

FEDERAL STATE AUTONOMOUS EDUCATIONAL INSTITUTION  
OF HIGHER EDUCATION  
ITMO UNIVERSITY

Report

on the practical task No. 8

Practical analysis of advanced algorithms

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# Goal

Implement and analyze the algorithms:

- Floyd-Warshall Algorithm
- Rabin Karp String Matching

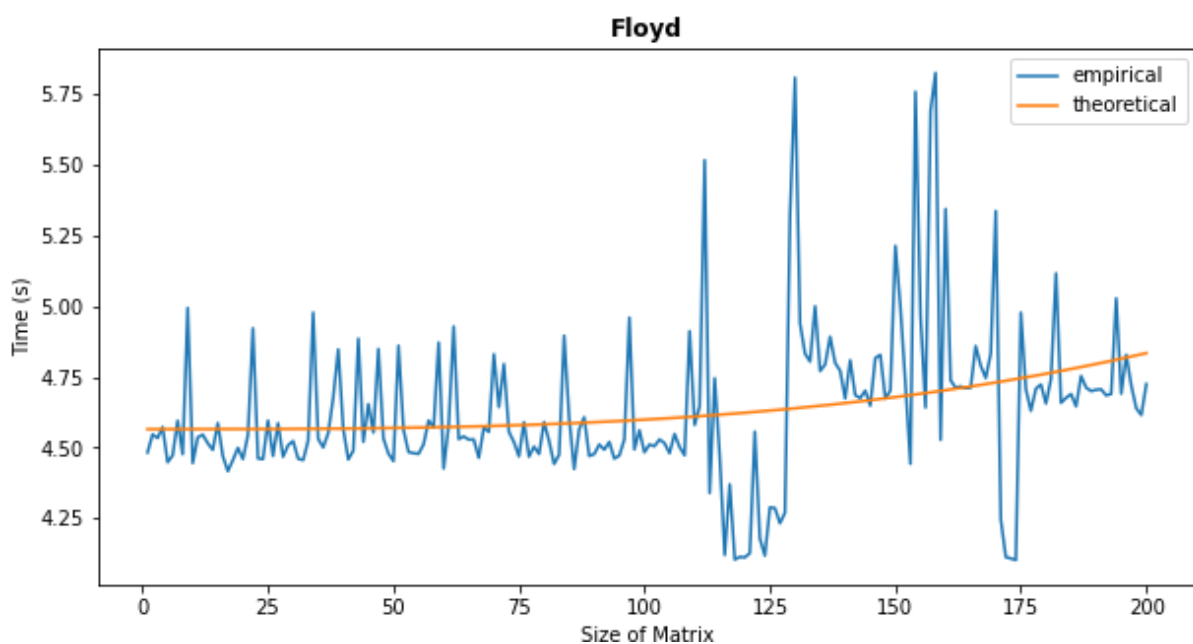
## Formulation of the problem[1]

**Floyd-Warshall Algorithm** is an algorithm for finding the shortest path between all the pairs of vertices in a weighted graph. This algorithm works for both the directed and undirected weighted graphs. But, it does not work for the graphs with negative cycles

**Rabin-Karp algorithm** is an algorithm used for searching/matching patterns in the text using a hash function. Unlike Naive string matching algorithm, it does not travel through every character in the initial phase rather it filters the characters that do not match and then performs the comparison.

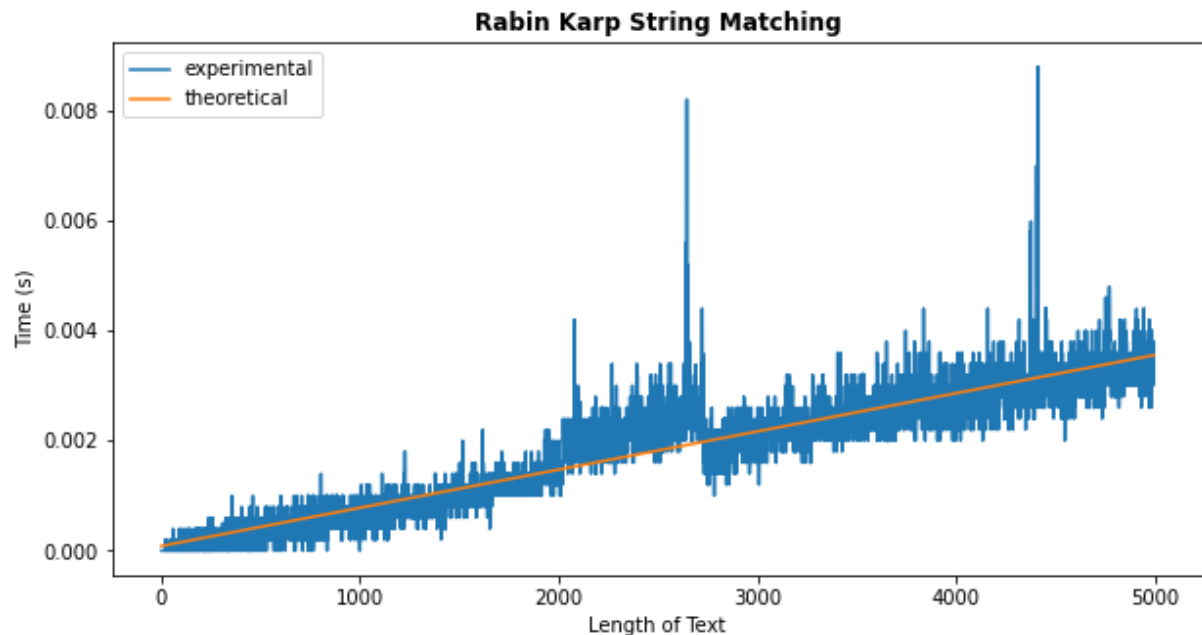
## Implementation

### Floyd-Warshall Algorithm



The time complexity of Floyd-Warshall Algorithm is  $O(n^3)$ , it has three loops. Each loop has constant complexities. Was impossible due machine performance make experiments with size of matrices in thousands, in that case the execution time took more than 5 hours and the machine run out of memory .

## Rabin-Karp algorithm



The implementation was issued using the pattern "science " in a text of 5000 characters comparing 5 iterations, in which the performance of the algorithm was good but not the best, demonstrating the advantage of not travel through every character in the initial phase, rather filtering the characters that do not match and then performing the comparison.

## Conclusions

- The complexity and time execution of Floyd-Warshall Algorithm make him not the best choice to work with graphs, A\* has a better performance
- Rabin-Karp algorithm offers quite good results in comparison task, due that can be used for many task in text processing, but is not the best in performance

# Bibliography

[1] Thomas H. Cormen Charles E. Leiserson Ronald L. Rivest Clifford Stein  
Introduction to Algorithms Third Edition, 2009.

[2] Floyd-Warshall Algorithm (2022),  
<https://www.programiz.com/dsa/rabin-karp-algorithm>

[3] Rabin-Karp Algorithm(2022), <https://www.programiz.com/dsa/rabin-karp-algorithm>