated :3536425
===============================================================
Enter the number of sites
1024000
the number of connections generated :7416381
===============================================================
```