**Depth-first search** (**DFS**) is an [algorithm](https://en.m.wikipedia.org/wiki/Algorithm) for traversing or searching [tree](https://en.m.wikipedia.org/wiki/Tree_data_structure) or [graph](https://en.m.wikipedia.org/wiki/Graph_(data_structure)) data structures. One starts at the [root](https://en.m.wikipedia.org/wiki/Tree_(data_structure)#Terminology) (selecting some arbitrary node as the root in the case of a graph) and explores as far as possible along each branch before [backtracking](https://en.m.wikipedia.org/wiki/Backtracking).

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| --- | --- |
| **Depth-first search** | |
| [Order in which the nodes get expanded](https://en.m.wikipedia.org/wiki/File:Depth-first-tree.svg)  Order in which the nodes are visited | |
| **Class** | [Search algorithm](https://en.m.wikipedia.org/wiki/Search_algorithm) |
| **Data structure** | [Graph](https://en.m.wikipedia.org/wiki/Graph_(data_structure)) |
| [**Worst-case performance**](https://en.m.wikipedia.org/wiki/Best,_worst_and_average_case) | {\displaystyle O(|V|+|E|)} for explicit graphs traversed without repetition, {\displaystyle O(b^{d})} for implicit graphs with branching factor *b* searched to depth *d* |
| [**Worst-case space complexity**](https://en.m.wikipedia.org/wiki/Best,_worst_and_average_case) | {\displaystyle O(|V|)} if entire graph is traversed without repetition, O(longest path length searched) = {\displaystyle O(bd)}for implicit graphs without elimination of duplicate nodes |