

IT2153/IT2352/IT2553/IT2653/IT2852

Data Structures & Algorithms

Tutorial 03 Search

1. Given the following unsorted list of numbers:
   * [ 12, 19, 3, 13, 20, 5, 8, 16, 6, 15 ]

Using sequential search, how many comparisons would you need to perform in order to find the search key 8?

***7 comparisons.***

***The best case for sequential search is to find the number 12.***

***Worse case for sequential search is to find the number 15, or a number not found inside the list.***

1. Given the following sorted list of numbers:
   * [ 3, 6, 8, 10, 11, 15, 17, 18, 19, 20 ]

Using sequential search, how many comparisons would you need to perform in order to find the search key 12

1. ***Comparison. In the first comparison, it will compare 11 and 15. Since 12 is bigger than 11 and smaller than 15, it will stop the search and return “Not found” or “Null” value.***
2. Given the following list of numbers and their corresponding index position:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Index Position** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **List Elements** | 10 | 23 | 25 | 34 | 36 | 42 | 63 | 74 | 87 | 92 | 99 |

Use the table below to perform a binary search on the value **63**:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pass** | **Low Pointer Index Position**  **(mid + 1) if target > mid**  **(first index) if target < mid** | **Middle Pointer Index Position**  **(high + low) // 2**  **\*round down\*** | **High Pointer Index Position**  **(last index) if target > mid**  **(mid – 1) if target < mid** | **Found (Yes/No)** |
| 1 | ***0*** | ***5*** | ***10*** | ***NO*** |
| ***2*** | ***6*** | ***8*** | ***10*** | ***NO*** |
| ***3*** | ***6*** | ***6*** | ***7*** | ***YES*** |

1. Given the following list of numbers and their corresponding index position:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Index Position** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **List Elements** | 10 | 23 | 25 | 34 | 36 | 42 | 63 | 74 | 87 | 92 | 99 |

Use the table below to perform a binary search on the value 18:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pass** | **Low Pointer Index Position**  **(mid + 1) if target > mid**  **(first index) if target < mid** | **Middle Pointer Index Position**  **(high + low) // 2**  **\*round down\*** | **High Pointer Index Position**  **(last index) if target > mid**  **(mid – 1) if target < mid** | **Found (Yes/No)** |
| 1 | ***0*** | ***5*** | ***10*** | ***No*** |
| ***2*** | ***0*** | ***2*** | ***4*** | ***No*** |
| ***3*** | ***0*** | ***0*** | ***1*** | ***No*** |
| ***4*** | ***1*** | ***1*** | ***1*** | ***No*** |
| ***5*** | ***1*** |  | ***0*** | ***No*** |

***18 is not found in the list of elements.***

***-- End of Tutorial --***

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