

CE205 Data Structures

Week-11

String Data Structures

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Outline

- Strings
 - Longest common subsequence problem
 - Longest increasing subsequence
 - Hunt–Szymanski algorithm (Hunt Macllory)
 - Levenshtein distance
 - Wagner–Fischer algorithm
 - String Alignment
 - Needleman Wunsch
 - Smith Waterman
 - Hunt Macllory
 - String Tokenizer
 - String Comparison

Strings

- <https://www.geeksforgeeks.org/string-data-structure/>

Longest common subsequence problem

- <https://ucoruh.github.io/ce100-algorithms-and-programming-II/week-6/ce100-week-6-lcs/?h=lcs#problem-3-longest-common-subsequence>
- <https://www.geeksforgeeks.org/longest-common-subsequence-dp-4/>
- <https://www.programiz.com/dsa/longest-common-subsequence>

Longest common subsequence problem

Longest increasing subsequence

- [https://www.geeksforgeeks.org/longest-increasing-subsequence-dp-3/#:~:text=The Longest Increasing Subsequence \(LIS\) problem is to find the,50%2C60%2C 80}](https://www.geeksforgeeks.org/longest-increasing-subsequence-dp-3/#:~:text=The Longest Increasing Subsequence (LIS) problem is to find the,50%2C60%2C 80}.).
- https://cp-algorithms.com/sequences/longest_increasing_subsequence.html

Longest common subsequence problem

Hunt–Szymanski algorithm (Hunt Macllory)

- https://en.wikipedia.org/wiki/Hunt–Szymanski_algorithm
- <https://www.geeksforgeeks.org/python-program-for-longest-common-subsequence/?ref=gcse>
- <https://imada.sdu.dk/~rolf/Edu/DM823/E16/HuntSzymanski.pdf>
- <https://github.com/LetsTrie/Code-Library-Of-Others/blob/master/sgtlaugh/Hunt-Szymanski.cpp>

Longest common subsequence problem

Levenshtein distance

- https://en.wikipedia.org/wiki/Levenshtein_distance
- <https://www.geeksforgeeks.org/java-program-to-implement-levenshtein-distance-computing-algorithm/?ref=gcse>
- <https://medium.com/@ethannam/understanding-the-levenshtein-distance-equation-for-beginners-c4285a5604f0>
- <https://www.educative.io/answers/the-levenshtein-distance-algorithm>

Longest common subsequence problem

Wagner–Fischer algorithm

- https://en.wikipedia.org/wiki/Wagner–Fischer_algorithm
- <https://www.geeksforgeeks.org/java-program-to-implement-wagner-and-fisher-algorithm-for-online-string-matching/>

String Alignment

- <https://www.geeksforgeeks.org/sequence-alignment-problem/?ref=gcse>

String Alignment

Needleman Wunsch

- https://en.wikipedia.org/wiki/Needleman–Wunsch_algorithm
- <https://www.geeksforgeeks.org/sequence-alignment-problem/?ref=gcse>
- <https://berthub.eu/nwunsch/>
- <http://experiments.mostafa.io/public/needleman-wunsch/index.html>
- <https://zhanggroup.org/NW-align/>

String Alignment

Smith Waterman

- https://en.wikipedia.org/wiki/Smith–Waterman_algorithm
- <http://jaligner.sourceforge.net/>
- <http://baba.sourceforge.net/>
- <https://doc.ugene.net/wiki/display/UUOUM15/Smith-Waterman+Search>
- <https://www.ebi.ac.uk/Tools/sss/fasta/>

String Alignment

Hunt Maclory

- https://en.wikipedia.org/wiki/Hunt-Szymanski_algorithm
- <https://www.geeksforgeeks.org/python-program-for-longest-common-subsequence/?ref=gcse>
- <https://imada.sdu.dk/~rolf/Edu/DM823/E16/HuntSzymanski.pdf>
- <https://github.com/LetsTrie/Code-Library-Of-Others/blob/master/sgtlaugh/Hunt-Szymanski.cpp>

String Tokenizer

- <https://towardsdatascience.com/tokenization-algorithms-explained-e25d5f4322ac>
- <https://www.oreilly.com/library/view/applied-natural-language/9781492062561/ch04.html>
- <https://www.geeksforgeeks.org/nlp-how-tokenizing-text-sentence-words-works/?ref=gcse>
- <https://github.com/frohoff/jdk8u-dev-jdk/blob/master/src/share/classes/java/util/StringTokenizer.java>

String Comparison

- https://en.wikipedia.org/wiki/String-searching_algorithm
- <https://www.geeksforgeeks.org/compare-two-strings-in-java/>
- <https://www.geeksforgeeks.org/comparing-two-strings-cpp/>

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