IT251 Assignment-7

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TOPIC: KMP AND RABIN KARP ALGORITHM

DESCRIPTION:

- The program can be executed by passing two extra arguments to ./a.out , first is problem number (either 1/2), second is input text file name, for eg. "input.txt"

- The program implements KMP or Rabin Karp pattern matching algorithms based on the command line inputs given while executing the program.

- **Time Complexity**

  1. KMP Algorithm: For each text, as we iterate through it only once and once through the pattern to compute the prefix array **pi**, the time complexity is $O(p+t)$ where 'p' is pattern length and 't' is text length. For 'n' such texts the time complexity is **O(p+nt)** i.e., Time complexity of the whole program for KMP.

  2. Rabin Karp Algorithm: For each text the worst case time complexity will be $O(tp+p)$ when all strings of length p in text T have the same hash value with that of the pattern. Hence, for 'n' such texts, the time complexity will be **O(tnp+p)** i.e., Time complexity of the whole program for Rabin Karp.

OUTPUT SCREENSHOT:

Input: (For both KMP and Rabin Karp)

ATA

3

ATAGATACA

ATC

GATA

Output:

```
suyash@suyash-VirtualBox:~/Desktop/IT251/Lab8$ g++ 191IT109_Lab8.cpp
suyash@suyash-VirtualBox:~/Desktop/IT251/Lab8$ ./a.out 1 input.txt
0 4
Pattern not found
1
suyash@suyash-VirtualBox:~/Desktop/IT251/Lab8$ g++ 191IT109_Lab8.cpp
suyash@suyash-VirtualBox:~/Desktop/IT251/Lab8$ ./a.out 2 input.txt
0 4
Pattern not found
1
suyash@suyash-VirtualBox:~/Desktop/IT251/Lab8$
```

TAHNK YOU