# C# Basics

# IDE Environment Introduction

In this article, we are going to talk about what the IDE is and how can we use VisualStudio to create a new project.

## Integrated Development Environment (IDE)

An IDE is an environment tool which helps us writing the code for our programs. For this complete tutorial, we are going to use VisualStudio 2017. To download it, visit [VisualStudio Download Page](https://visualstudio.microsoft.com/downloads/?utm_medium=microsoft&utm_source=docs.microsoft.com&utm_campaign=button+cta&utm_content=download+vs2017). VisualStudio has a support for different programming languages, which makes it a very popular development tool.

After the installation, we can start a new project by clicking the File menu and choosing New => Project:



For this tutorial, we will use the console application project the most, so let's choose that option:



After we click on OK button, we are going to see our created project. The main file to work with is the Program.cs and very soon we are going to talk more about it:



## Conclusion

Now we know the basics and how to create a new project. Very soon we are going to use this knowledge in our applications.

# Data Types, Declarations and Variable Definitions

Different data types are registered differently and different actions are allowed to execute upon them as well. For different data types, a certain amount of space is reserved on our computer.

With data type we define:

* How to register data in memory
* The possible values for that data
* Possible actions on the data

## Data Type Registration

Data types that represent the whole numbers could be expressed with a certain number of bits. For unsigned numbers, the representation is from 0 to 2N-1. But for signed number the representation is from -2N-1 to 2N-1-1. So if the data type has a size of 8 bits like the sbyte data type, we can represnt its range like this: from -27 to 27-1 => from -128 to 127.

In the next table, we will show the different data types that represent the whole numbers:

| Type | Size (bits) | Range (values) |
| --- | --- | --- |
| byte | 8 | 0 to 255 |
| sbyte | 8 | -128 to 127 |
| int | 32 | -2,147,483,648 to 2,147,483,647 |
| uint | 32 | 0 to 4294967295 |
| short | 16 | -32,768 to 32,767 |
| ushort | 16 | 0 to 65,535 |
| long | 64 | -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 |
| ulong | 64 | 0 to 18,446,744,073,709,551,615 |

Letter u in front of the type means that type can’t contain negative numbers, it is unsigned.

Above mentioned types are the whole number types. But in C#, we have the number types with the floating point.

We can present them in a table as well:

| Type | Size (bits) | Range (values) |
| --- | --- | --- |
| float | 32 | -3.402823e38 to 3.402823e38 |
| double | 64 | -1.79769313486232e308 to 1.79769313486232e308 |
| decimal | 128 | (+ or -)1.0 x 10e-28 to 7.9 x 10e28 |

Next to all of this types, in C# we have two more basic type data:

| Type | Size (bits) | Range (values) |
| --- | --- | --- |
| char | 16 | Single Unicode sign, a whole number from 0 to 65535 |
| bool | 8 | false, true |

To use char type in our code we must place it inside the single quotes: ’a’ or ’A’ or ’3’...

One more type that is often introduced as the basic data type is the **string** type. But the string is not a value type it is referent type. To use a string in our code we must place the value inside the double quotes: „This is the string type“ or „3452“...

So, we saw we have the value types and referent types, and it is time to talk more about those types and variables as well.

## Variables in C#

Variable is a name of a memory location in which application stores values.

We should create our variables by following examples:

* studentName
* subject
* work\_day ...

The wrong examples would be

* student Name
* work-day
* 1place...

We must mention that C# is case sensitive language so the **studentName** is not the same as the **StudentName**.