CURTIN UNIVERSITY (CRICOS number: 00301J)

Department of Computing, Faculty of Engineering and Science

Data Structures and Algorithms (COMP1002)

PRACTICAL 10 – DSA IN PRACTICE

AIMS

- To implement and assess additional sorting algorithms
- To use Java Collections to implement ADTs

BEFORE THE PRACTICAL:

- Read this practical sheet fully before starting.
- Make sure you have completed previous practicals.

ACTIVITY 1: SHELL SORT

Return to your code from Practical 2. Using the lecture notes, or other online resources, find the algorithm for shell sort and add it to Sorts.java and SortsTestHarness.java.
Using the script run.sh, assess where shell sort fits compared to other sorting algorithms in terms of performance?

ACTIVITY 2: COUNTING SORT

Working with the lecture notes and online resources, add counting sort to Sorts.java. Note that you may have to change the input data to have the repetition and smaller range of values to suit this sort.

What are the benefits of counting sort, and what negatives does it have?

ACTIVITY 3: RADIX LSD SORT

Working with the lecture notes and online resources, add the Radix LSD sort to Sorts.java. You should use your Counting sort implementation

Using the script run.sh, assess where Radix sort fits compared to other sorting algorithms in terms of performance? How is it impacted by choice of base?

ACTIVITY 4: JAVA COLLECTIONS QUEUE

Using your code from previous practicals, substitute a Java collections-based ~~stack~~ queue for the DSAQueue. Test it using your Queue test harness.

ACTIVITY 5: JAVA COLLECTIONS HASH TABLE

Using your code from the Hash Table practical, substitute a Java collections-based HashMap for the DSAHashTable. Test it using your Hash Table test harness.

SUBMISSION DELIVERABLE:

Your UML and completed java classes and related files are due before the beginning of your next tutorial.

SUBMIT ELECTRONICALLY VIA BLACKBOARD, under the *Assessments* section.

MARKING GUIDE

Your submission will be marked as follows:

- [2] UML for all implemented classes. Include the methods (excluding basic getters and setters).
- [2] Shell sort implemented and tested.
- [2] Counting sort implemented and tested.
- [2] Radix LSD sort implemented and tested.
- [2] Queue implemented through Java Collections, and tested.
- [2] Hash table (map) implemented through Java Collections, and tested.