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> Non-Deterministic Algorithm

Non-Deterministic Algorithm



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Editor

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What Does Non-Deterministic Algorithm Mean?

A non-deterministic algorithm can provide different outputs for the same input on different executions. Unlike a deterministic algorithm which produces only a single output for the same input even on different runs, a non-deterministic algorithm travels in various routes to arrive at the different outcomes.

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Non-deterministic algorithms are useful for finding approximate solutions, when an exact



Techopedia Explains Non-Deterministic Algorithm

One example of a non-deterministic algorithm is the execution of concurrent algorithms with race conditions, which can exhibit different outputs on different runs. Unlike a deterministic algorithm which travels a single path from input to output, a non-deterministic algorithm can take many paths, with some arriving at the same outputs, and others arriving at different outputs. This feature is mathematically used in non-deterministic computation models like non-deterministic finite automaton.

A non-deterministic algorithm is capable of execution on a deterministic computer which has an unlimited number of parallel processors. A non-deterministic algorithm usually has two phases and output steps. The first phase is the guessing phase, which makes use of arbitrary characters to run the problem.

The second phase is the verifying phase, which returns true or false for the chosen string. There are many problems which can be conceptualized with help of non-deterministic algorithms including the unresolved problem of P vs NP in computing theory.

Non-deterministic algorithms are used in solving problems which allow multiple outcomes. Every outcome the non-deterministic algorithm produces is valid, regardless of the choices made by the algorithm during execution.

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