CSE 564 Algorithms

Program 8

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All times are in nanoseconds

We searched the file “tale.txt” for three different sizes - a small size, a large size and a “long” size using the different search algorithms.

[0] - "it was the dover"
[1] - "i am doubtful said"
[2] - "Nishil is nice person"

smallBruteForce
[354, 148, 126]

smallKnuthMorrisPratt
[476, 319, 353]

smallBoyerMoore
[98, 91, 91]

smallRabinKarp
[96, 78, 80]

[0] - "it is a far far better thing that i do than i have ever done"
[1] - "to take care of him there were no other passengers that night but"
[2] - "we have been to your residence said the first and not being so"

largeBruteForce
[31, 31, 31]

largeKnuthMoririsPratt
[247, 298, 323]

largeBoyerMoore
[31, 29, 29]

largeRabinKarp
[30, 25, 25]

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[0] - "less horrible sentencehad there been a chance of any one of its "+
                                "savage details being sparedby just so much would he have lost in " +
                                "his fascination  the form that was to be doomed to be so shamefully "
+
                                "mangled was the sight the immortal creature that was to be so " +
                                "butchered and torn asunder yielded the sensation  whatever gloss";


[1] - "i think he whispered to miss pross after anxious consideration " +
                                "i think we had best not speak to him just now or at all disturb him " +
                                "i must look in at tellsons so i will go there at once and come back " +
                                "presently  then we will take him a ride into the country and dine " +
                                "there and all will be well";


[2] - "light of his  i see the blots i threw upon it faded away  i see " +
                                "him foremost of just judges and honoured men bringing a boy of my "
+
                                "name with a forehead that i know and golden hair to this place " +
                                "then fair to look upon with not a trace of this days disfigurement " +
                                "and i hear him tell the child my story with a tender and a faltering";


longBruteForce
[35, 35, 35]

longKnuthMoririsPratt
[1317, 1223, 1349]

longBoyerMoore
[37, 37, 37]

longRabinKarp
[24, 24, 24]
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Summary of results

	Brute Force	KnuthMorrisPratt	BoyerMoore	RabinKarp
Small string 1	354	476	98	96
Small string 2	148	319	91	78
Small String 3	126	353	99	803
Large String 1	31	247	31	30
Large String 2	31	298	29	25
Large String 3	31	323	29	253
Long String (XLarge) 1	35	1317	37	24
Long String (XLarge) 2	35	1223	37	24
Long String (XLarge) 3	35	1349	37	24

As we can see from above, the algorithms behave differently for different sizes of strings.

The big trend here is that the search time for a very small pattern is the highest. The search time for a long pattern is less than that for a very small pattern. However, the search time increases again as the pattern becomes X Large.

Brute Force: The expected performance is 1.1N. Here we see that between the large and the very large string, the time goes up marginally. This is what is expected in theory.

Kunth Morris Pratt: The expected performance is 1.1N. Here we see that between the large and the very large string, the time goes up marginally. This is what is expected in theory.

Boyer Moore: The expected performance is N/M. We see that initially the time goes down as the pattern size increases between small and large patterns. However, the time increases between the large pattern and the X large pattern. This is contrary to what we expect.

Rabin Karp: The expected performance is 7N. The performance is not in line with theory.