

Project Development phase

Utilization of algorithms,Dynamic programming,Optimal memory utilization

Date	3 November 2023
Team ID	NM2023TMID02112
Project Name	Food Tracking System
Maximum Marks	4 Marks

Utilization of algorithms:

Algorithms are used to find the best possible way to solve a problem, based on data storage, sorting and processing, and machine learning. In doing so, they improve the efficiency of a program. Algorithms are used in all areas of computing.

Advantages of Algorithms:

- It is easy to understand.
- An algorithm is a step-wise representation of a solution to a given problem.
- In an Algorithm the problem is broken down into smaller pieces or steps hence, it is easier for the programmer to convert it into an actual program.

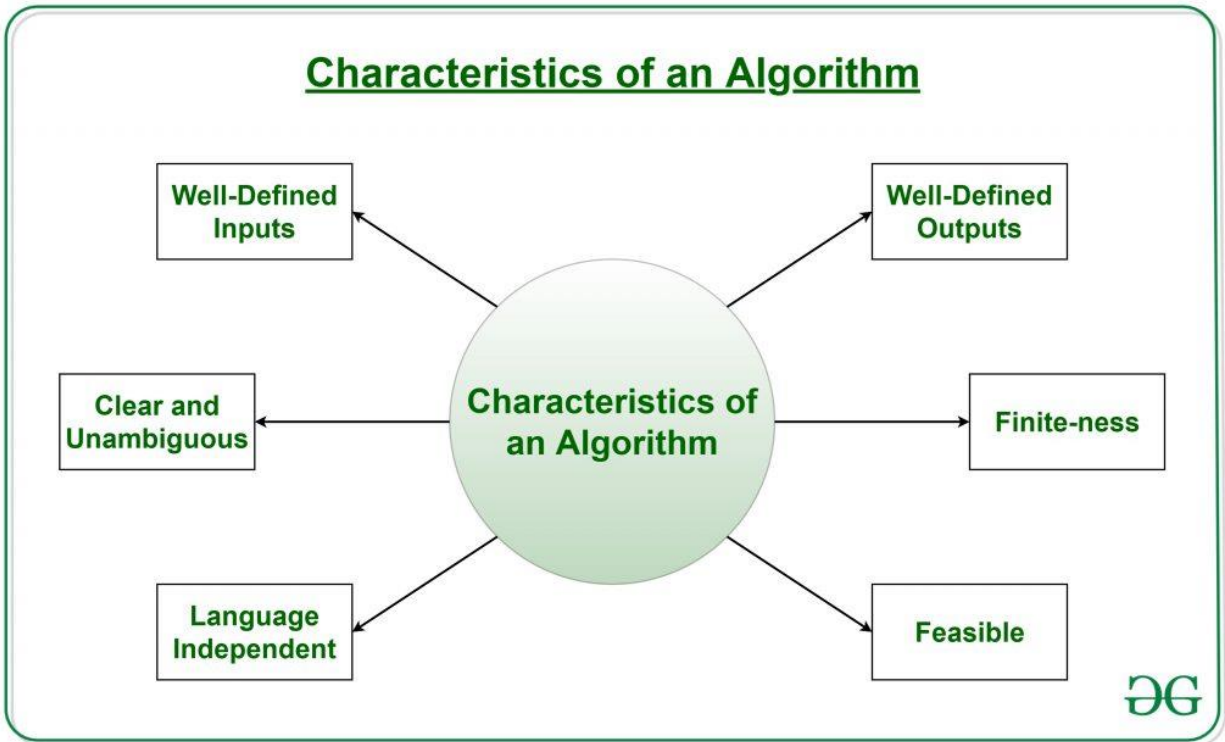
Limitations of algorithms

There are two categories of problems that an algorithm cannot solve. **Undecidable Problems.** These problems are the theoretically impossible to solve — by any algorithm. The halting problem is a decision problem (with a yes or no answer) that is undecidable.

What are the major elements of an algorithm?

The basic elements of an algorithm

- Sequence - the order in which behaviors and commands are combined in a project in order to produce a desired result.
- Selection - is the use of conditional statements in a project.



Dynamic programming:

The algorithm employs a dynamic programming approach by maintaining tables that store the shortest distances between airports. It iteratively updates these tables until the shortest paths for all pairs are determined.



Dynamic Programming in Action:

Enter dynamic programming. Airlines leverage dynamic programming algorithms, such as the Floyd-Warshall algorithm, to meticulously map out the most efficient routes within their extensive network of airports and destinations. Here's a breakdown of how this process unfolds:

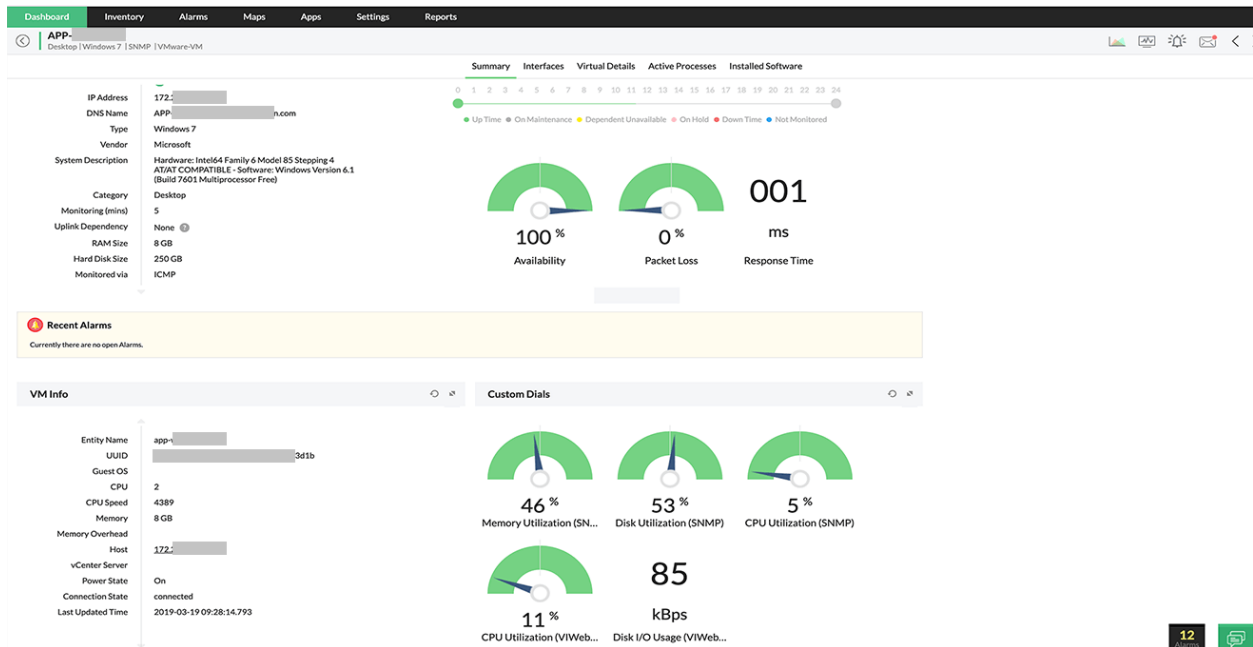
1. **Network Representation:** Airlines construct a graph representation of their flight network, where airports are nodes, and the routes connecting them are edges. Each edge is assigned a weight, which typically represents factors like distance, air traffic, and prevailing weather conditions.
2. **Shortest Path Calculation:** The Floyd-Warshall algorithm takes this graph and systematically calculates the shortest path between every pair of airports within the network. Unlike other shortest path algorithms like Dijkstra's, which find the shortest path from a single source to all destinations, the Floyd-Warshall algorithm considers all pairs of airports simultaneously.
3. **Dynamic Programming Tables:** The algorithm employs a dynamic programming approach by maintaining tables that store the shortest distances between airports. It iteratively updates these tables until the shortest paths for all pairs are determined. This method minimizes redundant calculations, enhancing computational efficiency.

Optimal memory utilization:

Good memory utilization

On average, your RAM usage should be 50% or lower with nothing open at all. With an internet browser open with a few tabs, about 75% RAM usage is normal. When gaming, it's not uncommon to see RAM usage max out at 100%. Ideally RAM usage should be as high as possible.

The percentage is nothing but the total memory used vs the installed memory. For example if you have 32gb installed memory and you are using 16gb then it is 50% usage.



How much memory usage is normal for 8GB RAM?

However, in general, it is considered normal for a computer with 8GB of RAM to use around 50-60% of its memory. This means that if your computer is using 6-7GB of memory, it is likely operating within normal parameters.