# Exercises: Basic Syntax

This document defines the exercises for the ["C++ Fundamentals" course @ Software University](https://softuni.bg/trainings/4263/cpp-fundamentals-november-2023).

Please submit your solutions (source code) of all below-described problems in [Judge](https://judge.softuni.org/Contests/2939/CPlusPlus-Basic-Syntax).

# Order Two Numbers

Write a program that reads **two integers** from the console and prints them in increasing order.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1 2 | 1 2 |
| 1 -1 | -1 1 |
| 4242 1313 | 1. 2 |

# Product Sign

Write a program that shows the sign **(+ or -)** of the product of three real numbers without calculating it.

The program should read **3 real numbers** from the console (on a single line, separated by spaces). Print the sign of their product. **If the product is 0, print +.**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1 2 0 | + |
| 1 -1 1 | - |
| -411531.13 123123 -8673.24 | + |

# Quadratic Equation

Write a program that enters the coefficients **a**, **b,** and **c** of a quadratic equation **a\*x2 + b\*x + c = 0** and calculates and prints its real solutions. Note that quadratic equations may have **0**, **1,** or **2** real solutions.

You can check your program against this: <https://www.mathsisfun.com/quadratic-equation-solver.html>

The numbers **a**, **b**, and **c** will be entered on a single line from the console, separated by spaces.

If the quadratic equation has no real roots (e.g. if the Discriminant is less than 0), print "**no roots**".

If it has one real root print it, if it has two roots, print them on a single line, separated by a single space.

### Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Explanation** |
| 2 5 -3 | -3 0.5 | Equation: 2x2 + 5x - 3 = 0 |
| 10 1 3 | no roots | Equation: 10x2 + x + 3 = 0 |
| 0.5 5 12.5 | -5 | Equation: 0.5x2 + 5x + 12.5 = 0 |

# Numbers 1 to N

Write a program that reads the **integer number N** from the console. Prints all numbers from 1 to N (inclusively) to the console on a single line. **The number N will always be larger than or equal to 1.**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1 | 1 |
| 10 | 1 2 3 4 5 6 7 8 9 10 |

# Min and Max

Write a program that reads an integer number N, then reads a line of N integers, and prints the **minimum** and **maximum** of those integers, separated by single space.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 2  -1 5 | -1 5 |
| 7  5 3 44 21 69 2 10 | 2 69 |

# Greatest Common Divisor

### Write a program that calculates the greatest common divisor (GCD) of given two numbers.

### Hint: you can use the Euclidean algorithm.

The **two integer numbers** will be entered on a single line from the console, separated by a single space.

Find and print their GCD.

### Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Explanation** |
| 25 10 | 5 | 5 is the largest number that divides both 25 and 10 (without a remainder) |
| 50 50 | 50 | Both numbers are 50, so GCD is 50 |
| 7 13 | 1 | 7 and 13 are prime numbers, meaning they only divide by 1 and themselves, so their GCD is 1 |

## Print and Sum

Write a program to display numbers from given start to given end and their sum. All the numbers will be integers. On the first line, you will receive the start number, on the second the end number.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 5  10 | 5 6 7 8 9 10  Sum: 45 |
| 0  26 | 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26  Sum: 351 |
| 50  60 | 50 51 52 53 54 55 56 57 58 59 60  Sum: 605 |

## Strong Number

Write a program to check whether or not a given number is strong. A number is strong if the sum of the Factorial of each digit is equal to the number. For example 145 is a strong number, because **1! + 4! + 5! = 145.** Print "**yes**" if the number is strong and "**no**" if the number is not strong.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 2 | yes |
| 3451 | no |
| 40585 | yes |