CE205 Data Structures Week-12

String Search Algorithms, Tries, Data Structures for Disjoint Sets

Author: Asst. Prof. Dr. Uğur CORUH

# CE205 Data Structures

# Week-12

### String Search Algorithms, Tries, Data Structures for Disjoint Sets

Download [DOC](ce205-week-12-string-algorithms.md_doc.pdf), [SLIDE](ce205-week-12-string-algorithms.md_slide.pdf), [PPTX](ce205-week-12-string-algorithms.md_slide.pptx)

### Outline

* Strings
  + Reverse Factor Algorithm (String Search)
    - Knuth-Morris-Pratt Algorithm
    - Horspool Algorithm
    - Boyer-Moore Algorithm
    - Brute-Force / Linear Text Search
    - DFA Text Search
  + Tries
    - Patricia Tree (Radix Tree)
  + Data Structures for Disjoint Sets
    - Disjoint-set operations
    - Linked-list representation of disjoint sets
    - Disjoint-set forests
    - Analysis of union by rank with path compression

### Strings - Reverse Factor Algorithm (String Search)

#### Knuth-Morris-Pratt Algorithm

* https://en.wikipedia.org/wiki/Knuth%E2%80%93Morris%E2%80%93Pratt\_algorithm
* https://www.geeksforgeeks.org/kmp-algorithm-for-pattern-searching/
* https://www.javatpoint.com/daa-knuth-morris-pratt-algorithm
* https://www.educative.io/answers/what-is-the-knuth-morris-pratt-algorithm
* http://www.btechsmartclass.com/data\_structures/knuth-morris-pratt-algorithm.html
* https://www-igm.univ-mlv.fr/~lecroq/string/node32.html#SECTION00320
* https://algs4.cs.princeton.edu/lectures/keynote/53SubstringSearch.pdf

### Strings - Reverse Factor Algorithm (String Search)

#### Horspool Algorithm

* https://en.wikipedia.org/wiki/Boyer%E2%80%93Moore%E2%80%93Horspool\_algorithm
* https://www.inf.hs-flensburg.de/lang/algorithmen/pattern/horsen.htm
* https://www-igm.univ-mlv.fr/~lecroq/string/node18.html

### Strings - Reverse Factor Algorithm (String Search)

#### Boyer-Moore Algorithm

* https://en.wikipedia.org/wiki/Boyer%E2%80%93Moore\_string-search\_algorithm
* https://www.geeksforgeeks.org/boyer-moore-algorithm-for-pattern-searching/?ref=gcse

### Strings - Reverse Factor Algorithm (String Search)

#### Brute-Force / Linear Text Search

* https://algs4.cs.princeton.edu/lectures/keynote/53SubstringSearch.pdf

### Strings - Reverse Factor Algorithm (String Search)

#### DFA (deterministic finite automaton) Text Search

* https://www.geeksforgeeks.org/finite-automata-algorithm-for-pattern-searching/

### Tries

#### Patricia Tree (Radix Tree)

* https://en.wikipedia.org/wiki/Radix\_tree
* http://www.btechsmartclass.com/data\_structures/tries.html
* https://www.geeksforgeeks.org/implementing-patricia-trie-in-java/

### Data Structures for Disjoint Sets

* https://ucoruh.github.io/ce100-algorithms-and-programming-II/week-10/ce100-week-10-graphs/?h=disjoint#disjoint-set-operations
* Disjoint-set operations
* Linked-list representation of disjoint sets
* Disjoint-set forests
* Analysis of union by rank with path compression
* https://www.geeksforgeeks.org/disjoint-set-data-structures/
* https://www.javatpoint.com/disjoint-set-data-structure