Assignment 4
Height Weighted Quick Union using Path Compression

Part 1. Implement HWQUPC

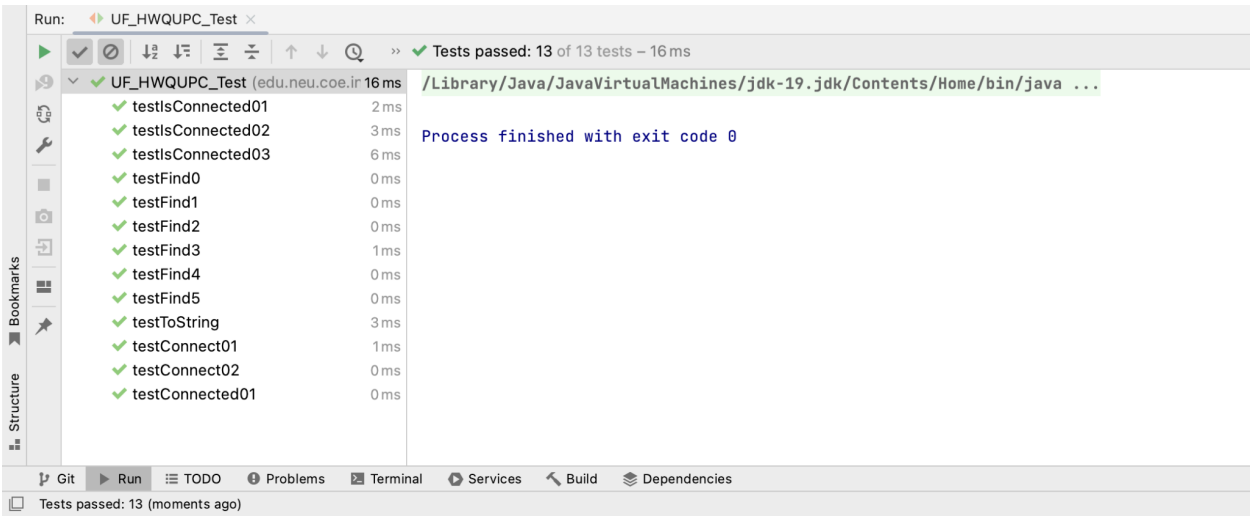

Fig. As shown in the image, all test cases pass for HWQUPC.java

Part 2. Implement a Program to count the number of connections and pairs

I have implemented UF_Client.java, which return the number of connections and pairs generated in connecting n sites.

```
/Library/Java/JavaVirtualMachines/jdk-19.jdk/Contents/Home/bin/java ...
399

Process finished with exit code 0
```

Fig. The image shows the result of the program for n as 400

```
/Library/Java/JavaVirtualMachines/jdk-19.jdk/Contents/Home/bin/java ...
799

Process finished with exit code 0
```

Fig. The image shows the result of the program for n as 800

Part 3. Observation

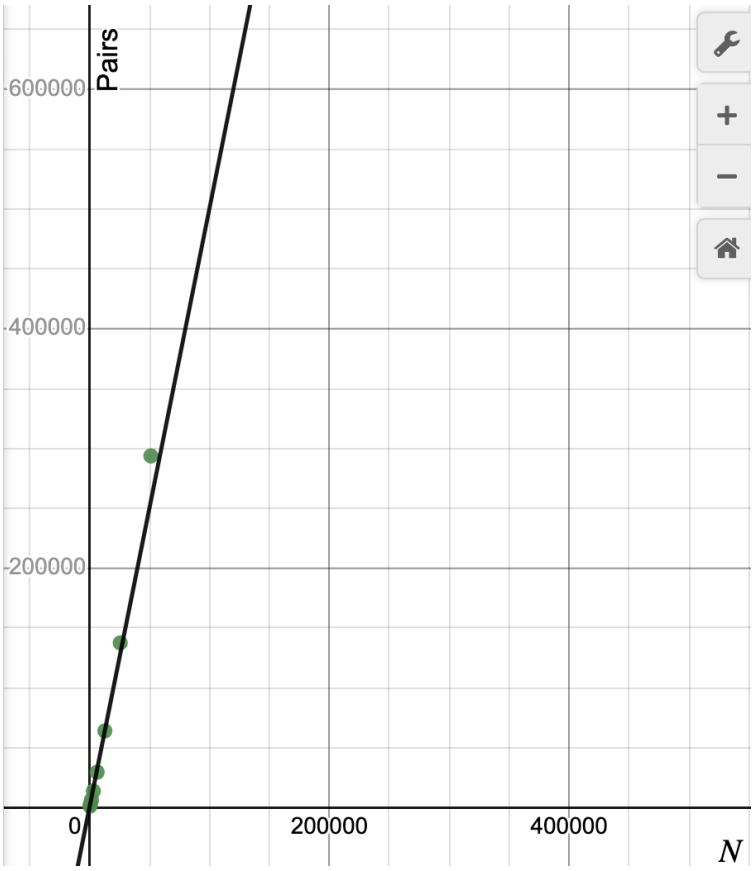

Fig. The graph shows the relationship between the number of objects (*N*) and the number of pairs.

As shown in the graph above, the relationship between the number of objects and pairs is that the number of pairs is five times the number of objects. This relationship is obtained by testing eight values of the number of objects, in which every value is double the previous value. In the

Conclusion

The number of pairs generated is five times the number of objects.

P.S.: The programs are available on https://github.com/sachshan/INFO6205 . In addition, a copy of the programs is attached in the zip file.