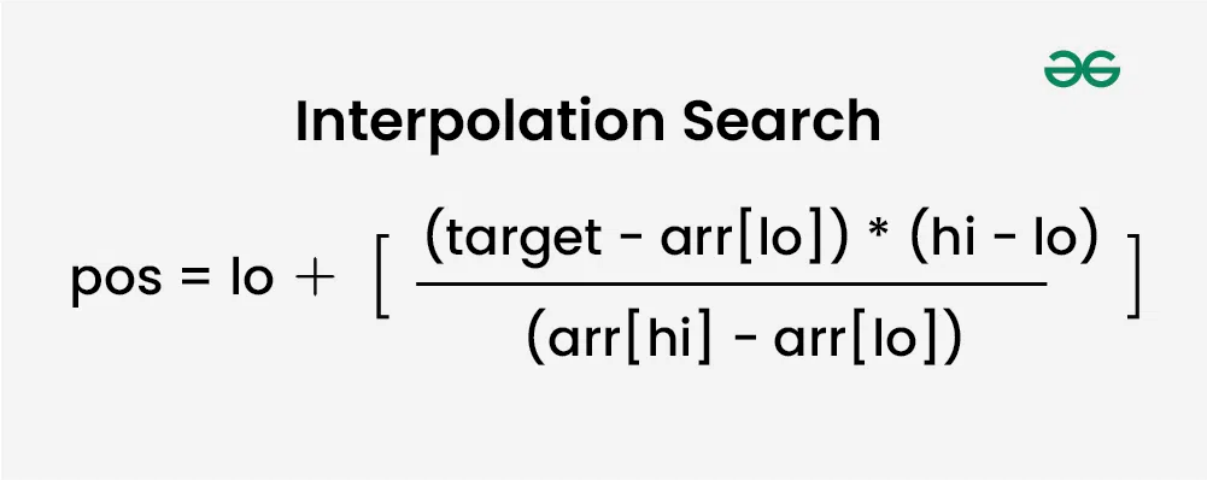
Interpolation Search

💡 Interpolation search is an improved variant of binary search. This search algorithm works on the probing position of the required value. For this algorithm to work properly, the data collection should be in a sorted form and equally distributed.

Interpolation search finds a particular item by computing the probe position. Initially, the probe position is the position of the middle most item of the collection.



If the middle item is greater than the item, then the probe position is again calculated in the sub-array to the right of the middle item. Otherwise, the item is searched in the sub-array to the left of the middle item. This process continues on the sub-array as well until the size of subarray reduces to zero.

Algorithm Steps

1. Start searching data from middle of the list.
2. If it is a match, return the index of the item, and exit.
3. If it is not a match, probe position.
4. Divide the list using probing formula and find the new middle.
5. If data is greater than middle, search in higher sub-list.
6. If data is smaller than middle, search in lower sub-list.
7. Repeat until match.

📌 Interpolation search can be implemented only on a sorted list of items. If the elements are not sorted already, we need to sort them first.

Pseudocode

```
A → Array list
N → Size of A
X → Target Value

Procedure Interpolation_Search()

   Set Lo → 0
```

```
   Set Mid → -1
   Set Hi → N-1

   While X does not match
      if Lo equals to Hi OR A[Lo] equals to A[Hi]
         EXIT: Failure, Target not found
      end if

      Set Mid = Lo + ((Hi - Lo) / (A[Hi] - A[Lo])) * (X - A
[Lo])

      if A[Mid] = X
         EXIT: Success, Target found at Mid
      else
         if A[Mid] < X
            Set Lo to Mid+1
         else if A[Mid] > X
            Set Hi to Mid-1
         end if
      end if
   End While
End Procedure
```

Analysis

- Best Case : O(1)
- Average Case : O**(log (log n))**
- Worst Case : O(n)

📌 Java implementation can be found under Implementation_Java folder

📚 References

Interpolation Search Algorithm

Interpolation Search Algorithm - Interpolation search is an improved variant of binary search. This search algorithm works on the probing position of the required value. For this

https://www.tutorialspoint.com/data_structures_algorithms/interpolation_search_algorithm.htm

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SerhatKumas - Overview

Computer engineering student who loves coding in different fields instead of focusing on a one spesific area. - SerhatKumas

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