// Kulthum Lakha

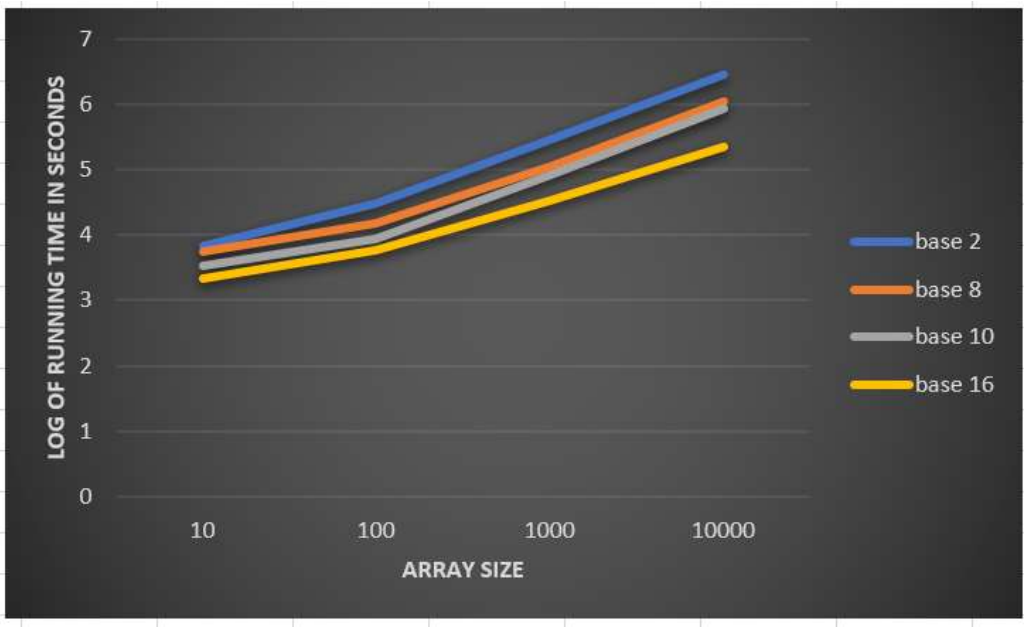
// kyl0029

Data

Following time averages in nano-seconds show how Radix sort operates on different sized arrays using different bases.

Array Size/ Base	2	8	10	16
10	6651	5560	3335	2115
100	30045	15339	8823	5720
1000	284282	108018	83017	33190
10000	2839882	1062977	835872	225868

Graph



Abstract

As the base used gets bigger, time taken for radix sort gets smaller.

Best being base 16, then base 10, then base 8, and lastly, base 2.

Explanation:

Each key is visited once for each digit of the longest key. Therefore, if the longest key has d digits and there are k keys, radix sort has order O(dk).

However, the number of digits in each key depends on the base.

Radix Sort takes O(d*(n+b)) time where b is the base for representing numbers and d is the O(logb(k)).

Time complexity = O((n+b) * logb(k))

As b approaches n, the algorithm for radix sort becomes linear O(n) and the number of digits in a key becomes insignificant.