

# C++ Programming

## Variables Homework

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# Homework 1: Math operations

- Write a program that reads 2 numbers and **print** their + - \* / as following
  - For inputs 12 and 3
- Do good testing for your code
  - E.g. consider zero as first or 2nd number
  - E.g. consider negative values
  - E.g. even and odd values
  - E.g. try the MAX of int: 2147483647

```
12 3
12 + 3 = 15
12 - 3 = 9
12 / 3 = 4
12 * 3 = 36
```

# Homework 2: Students grades

- Write a program that reads 2 students information about math exam
  - Read per student: name, id and grade
  - Then print them. See the picture
- Be a good software engineer
  - Think deeply in your selected data types
  - The teacher gives us this dialogue to guide us
  - Be careful from your assumptions?
    - Is exam's grade an integer?

```
What is student 1 name: mostafa
His id: 111
His math exam grade: 20
What is student 2 name: ALI
His id: 555
His math exam grade: 30
```

```
Students grades in math
mostafa (with id 111) got grade: 20
ALI (with id 555) got grade: 30
Average grade is 25
```

# Homework 3: Even and Odd sum

**Problem Statement:** Given 8 space-separated integers, find the sum of those in even places and the sum of those in odd places.

Note: Even place means the 2nd, 4th, 6th or 8th numbers, while odd places are the 1st, 3rd, 5th and 7th numbers.

**Example Input:**

```
11 2 7 9 12 -8 3 -1
```

**Example Output:**

```
2 33
```

**Example Explanation:**

$$2 + 9 + (-8) + (-1) = 2$$

$$11 + 7 + 12 + 3 = 33$$

# Homework 4: Guess Program Output (Medium)

04\_homework4.cpp

```
1 #include<iostream>
2 using namespace std;
3
4 int main() {
5     int num1, num2, num3;
6
7     num1 = 0, num2 = 1, num3 = num1 + num2, cout <<num3<<"\n";
8     num1 = num2, num2 = num3, num3 = num1 + num2, cout <<num3<<"\n";
9     num1 = num2, num2 = num3, num3 = num1 + num2, cout <<num3<<"\n";
10    num1 = num2, num2 = num3, num3 = num1 + num2, cout <<num3<<"\n";
11    num1 = num2, num2 = num3, num3 = num1 + num2, cout <<num3<<"\n";
12    num1 = num2, num2 = num3, num3 = num1 + num2, cout <<num3<<"\n";
13    num1 = num2, num2 = num3, num3 = num1 + num2, cout <<num3<<"\n";
14    num1 = num2, num2 = num3, num3 = num1 + num2, cout <<num3<<"\n";
15    num1 = num2, num2 = num3, num3 = num1 + num2, cout <<num3<<"\n";
16
17    // https://en.wikipedia.org/wiki/Fibonacci\_number
18
19    return 0;
20 }
```

# Homework 5: Swapping 2 numbers! (Medium)

- Write a program that reads 2 variables num1 and num2
  - E.g. say we read num1 = 7 and num2 = 231
- Target: we want swap the values of Num1 and Num2?
  - Swap means exchange
  - So Num1 takes value 231 and Num2 takes value 7

```
int main() {  
    int num1, num2, num3 = -1;  
  
    cin>>num1>>num2;           // let say we read 7 and 231  
  
    // TODO write 3 lines that swaps them  
  
    cout<<num1<<" "<<num2<<endl;    // This should print 231 7  
  
    return 0;  
}
```

# Homework 6: Swapping 3 numbers! (Hard)

- Same as previous, but on 3 numbers
- Let say we have numbers  $a = 115$ ,  $b = 20$ ,  $c = 301$
- We wanna their final values to be:  $a = 20$ ,  $b = 301$ ,  $c = 115$

# Homework 7: Print Me (Hard)

- Write a program that reads 2 integers A, B
  - B is either -1 or 1
    - If -1, print  $2*A+1$
    - If 1, print  $A*A$
- Hint
  - You need to think in a **simple 1 line formula** for the output



# Homework 8: Sum numbers from 1 to N (Hard)

- Write a program that reads integer N and Print the sum from 1 to N
  - E.g. If input N = 5, then Output is: 15
  - Why? As  $1+2+3+4+5 = 15$
  - Below table of more values
  - $3 \Rightarrow 6$  ( $1+2+3$ )
  - $4 \Rightarrow 10$  ( $1+2+3+4$ )
  - $5 \Rightarrow 15$  ( $1+2+3+4+5$ )
- You need to find a **simple 1 line formula** to solve the problem :)
  - Hint: Let N = 8. Write numbers from 1 to 8
  - What is the sum of 1st and 8th number? sum of 2nd and 7th? And so on
  - Your formula should be good for even and odd N. Be careful programmer!
  - What is the maximum N after it overflow occurs? Recall int max is **2147483647**

*“Acquire knowledge and impart it to the people.”*

*“Seek knowledge from the Cradle to the Grave.”*