# More Exercises: Data Types and Variables

Problems for exercises and homework for the ["Technology Fundamentals" course @ SoftUni](https://softuni.bg/courses/technology-fundamentals).

You can check your solutions in [Judge](https://judge.softuni.bg/Contests/1267/).

## From Left to The Right

You will receive number which represent how many lines we will get as an input. On the next N lines, you will receive a string with 2 numbers separated by single space. You need to compare them. If the **left number is greater than the right number**, you need to **print the sum of all digits in the left number**, otherwise **print the sum of all digits in the right number**.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 2  1000 2000  2000 1000 | 2  2 |
| 4  123456 2147483647  5000000 -500000  97766554 97766554  9999999999 8888888888 | 46  5  49  90 |

## Exchange Integers

Read two integer numbers and after that **exchange their values** by using some programming logic. Print the variable values before and after the exchange, as shown below:

**Examples**

|  |  |
| --- | --- |
| **Input** | **Output** |
| 5  10 | Before:  a = 5  b = 10  After:  a = 10  b = 5 |

**Hints**

You may use a **temporary variable** to remember the old value of **a**, then assign the value of **b** to **a**, then assign the value of the temporary variable to **b**.

## Floating Equality

Write a program that **safely compares** **floating-point numbers** with precision eps = 0.000001. Note that we cannot directly compare two floating-point numbers a and b by a==b because of the nature of the floating-point arithmetic. Therefore, we assume two numbers are equal if they are more closely to each other than some fixed constant **eps**.

You will receive **two** lines, each containing a **floating-point** number. Your task is to **compare** the **values** of the two numbers.

### Examples

|  |  |  |  |
| --- | --- | --- | --- |
| **Number a** | **Number b** | **Equal (with precision eps=0.000001)** | **Explanation** |
| 5.3 | 6.01 | False | The difference of 0.71 is too big (> eps) |
| 5.00000001 | 5.00000003 | True | The difference 0.00000002 < eps |
| 5.00000005 | 5.00000001 | True | The difference 0.00000004 < eps |
| -0.0000007 | 0.00000007 | True | The difference 0.00000077 < eps |
| -4.999999 | -4.999998 | False | Border case. The difference 0.0000001== eps. We consider the numbers are different. |
| 4.999999 | 4.999998 | False | Border case. The difference 0.0000001 == eps. We consider the numbers are different. |

## Data Type Finder

You will receive an input until you receive "END". Find what **data type** is the input. Possible data types are:

* Integer
* Floating point
* Characters
* Boolean
* Strings

Print the result in the following format: "**{input}** is **{data type}** type"

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 5  2.5  true  END | 5 is integer type  2.5 is floating point type  true is boolean type |
| a  asd  -5  END | a is character type  asd is string type  -5 is integer type |

### Hint

You can use [filter\_var](http://php.net/manual/en/function.filter-var.php).

## Refactoring: Prime Checker

You are given a program that checks if numbers in a given range [2...N] are prime. For each number is printed "{number} -> {true or false}". The code however, is not very well written. Your job is to modify it in a way that is easy to read and understand.

### Code

|  |
| --- |
| **Sample Code** |
| **<?php** $\_\_\_Do\_\_\_ = *intval*(*readline*()); **for** ($takoa = 2; $takoa <= $\_\_\_Do\_\_\_; $takoa++) {  $takovalie = **true**;  **for** ($cepitel = 2; $cepitel < $takoa; $cepitel++) {  **if** ($takoa % $cepitel == 0) {  $takovalie = **false**;  **break**;  }  }   **if** ($takovalie)  *printf*(**"%d -> true"** . ***PHP\_EOL***, $takoa);  **else** *printf*(**"%d -> false"** . ***PHP\_EOL***, $takoa); } |

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 5 | 2 -> true  3 -> true  4 -> false  5 -> true |