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INFO 6205 Program Structure & Algorithms

Spring 2021

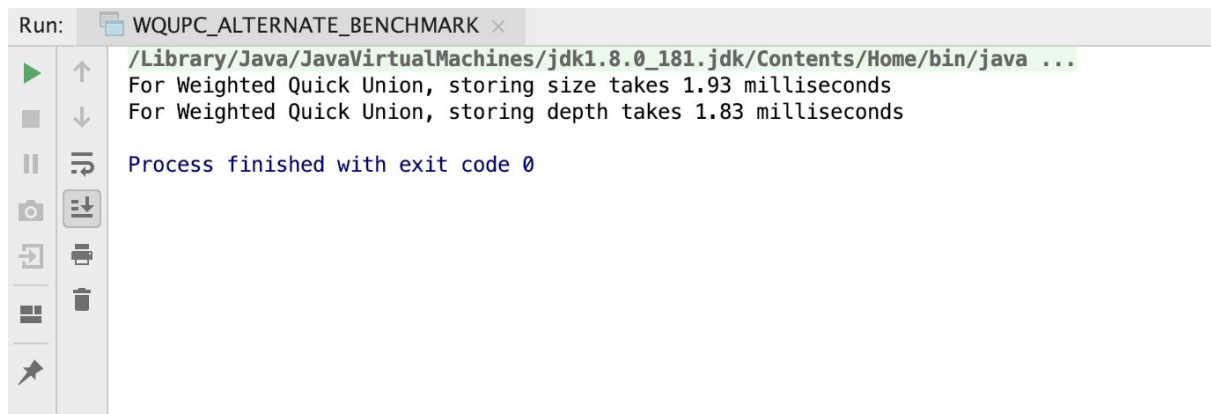
Assignment 4

Task 1:

For weighted quick union, store the depth rather than the size. If you can explain why alternative #1 is unnecessary to be benchmarked, you may skip benchmarking that one.

Output:

I have generated output for 15000 sites and benchmarked it. It is unnecessary to benchmark weighted unions by depth because the running time for both by size and depth are **approximately the same**. So storing by depth doesn't help in reducing run time.



```
Run: WQUPC_ALTERNATE_BENCHMARK x
/Library/Java/JavaVirtualMachines/jdk1.8.0_181.jdk/Contents/Home/bin/java ...
For Weighted Quick Union, storing size takes 1.93 milliseconds
For Weighted Quick Union, storing depth takes 1.83 milliseconds

Process finished with exit code 0
```

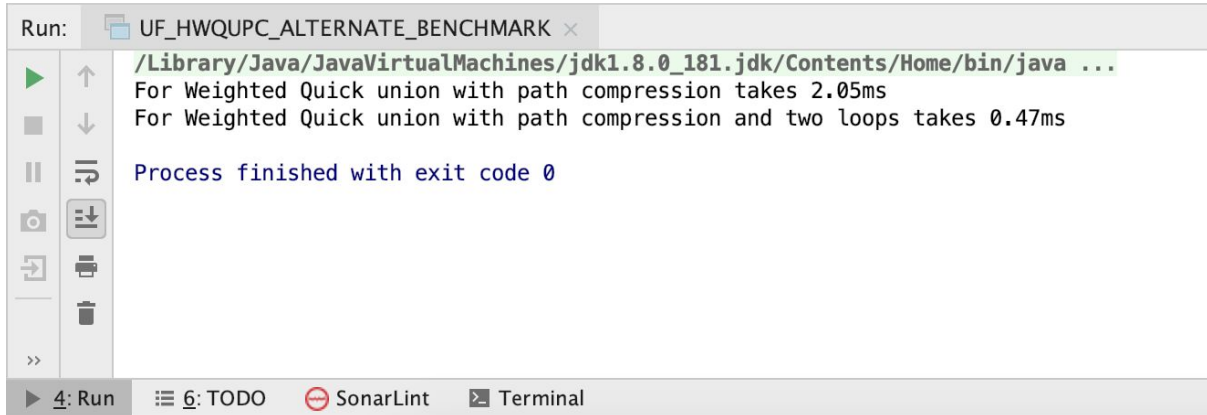
1.1 Benchmark Results

Task 2:

For weighted quick union with path compression, do two loops, so that all intermediate nodes point to the root, not just the alternates.

Output:

Weighted union with Path compression for 15000 sites and with two loops improves the runtime performance compared to the previous solution.



```
Run: UF_HWQUPC_ALTERNATE_BENCHMARK x
/Library/Java/JavaVirtualMachines/jdk1.8.0_181.jdk/Contents/Home/bin/java ...
For Weighted Quick union with path compression takes 2.05ms
For Weighted Quick union with path compression and two loops takes 0.47ms

Process finished with exit code 0
```

The screenshot shows an IDE's Run console. The top bar indicates the run configuration is 'UF_HWQUPC_ALTERNATE_BENCHMARK'. The console output shows the Java command executed, followed by two lines of benchmark results: 'For Weighted Quick union with path compression takes 2.05ms' and 'For Weighted Quick union with path compression and two loops takes 0.47ms'. Below the output, it states 'Process finished with exit code 0'. The IDE's status bar at the bottom shows '4: Run', '6: TODO', 'SonarLint', and 'Terminal'.

2.1 Benchmark Results