# Exercises: Data Types: Text and Other Types, Variables

Problems for exercises and homework for the [“Programming Fundamentals” course @ SoftUni](https://softuni.bg/courses/programming-fundamentals).

You can check your solutions here: <https://judge.softuni.bg/Contests/206/Data-Types-and-Variables-Exercises>.

## Practice Characters and Strings

Create a new C# project and create a program that **assigns character** and **string values** to **variables**. Be sure that each **value** is stored in the **correct variable**. Finally, you need to **print** all variables to the console.

|  |  |
| --- | --- |
| **Input** | **Output** |
| Software University  B  y  e  I love programming | Software University  B  y  e  I love programming |

### Hints

Like at the previous problem, declare variables of type char or sting, assign the above values and **print** them.

## Variable in Hexadecimal Format

Write a program that reads a number in **hexadecimal format** (0x##) convert it to **decimal format** and prints it.

|  |  |
| --- | --- |
| **Input** | **Output** |
| 0xFE | 254 |
| 0x37 | 55 |
| 0x10 | 16 |

### Hints

* Use [**Convert.ToInt32(string, 16)**](https://msdn.microsoft.com/en-us/library/1k20k614(v=vs.110).aspx).

## Boolean Variable

Write a program that reads a **string**, converts it to **Boolean** variable and **prints** “**Yes**”if the variable is true and “**No**” if the variable is false.

|  |  |
| --- | --- |
| **Input** | **Output** |
| True | Yes |
| False | No |

### Hints

* Use [**Convert.ToBoolean(string)**](https://msdn.microsoft.com/en-us/library/86hw82a3(v=vs.110).aspx).

## Strings and Objects

Declare two **string variables** and assign them with “Hello” and “World”. Declare an **object variable** and assign it with the **concatenation** of the first two variables (mind adding an interval between). Declare a third **string** variable and initialize it with the value of the object variable (you should perform type **casting**).

|  |  |
| --- | --- |
| **Input** | **Output** |
| Hello  World | Hello World |

## Exchange Variable Values

Declare two integer variables a and b and assign them with 5 and 10 and after that **exchange their values** by using some programming logic. Print the variable values before and after the exchange, as shown below:

|  |  |
| --- | --- |
| **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.

## Employee Data

A marketing company wants to keep record of its employees. Each record would have the following characteristics:

* First name
* Last name
* Age (0...100)
* Gender (m or f)
* Personal ID number (e.g. 8306112507)
* Unique employee number (27560000…27569999)

Declare the **variables** needed to keep the information for a single employee using appropriate primitive data types. Use descriptive names. **Print** the data at the console.

|  |  |
| --- | --- |
| **Input** | **Output** |
| Amanda  Jonson  27  f  8306112507  27563571 | First name: Amanda  Last name: Jonson  Age: 27  Gender: f  Personal ID: 8306112507  Unique Employee number: 27563571 |

### Hints



## Reverse Characters

Write a program to ask the user for **3 letters** and print them in **reversed order**.

### Examples

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |  | **Input** | **Output** |
| A  B  C | CBA |  | x  Y  z | zYx |  | G  g  n | ngG |

## Vowel or Digit

Create a program to check if given symbol is **digit**, **vowel** or any **other symbol**.

### Examples

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |  | **Input** | **Output** |
| a | vowel |  | 9 | digit |  | g | other |

## Integer to Hex and Binary

Create a program to convert a **decimal number** to **hexadecimal** and **binary** number and print it.

### Examples

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |  | **Input** | **Output** |
| 10 | A  1010 |  | 420 | 1A4  110100100 |  | 256 | 100  100000000 |

### Hints

* Use [**Convert.ToString(number, base)**](https://msdn.microsoft.com/en-us/library/14kwkz77(v=vs.110).aspx)and [**string.ToUpper()**](https://msdn.microsoft.com/en-us/library/ewdd6aed(v=vs.110).aspx).

## Fast Prime Checker - Refactor

You are given a program that checks if numbers in a given range [2...N] are prime. For each number is printed "{number} is prime -> {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** |
| int \_\_\_Do\_\_\_ = int.Parse(Console.ReadLine());  for (int DAVIDIM = 0; DAVIDIM <= \_\_\_Do\_\_\_; DAVIDIM++)  {  bool TowaLIE = true;  for (int delio = 2; delio <= Math.Sqrt(DAVIDIM); delio++)  {  if (DAVIDIM % delio == 0)  {  TowaLIE = false;  break;  }  }  Console.WriteLine($"{DAVIDIM} is prime -> {TowaLIE}");  } |

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 5 | 2 -> True  3 -> True  4 -> False  5 -> True |

### Hints

* Search how to check if a number is prime
* Rename all variables such as to be clear what is their role in the algorithm

## Print Part of the ASCII Table

Find online more information about [ASCII](http://www.ascii-code.com/) (American Standard Code for Information Interchange) and write a program that **prints part of the ASCII table** of characters at the console. On the first line of input you will receive **the char index you should start with** and on the **second line - the index of the last character** you should print.

|  |  |
| --- | --- |
| **Input** | **Output** |
| 60  65 | < = > ? @ A |
| 69  79 | E F G H I J K L M N O |
| 97  104 | a b c d e f g h |
| 40  55 | ( ) \* + , - . / 0 1 2 3 4 5 6 7 |

## \* Thea the Photographer

***This problem is from the Programming Fundamentals Retake Exam (11 September 2016).***

Thea is a photographer. She takes pictures of people on special events. She is a good friend and you want to help her.

She wants to inform her clients when their pictures will be ready. Since the number of pictures is big and it requires time for editing (#nofilter, #allnatural) **every** single picture - you decide to write a program in order to help her.

Thea follows this pattern: first she takes **all** pictures. Then she goes through every single picture to **filter** these pictures that are considered "good". Then she needs to upload every single **filtered** picture to her cloud. She is considered ready when all **filtered** pictures are **uploaded** in her picture storage.

You will receive the **amount** of pictures she had taken. Then the approximate **time** in **seconds** for every picture to be filtered. Then a **filter factor** – a **percentage** (integer number) of the **total photos** (rounded to the nearest **bigger** **integer** value e.g. 5.01 -> 6) that are good enough to be given to her clients (Photoshop may do miracles but Thea does not). Approximate **time** for every picture to be uploaded will be given again in **seconds**. Your task is: based on this input to display total time needed for her to be ready with the pictures in given below format.

### Input

On the first line you will receive an integer **N** – the amount of pictures Thea had taken.

On the second line you will receive an integer **FT** – the amount of time (filter time) in seconds that Thea will require to filter every single picture.

On the third line you will receive an integer **FF** – the filter factor or the percentage of the total pictures that are considered “good” to be uploaded.

On the fourth line you will receive an integer **UT** – the amount of time needed for every **filtered** picture to be uploaded to her storage.

The input will be in the described format, there is no need to check it explicitly.

### Output

Print the amount of time Thea will need in order to have her pictures ready to be sent to her client in given format:

d:HH:mm:ss

d - days needed – starting from 0.

HH – hours needed – from 00 to 24.

mm – minutes needed – from 00 to 59.

ss – minutes needed – from 00 to 59.

### Constraints

The amount of total pictures Thea will have taken is range [0 … 1 000 000]

The seconds for both filtering and uploading will be in range [0 … 100 000]

The filter factor will be an integer number between [0 … 100].

### Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comments** |
| 1000  1  50  1 | 0:00:25:00 | Total pictures = 1 000, 50% of them are useful -> Filtered pictures = 500  Total pictures \* filter time = 1000 s  Filtered pictures \* upload time = 500 s  Total time = 1500 s |
| 5342  2  82  3 | 0:06:37:07 | Total pictures = 5342 - 82% of them are useful -> 4380.44-> 4381 filtered. |