

UQCS Competitive Programming Group

Week 11



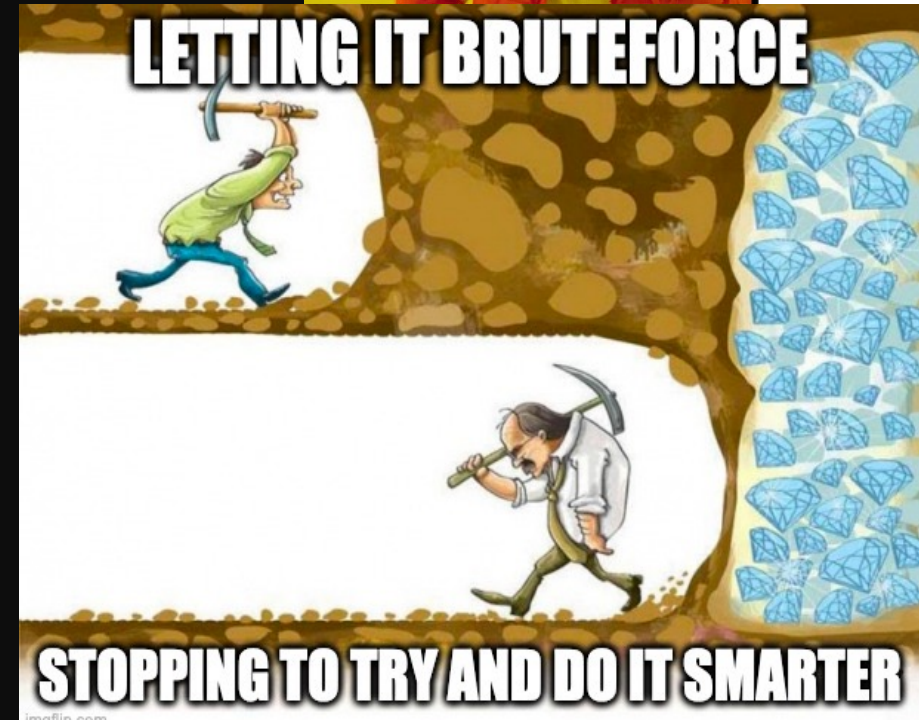
Today's topic: Brute Force



Let brute force
algorithm run for
30 mins to get
location



Spend 2h thinking
about a more
efficient algorithm



What is Brute Force?

- A brute force algorithm finds a solution by iterating through all possible combinations for the solution to a given problem.

*SIMPLY EXPLAINED:
BRUTE FORCE ATTACK*



Advantages of Brute Force Algorithms

- Brute force is usually straight forward and easy to understand.
- It is easy to implement.
- Guaranteed to find a correct solution, if they exist.

```
//I don't know what I did but it works
//Please don't modify it
private int square(int n)
{
    int k = 0;
    while (true)
    {
        if (k == n*n)
        {
            return k;
        }
        k++;
    }
}
```

Disadvantages of Brute Force Algorithms

- It can consume a lot of time and computational resources.
- Lack of scalability – as the input size increase, the time and resources required for solving the problem increases exponentially, sometimes even goes above $O(n!)$
- Not applicable for problems requiring quick or real-time responses.

My algorithms in online coding competitions



***ONLINE JUDGE:**



Example Where Brute Force is used

- Linear search – going through the entire array one by one to find an element.
- Password cracking – trying every combination for password until a solution is found.
- Solving a sudoku puzzle by trying every different ways of filling the unfilled part of a puzzle. (Dumb, but it gets the job done)



So, where can you use it in CPG?

- Advent of code:
 - sometimes it is faster to make a brute force algorithm that require 5 minutes to solve the problem than spending half an hour to code for an optimized solution.
- In fact, any CPG competition:
 - if it can solve the problem correctly and does not exceed the time limit.

If it works, it works

Thanks For Coming

References

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