Binary Search
+
Interactive Problems

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Binary Search

Binary search is a searching algorithm for a sorted collection of data.

It divides the range to search by half every iteration.

Time complexity: O(log n)

Takes ~20 iterations to search 10^6 elements

Binary Search Conditions

Binary search works on a set of elements where the "predicate" function applied on it is as follows:

$$T\ T\ T\ \ldots T\ T\ F\ F\ \ldots F\ F\ F$$

Binary search will move:

- L to mid when predicate is true.
- R to mid when predicate is false.

Binary Search Method

```
int l = min-1, r = max+1;
while (r-l > 1) {
    int m = (l + r) / 2;
    if (predicate(m))
        l = m;
    else
        r = m;
}

// l is the last true
// r is the first false
```

Interactive Problems:

In interactive problems, you get answers for your queries. Output a query, and an input will be given as the answer.

There will be a limit to the number of queries you can make.

Also note the format of the queries and use it properly.

Remove fastio and use endl (not ‘\n’) when solving interactive problems.

Problems:

- https://codeforces.com/contest/1621/problem/C
- https://codeforces.com/contest/1480/problem/C
- https://codeforces.com/contest/1486/problem/C2
- https://www.spoj.com/problems/AGGRCOW/

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