ICPC Tutorial

Intro. to ICPC, Binary Search, DP, Graphs

Ankesh Gupta

Dept. of Computer Science and Engineering
Indian Institute of Technology, Delhi

Table of Contents

Table of Contents

(What is ICPC?)

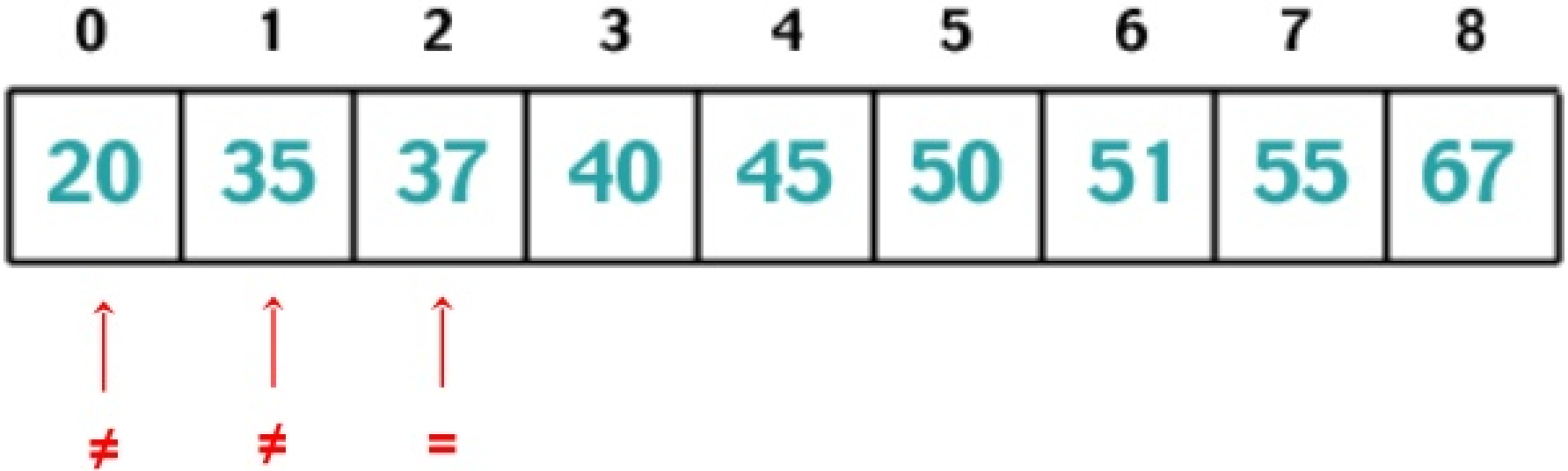
General introduction to competition logistics

Table of Contents

Why?

Linear Search

- Find 37?

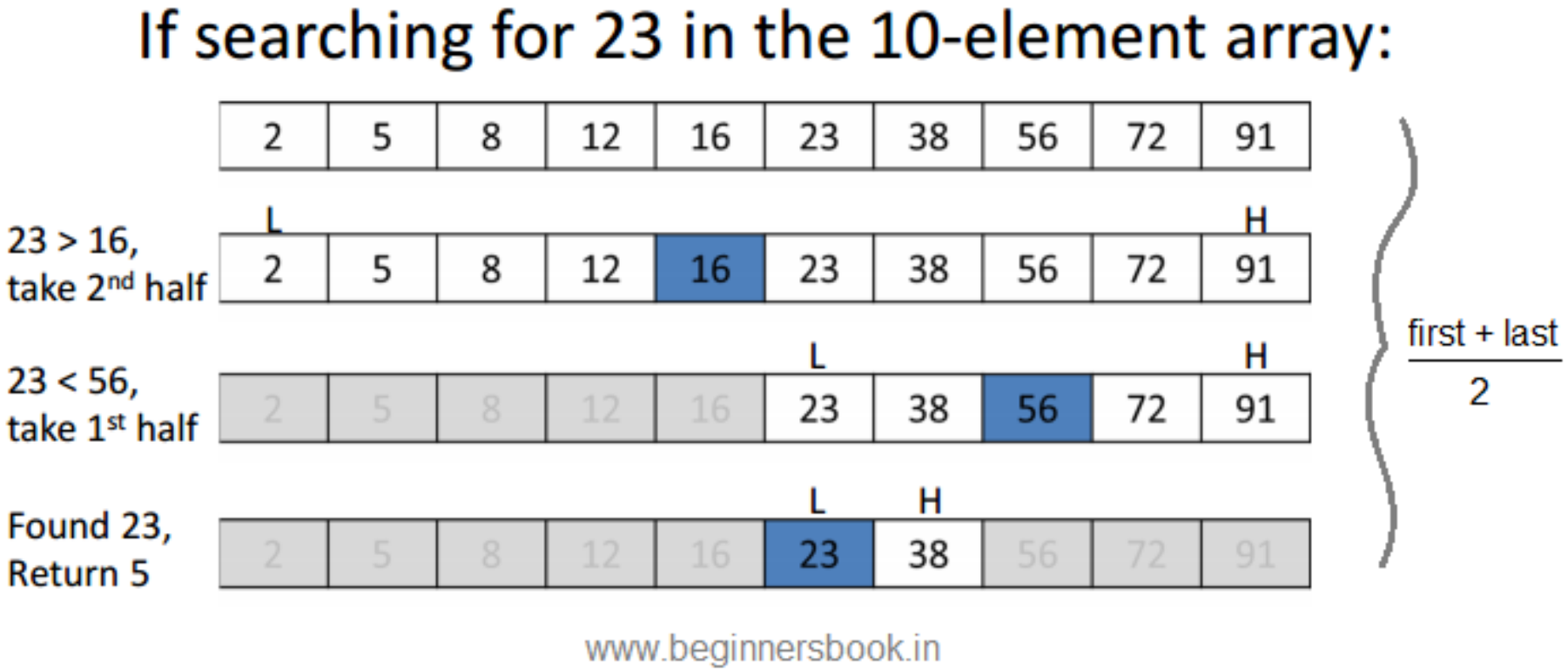


Analysing

(Complexity)

1. Complexity $\mathcal{O}(n)$
2. Can we exploit the structure of array?
3. Array is Partially Ordered!

Picture is worth a 1000 words!



(Complexity)

- Complexity is $\mathcal{O}(\log_2 n)$. Intuition how many times can a number be divided by k - $\mathcal{O}(\log_k n)$

Problems

(Trivial)

- Find largest element less than a given element
- Find smallest element greater than a given element

(Better)

- AGGRCOW - Aggressive cows
- C. Mike and Chocolate Thieves
- Many more - Hackerearth
- Advanced Concept: Ternary Searches,Parallel Binary Searches

Table of Contents

(Dynamic Programming a.k.a DP)

- Brief introduction
- Problem discussion
- Ideal Tutorial: Topcoder

(Comments)

- Advanced Topics: DP Optimizations
- Generally easy to code, tough to spot/figure-out state
- Can be coupled with any algorithm you know - general technique very useful in life: Discussion

Table of Contents

(Graphs)

- Most beautiful! personal favourite :)
- Brief introduction
- Problem discussion

(Comments)

- Very useful! Immense applications!
- Generally short codes and recursive thinking.
- Some must know trivia - Traversals, Shortest Paths Algorithms
- Many advanced topics: Bridges, Articulation Points, Strongly Connected Components(SCC), Heavy-Light Decomposition, Centroid Decomposition, 2-SAT and many-many more.

Table of Contents

Closing Remarks

- CP is an art!
- Don't force it upon. Give time.
- Don't rush to solution/editorials. Try once more! It's thinking that matters!
- Make a good team.
- Speed matters!
- Everything you need is online!
- Awesome community! Brilliant people!
- It helps knowing CP in interview. Helps arrive at efficient solutions quickly.

Thank You!

Questions?