Hacettepe University

Computer Engineering Department



BBM 204

1. Homework Report

Zekeriya Onur Yakışkan

21527539

**Problem Definition**

In this homework, we are supposed to implement three diffrent sorting algorithms and test their running time on diffrent length of data . The data has lengths of 100, 1.000, 50.000 100.000 and 250.000. I have implemented insertion sort, qıick sort and heap sort.

Algorithms we choose works on a real dataset that contains information about traffic flows. Each flow has 84 diffrent features. Data is given as a csv file. Each row in csv file represents an element. Each column represents a feature. First row contains variable names. After first row, each row represents an element.

Algorithms sorts data with respect to one feature that has to be specified as an argument. Also data file has to be specified as an argument. Another argument which can be "T" or "F" has to be written. T means save the file and F means dont do anything at all.

Starting program: java assignment1 <dataset path> <feature index> <save T/F>

**Findings**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Algorithm & Data Set | TrafficFlow100.csv | TrafficFlow1000.csv | TrafficFlow50000.csv | TrafficFlow100000.csv | TrafficFlowAll.csv |
| **Insertion Sort** | 0 | 10 | 1571 | 26634 | 171083 |
| **Quic Sort(3-way)** | 1 | 4 | 36 | 62 | 112 |
| **Heap Sort** | 1 | 2 | 28 | 69 | 106 |

\*Time is shown as milliseconds.

**Discussion**

For All three algorithms, needed extra space is constant.

Insertion Sort: Time complexity for worst and average case O(n) = . Best case is O(n) = n. If data is nearly sorted, its complexity is O(n).

Quick Sort: Time complexity for worst case O(n) = . Best and average case O(n) = .

Heap Sort: Time complexity for best, average and worst case O(n) = .