# Homework: Introduction to Programming

This document contains homework assignments from the [“C# Basics“ Course @ Software University](http://softuni.bg/courses/csharp-basics/).

## Declare Variables

Declare five variables choosing for each of them the most appropriate of the types byte, sbyte, short, ushort, int, uint, long, ulong to represent the following values: 52130, -115, 4825932, 97, -10000. Choose a large enough type for each number to ensure it will fit in it. Try to compile the code.

## Float or Double?

Which of the following values can be assigned to a variable of type float and which to a variable of type double: 34.567839023, 12.345, 8923.1234857, 3456.091? Write a program to assign the numbers in variables and print them to ensure no precision is lost.

## Comparing Floats

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 a fixed constant eps. 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 |
| -0.0000007 | 0.00000007 | true | The difference 0.00000077 < eps |
| -4.999999 | -4.999998 | false | Border case. The difference 0.000001 == eps. We consider the numbers are different. |

## Variable in Hexadecimal Format

Declare an integer variable and assign it with the value 254 in hexadecimal format (0x##). Use Windows Calculator to find its hexadecimal representation. Print the variable and ensure that the result is “254”.

## Unicode Value

Declare a character variable and assign it with the symbol that has Unicode code 72, and then print it. Hint: first, use the Windows Calculator to find the hexadecimal representation of 72. The output should be “H”.

## Boolean Variable

Declare a Boolean variable called isFemale and assign an appropriate value corresponding to your gender. Print it on the console.

## 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**).

## Quotes in Strings

Declare two string variables and assign them with following value:

|  |
| --- |
| The "use" of quotations causes difficulties. |

Do the above in two different ways: with and without using quoted strings. Print the variables to ensure that their value was correctly defined.

## Isosceles Triangle

Write a program that prints an isosceles triangle of 9 copyright symbols ©, something like this:

|  |
| --- |
| ©  © ©  © ©  © © © © |

Note that the © symbol may be displayed incorrectly at the console so you may need to change the console character encoding to UTF-8 and the console font.

## Exchange Variable Values

Declare two integer variables a and b and assign them with 5 and 10 and after that exchange their values. Print the variable values before and after the exchange.

## 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.

## Bank Account Data

A bank account has a holder name (first name, middle name and last name), available amount of money (balance), bank name, IBAN, 3 credit card numbers associated with the account. Declare the variables needed to keep the information for a single bank account using the appropriate data types and descriptive names.

## Null Values Arithmetic

Create a program that assigns null values to an integer and to a double variable. Try to print these variables at the console. Try to add some number or the null literal to these variables and print the result.

## \* Print the ASCII Table

Find online more information about **ASCII** (American Standard Code for Information Interchange) and write a program to prints the entire ASCII table of characters at the console (characters from 0 to 255). Note that some characters have a special purpose and will not be displayed as expected. You may skip them or display them differently. You may need to use for-loops (learn in Internet how).