

# Introduction to the PT / C++ Programming

**Lesson #1** - 09/04/2025

TCHS Programming Team

# **Part 1: Introduction**

## Who am I?

- I'm currently a junior in high school
- Have been programming for close to 5 years
- Have done competitive programming for 2 years:
- Have attended Codequest, UCF, UF, etc.
- I also like electronics, Robotics, math, really anything stem

## Team History

- Have gotten top 10 at the UCF competition for the past 13 years.
- Have won twice (2022,2020) and gotten top 3 multiple times
- Have also gotten top 3 and won multiple times at LM Codequest, UF, FIU, ...

## Goals of these lessons and the team

- My personal goal is to get you guys addicted to enjoy competitive programming like I do, cause it pretty fun and can be pretty rewarding.
- We also want as a team to continue our competitive legacy, and I would really like you guys to get good at this and go and win some competitions.

## Lesson structure / Miscellaneous

- Two types of meetings:
  - Lessons
  - Practice days

## **Part 2: C++ Programming**

## Compiler and IDE

During lessons we will be using the following platform to write code:

<https://ide.usaco.guide>



# Speedrunning C++: Hello World

```
#include <bits/stdc++.h>
```

```
using namespace std;
```

```
int main(){  
    cout << "Hello World!" << endl;  
}
```

# Speedrunning C++: Variables

Variables consist of two things:

- Data type
- name

examples:

```
data_type name;
```

```
// can also "initialize" a variable with a value  
data_type name = value;
```

# Speedrunning C++: Variable examples:

```
#include <bits/stdc++.h>
using namespace std;

int main(){
    int some_number;
    int year = 2025;
    long long big_value = 1e18; //equivalent to 10^18
    double decimal_number = 5.67;
    string last_name = "foster";
    char random_letter = 'p';
    bool its_thursday = true;
}
```

# Speedrunning C++: Printing Values

```
#include <bits/stdc++.h>
```

```
using namespace std;
```

```
int main(){
```

```
    int year = 2025;
```

```
    cout << year << endl;
```

```
    // or
```

```
    cout << year;
```

```
    cout << endl;
```

```
}
```

```
// output(with either method): 2025
```

# Speedrunning C++: Input

```
#include <bits/stdc++.h>
using namespace std;

int main(){
    int year;
    // NOTE: pay attention to the direction of the arrows!

    // get input into year
    cin >> year;

    // output the year * 2
    cout << "twice the year is: " << year * 2 << endl;
}
// input: 2031
// output: twice the year is: 4062
```

# Speedrunning C++: Multiple Inputs

```
#include <bits/stdc++.h>
using namespace std;

int main(){
    int year;
    // can initialize variables of the same type by separating by commas
    int num1, num2, num3;

    // can be on the same line or on different lines
    cin >> num1 >> num2;
    cin >> num3;

    // outputs sum of all given nums
    cout << "sum of numbers is: " << num1 + num2 + num3 << endl;
}
// input: 20 40 3
// output: sum of numbers is: 63
```

# Speedrunning C++: if statements

```
if(condition){  
    // executes something  
else if(another_condition){  
    // executes if another condition  
}else{  
    // executes something else  
}
```

# Speedrunning C++: while/for loops

```
while(condition){  
    // do something  
}
```

// for example:

```
int i = 0;  
while(i < n){  
    // do something  
    i++;  
}
```

// in fact this is effectively a for loop



# Speedrunning C++: for loops

```
// made of three parts:  
//   defines variable  
//   defines the condition  
//   defines how the variable gets updated every iteration  
for(int i = 0; i < n; i++){  
    // do something  
}
```

## Speedrunning C++: practice

take the input of two numbers, then output their sum and their multiplication

example input:

10 8

example output:

18 80

## **Part 3: Programming Problems**

## First programming problems

This problem is from codeforces, google “codeforces 231A” and click on the first result to see it in your computer.

### Problem Statement

One day three best friends Petya, Vasya and Tonya decided to form a team and take part in programming contests. Participants are usually offered several problems during programming contests. Long before the start the friends decided that they will implement a problem if at least two of them are sure about the solution. Otherwise, the friends won't write the problem's solution.

This contest offers  $n$  problems to the participants. For each problem we know, which friend is sure about the solution. Help the friends find the number of problems for which they will write a solution. Input

## First programming problems (ii)

### Input

The first input line contains a single integer  $n$  ( $1 \leq n \leq 1000$ ) — the number of problems in the contest. Then  $n$  lines contain three integers each, each integer is either 0 or 1. If the first number in the line equals 1, then Petya is sure about the problem's solution, otherwise he isn't sure. The second number shows Vasya's view on the solution, the third number shows Tonya's view. The numbers on the lines are separated by spaces.

### Output

### Output

Print a single integer — the number of problems the friends will implement on the contest.

## First programming problems (iii)

example input:

3

1 1 0

1 1 1

1 0 0

example output:

2

# Solution

```
#include <bits/stdc++.h>
using namespace std;

int main(){
    int n; cin >> n;

    int implemented_problems = 0;

    for(int i = 0; i < n; i++){
        int a,b,c;
        cin >> a >> b >> c;
        if(a + b + c >= 2){
            implemented_problems++;
        }
    }
    cout << implemented_problems << endl;
}
```