



Competitive Programming

Lesson #1 (Introduction)!

Google Classroom Code: slwprdp





Competitive Programming Execs



Edison



Andrew

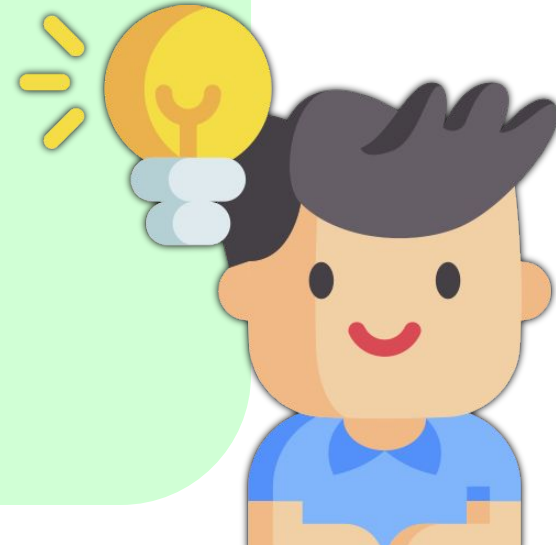


Why Competitive Programming?

- Improves programming skills (obviously)
- Helps develop problem solving skills
- Looks good for university 📖
- Helps give preview of what university CS will be like
- Fun!



Canadian Computing
Competition





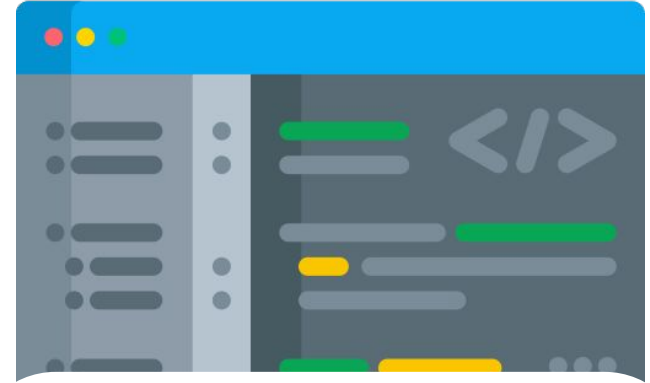
Pre-requisites

What should I know? 🤔

Needed:

- Input/output
- Data types
 - Int, long, float, double
 - String
 - Boolean
- Loops
- If statements

Recommended languages
(Python, java or C++)



Highly recommended

Arrays (🦆 Lists)
2D Arrays (🦆 2D Lists)
ArrayList (Vectors)
2D ArrayList (2D Vectors)
Using Functions



Plan for the year

- Data structures and algorithms
- CCC Prep (SAC Fee)
Due Date Oct 4
- Practice problems

**BUT
HOW?!**





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Online Judges

DMOJ

Leetcode
Codeforces





What is An Online Judge?



Library of problems.

Submit code to specific
problem.

Online judge compares each
test case to specific output.
(Code must print output correct exactly)

AC:

Correct Answer

WA:

Wrong Answer

TLE:

Time limit exceeded

MLE:

Memory limit exceeded



Let's Setup DMOJ!

- Search DMOJ account setup and enter information
- Select users
- Select organizations and join UHS!

The screenshot shows the DMOJ website's registration interface. At the top, there are input fields for 'Username', 'Email', and 'Password (7)'. Below these is a navigation bar with links for 'PROBLEMS', 'SUBMISSIONS', 'USERS' (which is highlighted in blue), 'CONTESTS', and 'ABOUT'. Under the 'USERS' section, there is a 'Timezone' dropdown menu set to 'Toronto'. Below the timezone, there are two buttons: 'Leaderboard' (with a group of people icon) and 'Organizations' (with a classical building icon). A search bar is located below these buttons. Further down, there is a checkbox labeled 'Notify me about upcoming contests' which is checked. At the bottom, there is a dark blue banner for 'Unionville H.S.' with a small 'CHA Terms' link. Below the banner, it says 'By registering, you agree to our Terms & Conditions.' followed by a blue 'Register!' button.

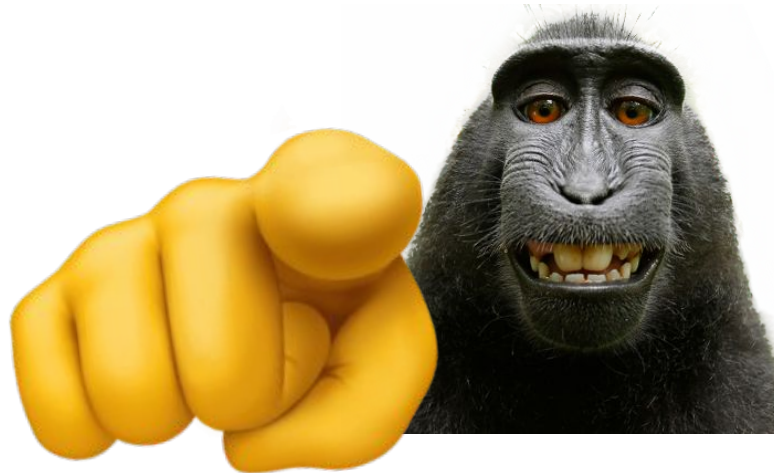


Tutorial Problem





TRY IT YOURSELF



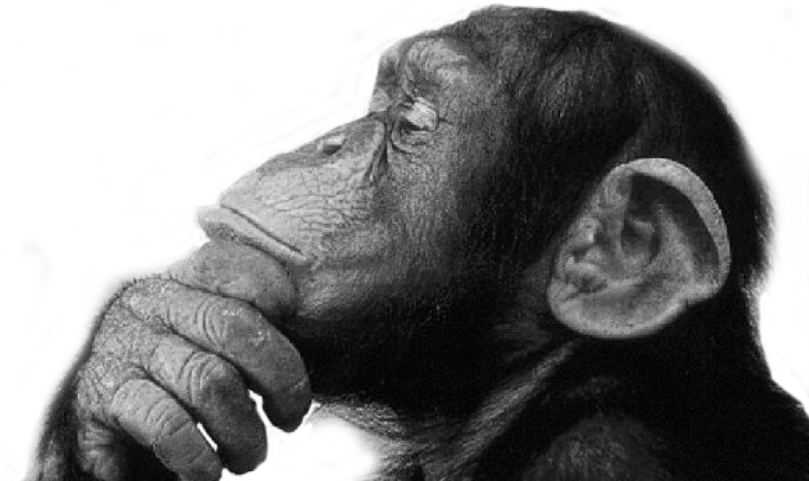


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CHALLENGE PROBLEM





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3

3

2

R 1

C 1

	1	2
3		
4		

Answer: 4



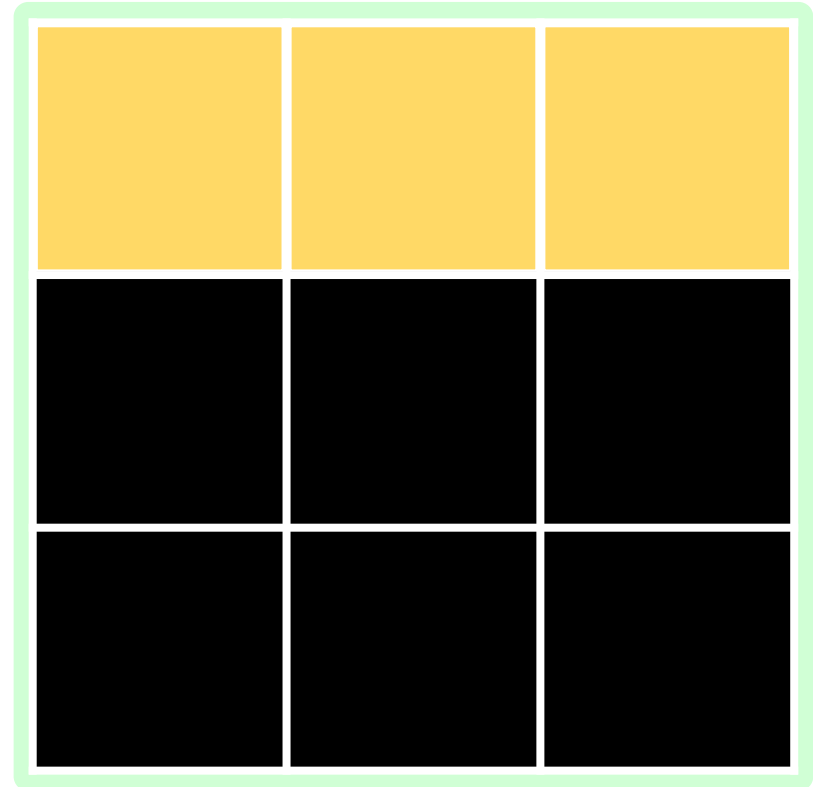
CAN IT BE FASTER?





Do we need
to update
cells every
operation?

NO! Only
parity
matters.





How can we use the found observation to improve our solution's speed?



Optimized Solution

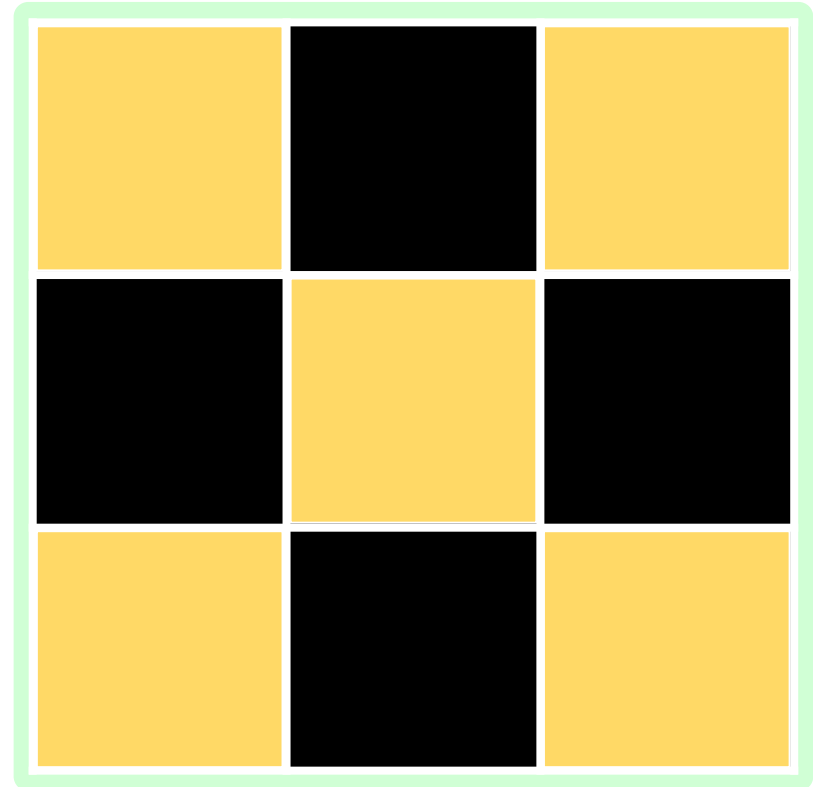
- Keep track of operations on each row and column.
- Loop through each cell and add the operations on its corresponding row and column.
- Even = Unchanged / Black
- Odd = Changed / Gold



Example:

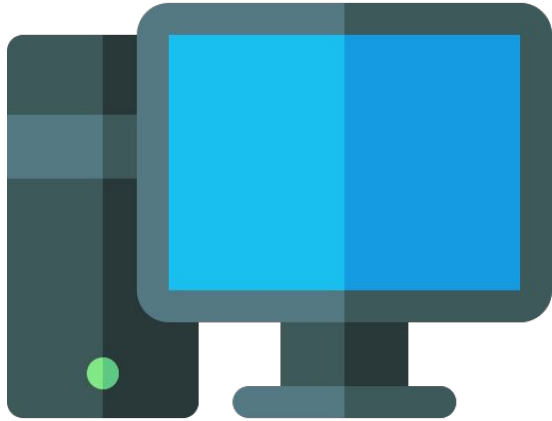
```
3      Row 1: 0
3      Row 2: 0
5      Row 3: 0
R 1    Column 1: 0
C 1    Column 2: 0
R 1    Column 3: 0
C 3
R 2
```

Answer: 5





Homework Practice



Easy
Medium
Hard
Hard





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Bye 🙌

Please Leave...

Instagram: **unionvillecs2024**

Discord: [QWBUScbMzz](#)

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