Introduction

Introduction to Computer Programming

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Rules of the game

0 2 programming tests – 30 pts.

0 Weekly assignments – 30 pts.

0 Final meeting test – 10 pts.

0 Attendance during laboratories is compulsory

What is programming?

In general
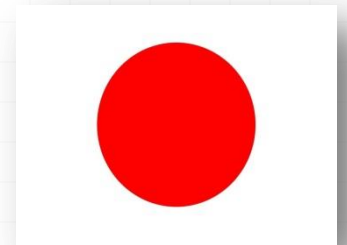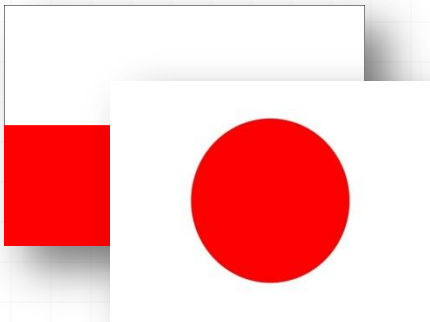
O We want to tell the computer what it should do.
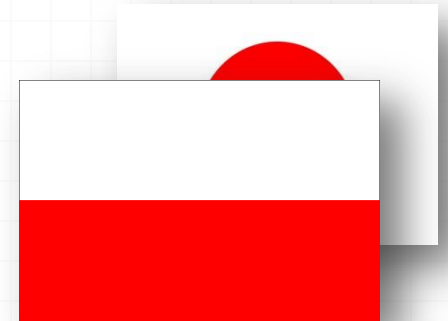
A little more specifically

O Design

O Implementation

O Testing

What is a programming language?

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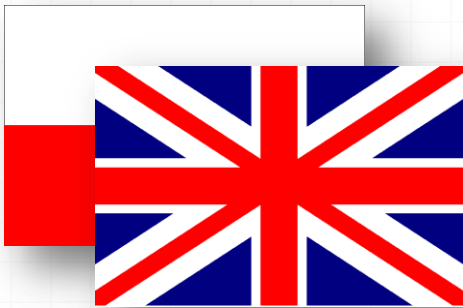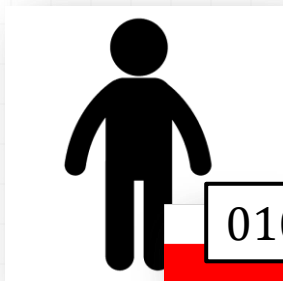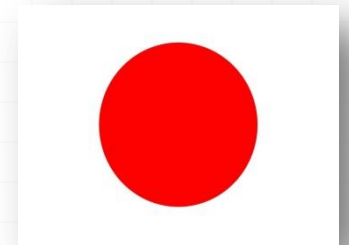010101010010101010

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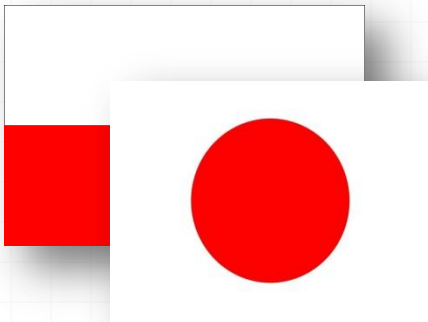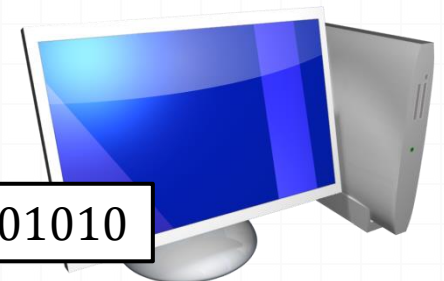# What is a programming language?
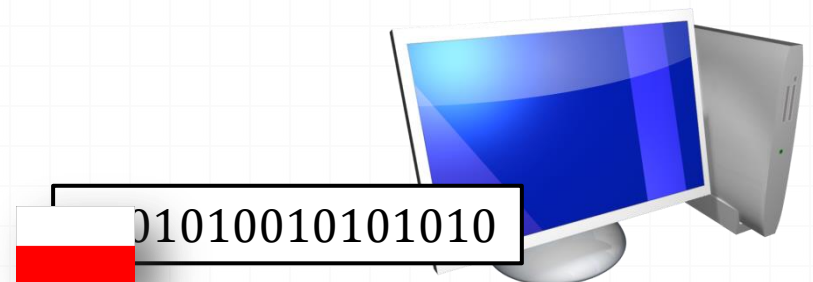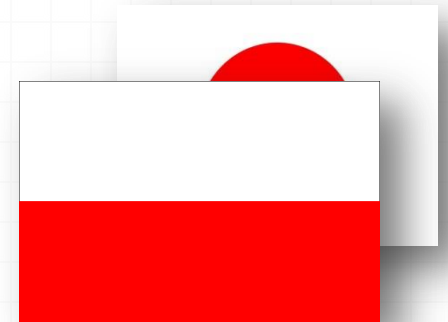
What is a programming language?
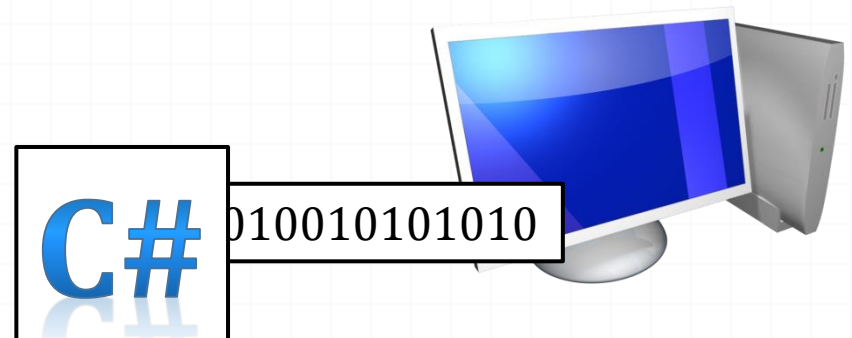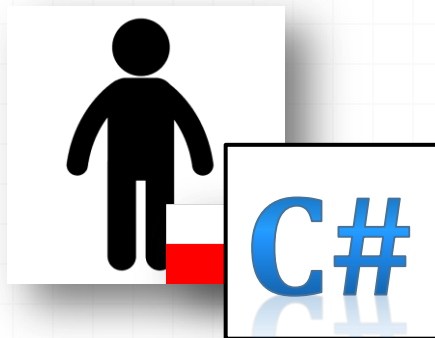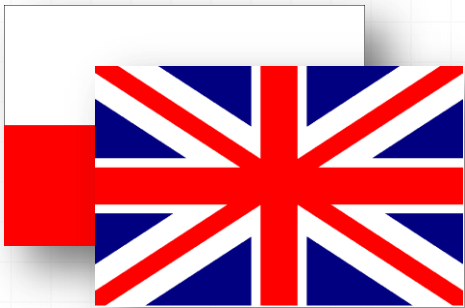
Programming languages

o High-level   Low-level

o Imperative   Declarative
  Structural/Object-oriented   Functional/Logical

o Interpreted   Compiled

.NET Framework

C# code

Intermediate code

Machine code

Compiler
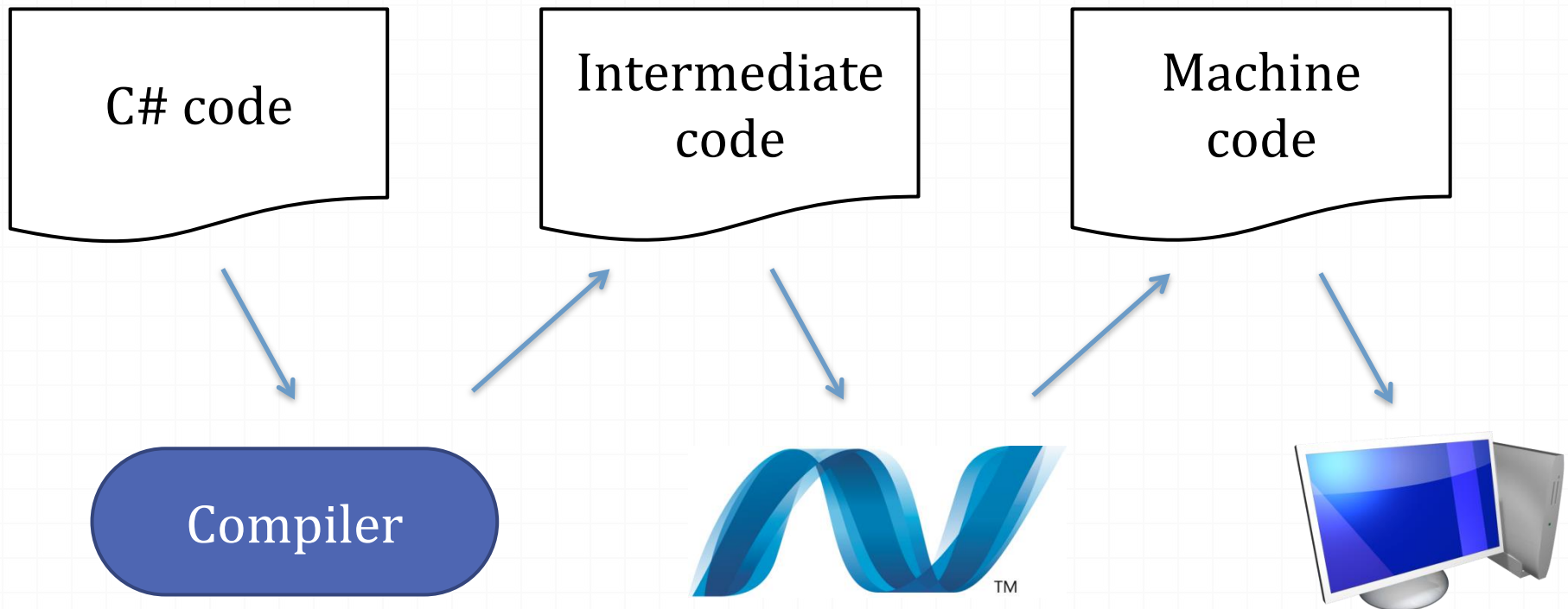
Let's begin!

O Assume we want to write a program which:

   O reads two numbers given by a user,

   O adds these numbers,

   O outputs the result as follows: `"a + b = x"`.

Variables

O Attributes of a variable
- O name
- O type
- O value

There are statically/dynamically and strongly/weakly typed languages. C# is statically and strongly typed.

Variables

O Value assignment

```
asdf = "This is some text...";
x = 23;
z = x + y;
y = int.Parse(Console.ReadLine());
```

O Reading from variables

O Variable declaration

```
string asdf;
int x = 5;
double a, b, c;
```

Variables

- What names can I use?
- How to name a variable?
- Can I redeclare a variable?
- How are variables stored?
- How do we know how much space a value takes?

Basic types

- string
- int
- double
- bool

Basic types

O Consequences of strong and static typing

```
string s = "This is a text";
int i = s;
i = "This also is a text";
```

?

```
string s = "23";
int i = s;
i = "23";
```

?

```
int i = 23;
string s = i;
s = 23;
```

?

ERROR!

O Casting and converting

```
int i = 23;
decimal d = i;
i = (int)d;
```

```
string s = "23";
int i = int.Parse(s);
s = i.ToString();
```

Communicating with a user

```
Console.WriteLine("Hello, World!");

Console.Write("Hello, ");
Console.WriteLine("World!");

string s = Console.ReadLine();

int i = int.Parse(Console.ReadLine());

Console.Write("Show me the money: ");
i = int.Parse(Console.ReadLine());

Console.WriteLine(i);
```
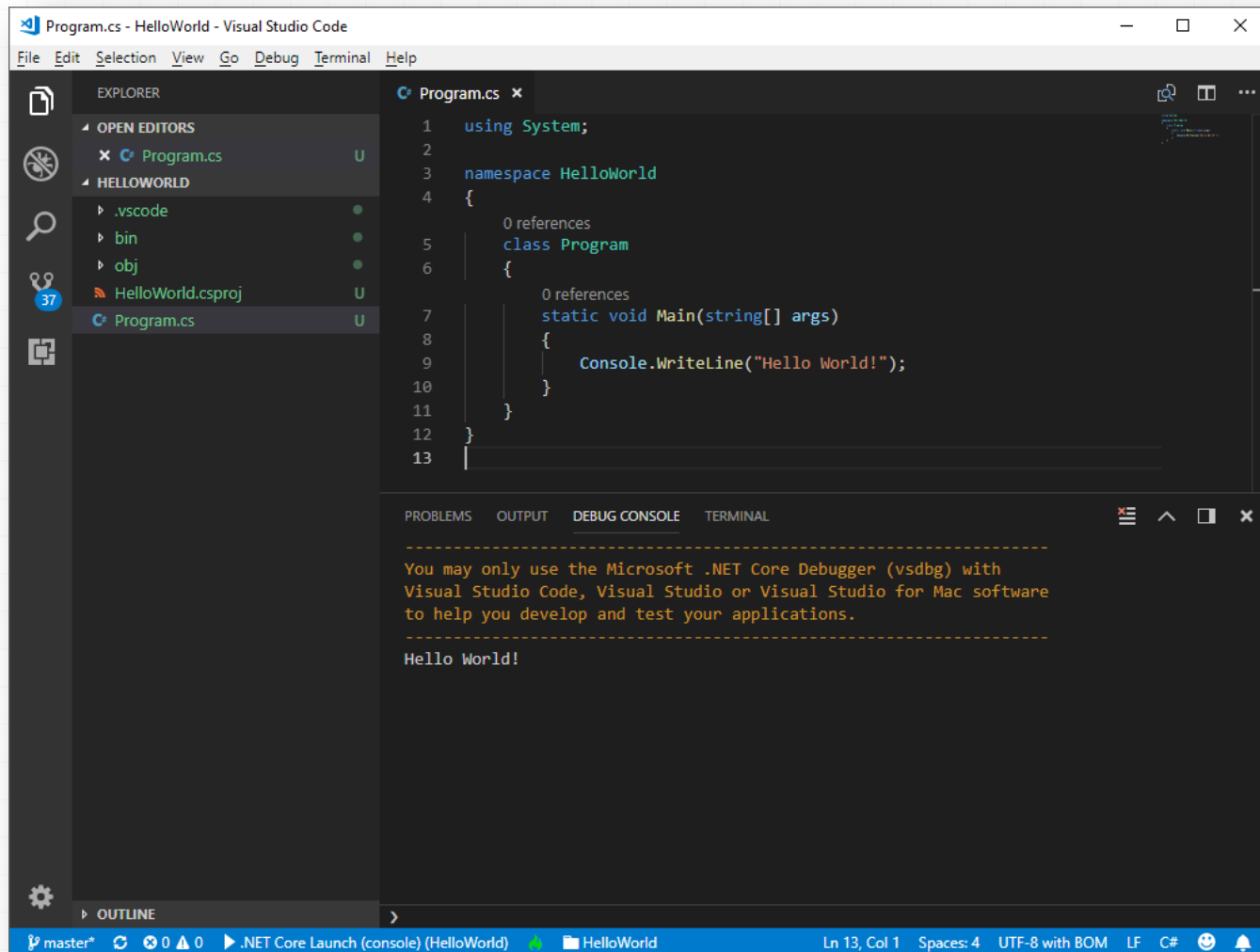
Pretty code

- Formatting
- Commenting

```
//This is a single-line comment
int i = 5; //To też...
/* This comment,
   on the other hand,
   spans through several lines...
   int j = 7 */
int j = 7;
```

A basic program

```csharp
using System;

namespace ConsoleApplication1
{
    class Program
    {
        static void Main(string[] args)
        {
            Instruction 1;
            Instruction 2;
            ...
        }
    }
}
```
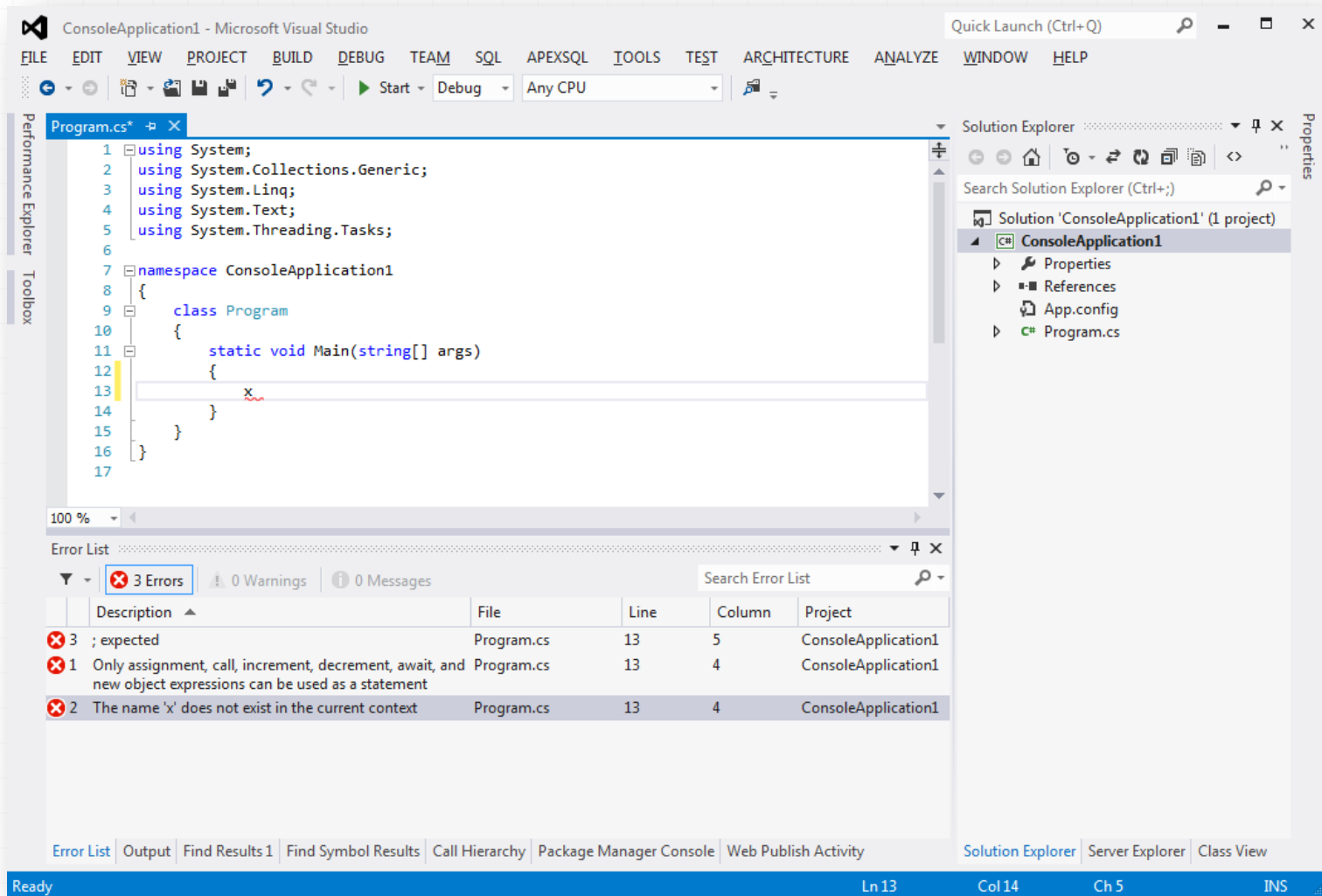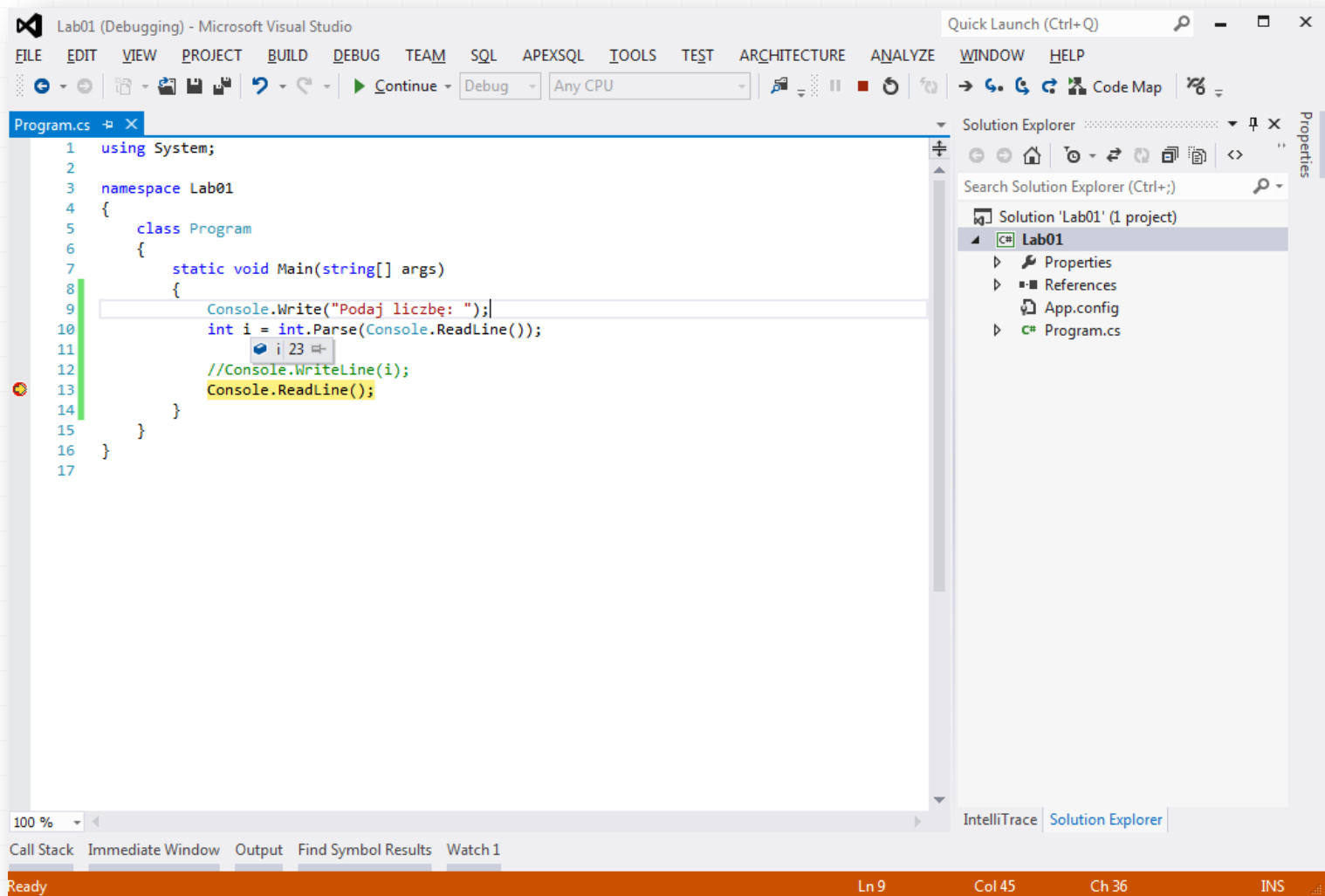
Visual Studio Code

Microsoft Visual Studio

Debugger

Basic keyboard shortcuts

O Ctrl + F5 – run

O F5 – run with debug

O Ctrl + Shift + B – build

O Ctrl + K, D – auto-format

O Ctrl + K, C – comment

O Ctrl + K, U – uncomment

How to run your app?

O From IDE

O Directly from the OS...

O ... Where is my program!?

Summary

0 What is a programming language?

0 What is a variable?

0 What are types and why do we need them?

0 How to communicate with a user?

0 What is the structure of a basic program?

0 What tools will we use?