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Shortest common supersequence problem

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In [computer science](#), the **shortest common supersequence problem** is a problem closely related to the [longest common subsequence problem](#). Given two sequences $X = \langle x_1, \dots, x_m \rangle$ and $Y = \langle y_1, \dots, y_n \rangle$, a sequence $U = \langle u_1, \dots, u_k \rangle$ is a common supersequence of X and Y if U is a supersequence of both X and Y . In other words, a shortest common supersequence of strings x and y is a shortest string z such that both x and y are [subsequences](#) of z .

A shortest common supersequence (scs) is a common supersequence of minimal length. In the shortest common supersequence problem, the two sequences X and Y are given and the task is to find a shortest possible common supersequence of these sequences. In general, an scs is not unique.

For two input sequences, an scs can be formed from a longest common subsequence (lcs) easily. For example, if $X[1..m] = \text{abcb\dab}$ and $Y[1..n] = \text{bdcaba}$, the lcs is $Z[1..r] = \text{bcba}$. By inserting the non-lcs symbols while preserving the symbol order, we get the scs: $U[1..t] = \text{abdcab\dab}$.

It is quite clear that $r + t = m + n$ for two input sequences. However, for three or more input sequences this does not hold. Note also, that the lcs and the scs problems are not [dual problems](#).

For the more general problem of finding a string, S which is a superstring of a set of strings S_1, S_2, \dots, S_l , the problem is NP-Complete.^[1] Also, good approximations can be found for the average case but not for the worst case.^{[2][3]}

References [\[edit\]](#)

- ↑ Kari-Jouko R  ih  , Esko Ukkonen (1981). "The shortest common supersequence problem over binary alphabet is NP-complete" [↗](#). *Theoretical Computer Science* **16** (2): 187–198. doi:10.1016/0304-3975(81)90075-x [↗](#).
- ↑ Tao Jiang and Ming Li (1994). "On the Approximation of Shortest Common Supersequences and Longest Common Subsequences" [↗](#). *SIAM Journal on Computing* **24** (5): 1122–1139. doi:10.1137/s009753979223842x [↗](#).
- ↑ Marek Karpinski and Richard Sch  mied (2013). "On Improved Inapproximability Results for the Shortest Superstring and Related Problems" [↗](#). *Proceedings of 19th CATS CRPIT* **141**: 27–36.
- Garey, Michael R.; Johnson, David S. (1979). *Computers and Intractability: A Guide to the Theory of NP-Completeness*. W.H. Freeman. p. 228 A4.2: SR8. ISBN 0-7167-1045-5. Zbl 0411.68039 [↗](#).
- Szpankowski, Wojciech (2001). *Average case analysis of algorithms on sequences*. Wiley-Interscience Series in Discrete Mathematics and Optimization. With a foreword by Philippe Flajolet. Chichester: Wiley. ISBN 0-471-24063-X. Zbl 0968.68205 [↗](#).

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