**H**      🏠 Practice      🕐 Compete      💼 Jobs      🎖 Rank      🏆 Leaderboard              🔍                    💬  📢  👤 dragar

Dashboard  ❯  Algorithms  ❯  Dynamic Programming  ❯  The Longest Increasing Subsequence

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| **Badge Progress** ⭐ ⭐ ⭐ | **Points: 1227.07 Rank: 17240** |

# The Longest Increasing Subsequence

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👤 **by vkristijan**

| Problem | Submissions | Leaderboard | Discussions |
|---|---|---|---|

**An Introduction to the Longest Increasing Subsequence Problems**

The task is to find the length of the longest subsequence in a given array of integers such that all elements of the subsequence are sorted in ascending order. For example, the length of the LIS for { 15, 27, 14, 38, 26, 55, 46, 65, 85 } is 6 and the longest increasing subsequence is {15, 27, 38, 55, 65, 85}.

Here's a great Youtube video of a lecture from MIT's Open-Coursware, covering the topic.

Here is one approach which solves this in quadratic time using dynamic programming. A more efficient algorithm which solves the problem in N Log N time is available here.

Dynamic Programming #1: Longest Increasing Subseque...

▶

In this challenge you simply have to find the length of the longest strictly increasing sub-sequence of the given sequence.

**Input Format**

In the first line of input, there is a single number $N$.
In the next N lines input the value of $a[i]$.

**Constraints**
$1 \le N \le 10^6$
$1 \le a[i] \le 10^5$

**Output Format**

In a single line, output the length of the longest increasing sub-sequence.

**Sample Input**

```
5
2
7
4
3
8
```

## Sample Output

```
3
```

## Explanation

{2,7,8} is the longest increasing sub-sequence, hence the answer is 3 (the length of this sub-sequence).

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**Submissions:** 10390
**Max Score:** 60
**Difficulty:** Advanced

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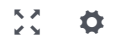Current Buffer (saved locally, editable)    ⑂  ⟳                          C++  ⌄      ⤢   ⚙

```cpp
1 ▾ #include <cmath>
2   #include <cstdio>
3   #include <vector>
4   #include <iostream>
5   #include <algorithm>
6   using namespace std;
7
8
9 ▾ int main() {
10      /* Enter your code here. Read input from STDIN. Print output to STDOUT */
11      return 0;
12  }
13
```

                                                                        Line: 1 Col: 1

⬆ Upload Code as File        ☐ Test against custom input              Run Code    Submit Code

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