Introduction

Introduction to Computer Programming

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Rules of the game

- 2 programming tests – 30 pts.
- Weekly assignments – 30 pts.
- Final meeting test – 10 pts.
- Attendance during laboratories is compulsory

What is programming?

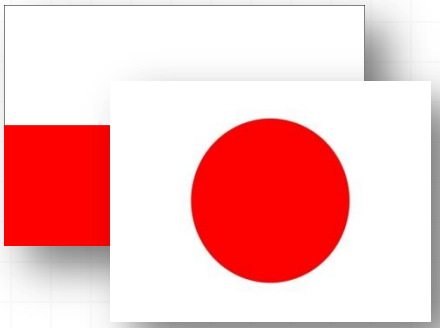
In general

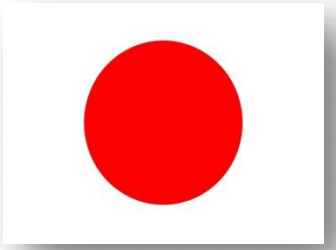
- We want to tell the computer what it should do.

A little more specifically

- Design
- Implementation
- Testing

What is a programming language?





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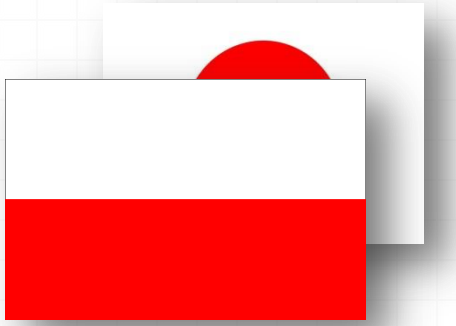

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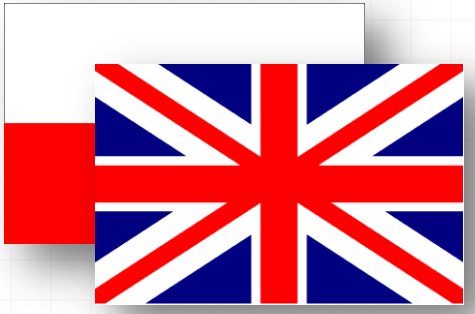

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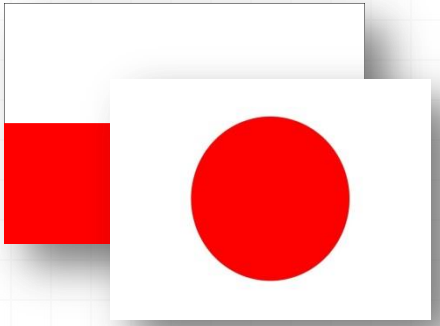

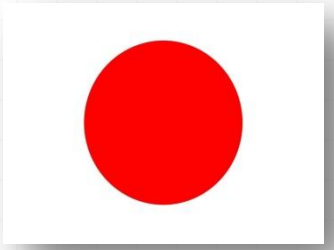

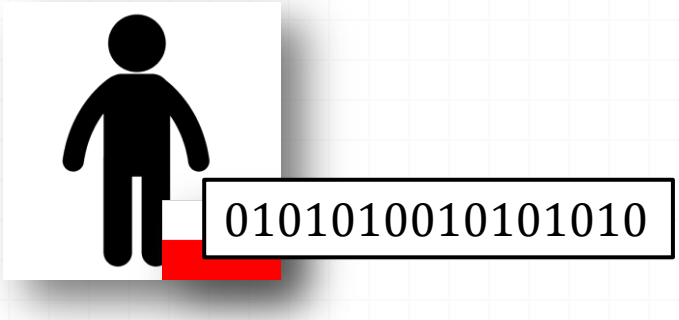

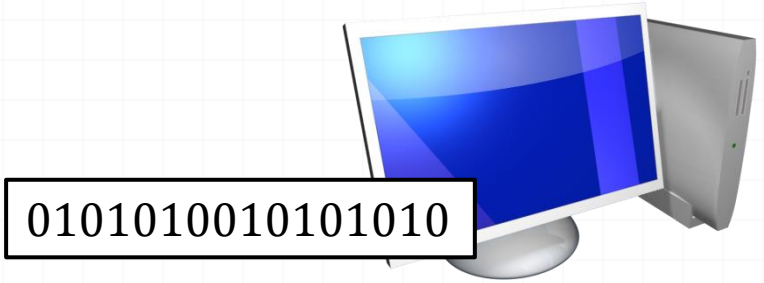

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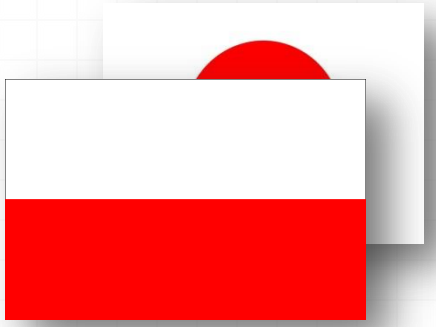

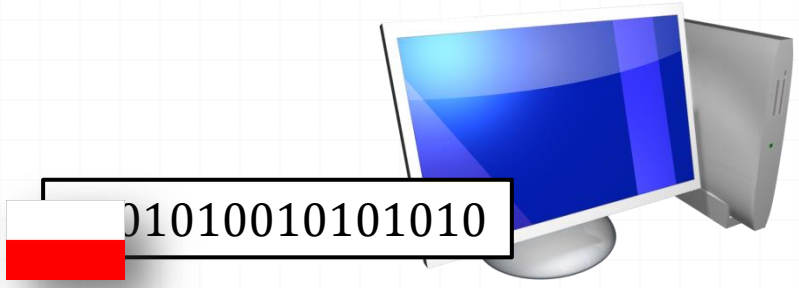

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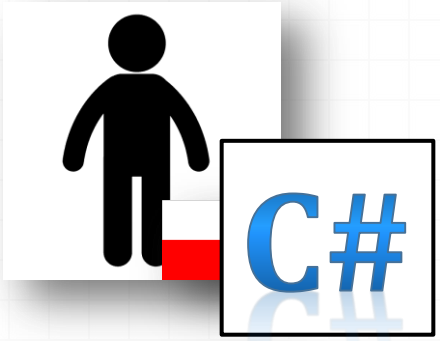
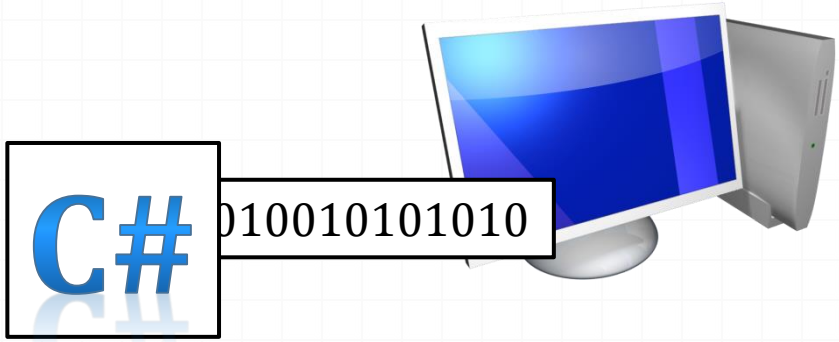
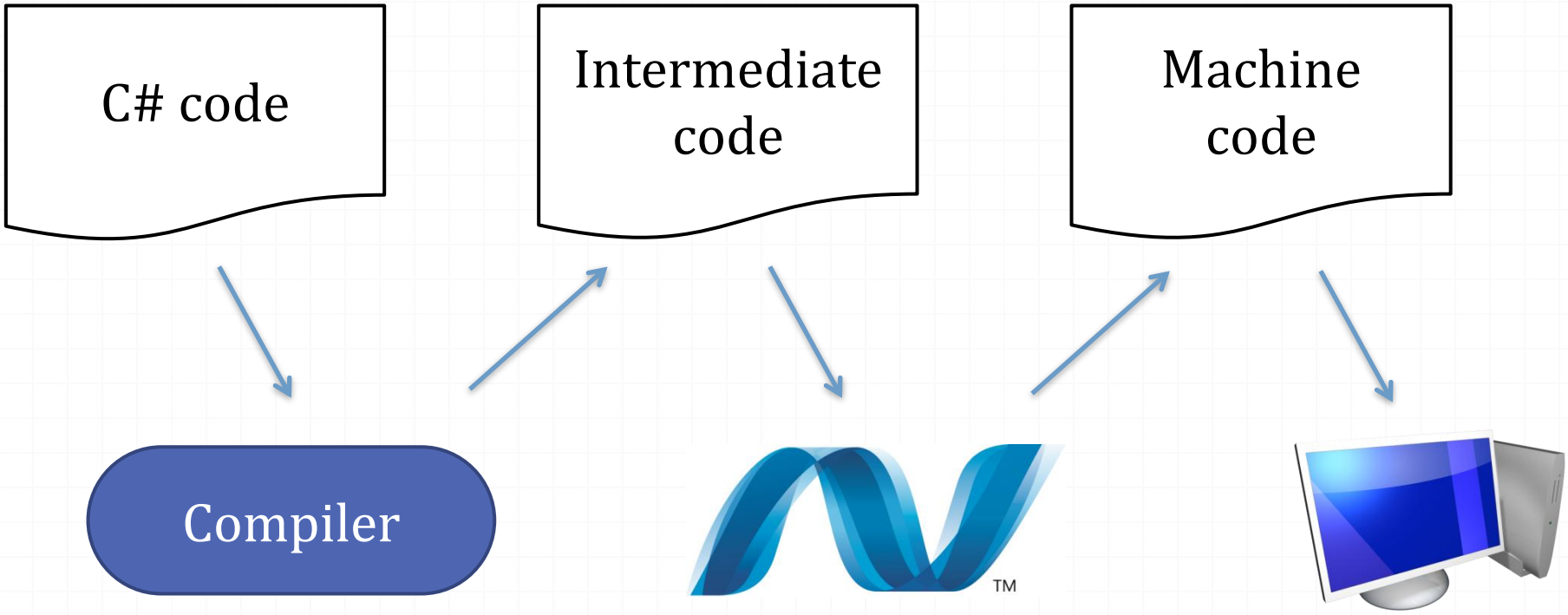




Programming languages

- High-level — Low-level
- Imperative — Declarative
  - Structural/Object-oriented — Functional/Logical
- Interpreted — Compiled

.NET Framework



Let’s begin!

- Assume we want to write a program which:
  - reads two numbers given by a user,
  - adds these numbers,
  - outputs the result as follows: `"a + b = x"`.

Variables

- Attributes of a variable
  - name
  - value
  - type

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

Variables

- Value assignment

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

- Reading from variables
- Variable declaration

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

Variables

- Which 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

- 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!

- 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

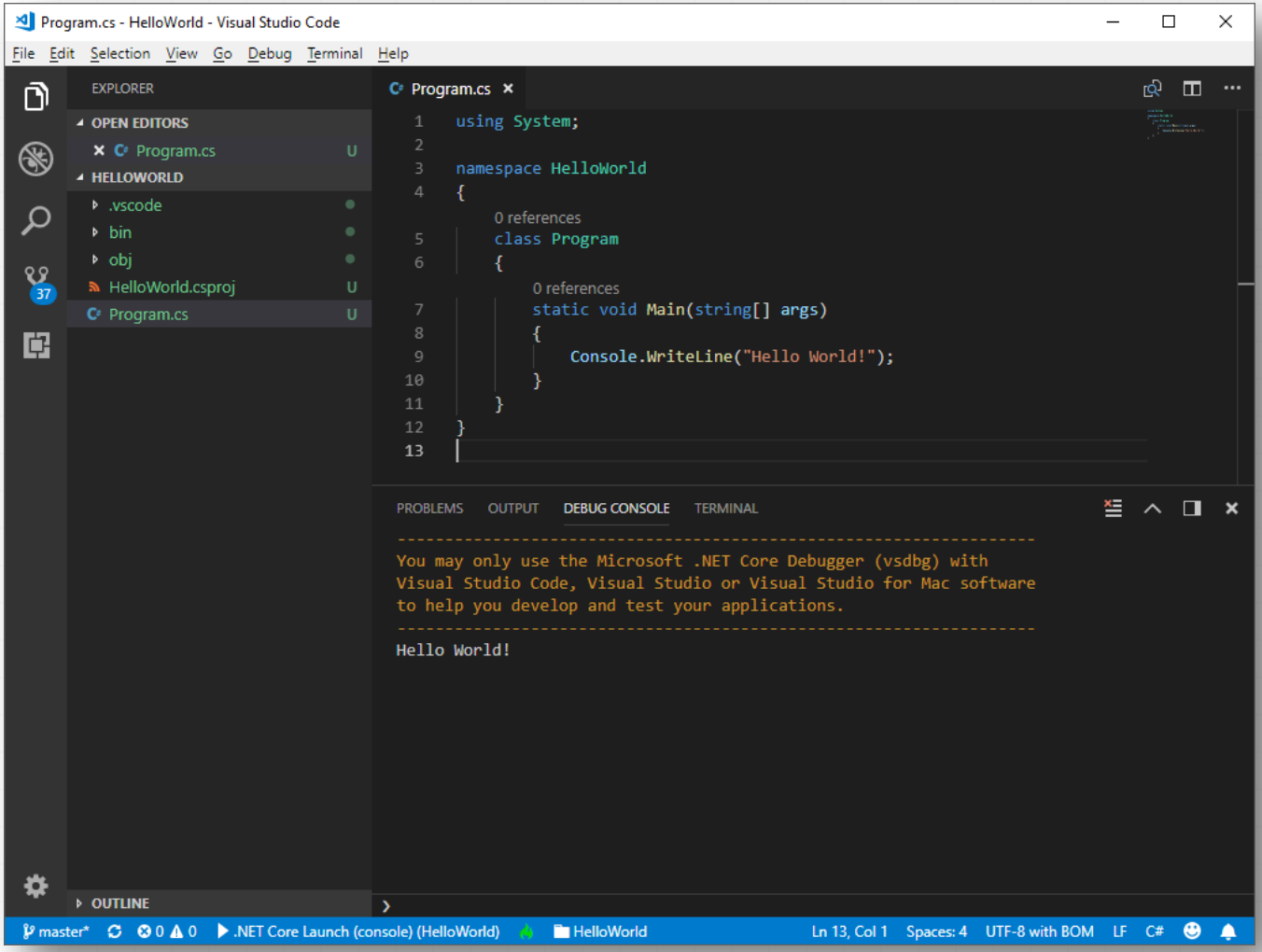
```
//This is a single-line comment
int i = 5; //To też...
/* This comment,
   on the other hand,
   spans through several lines...
   int j = 7 */
int j = 7;
```

A basic program

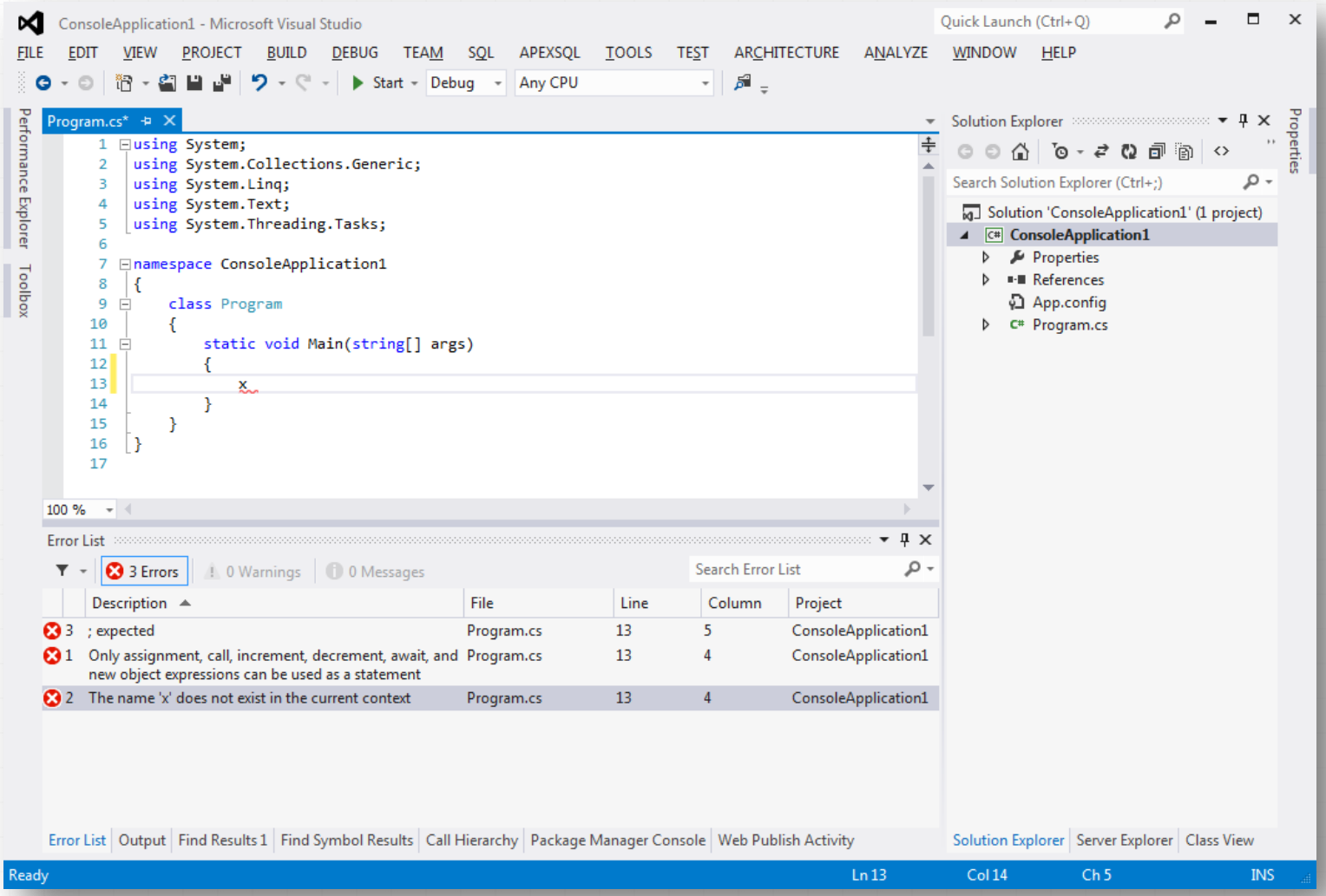
```
using System;

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

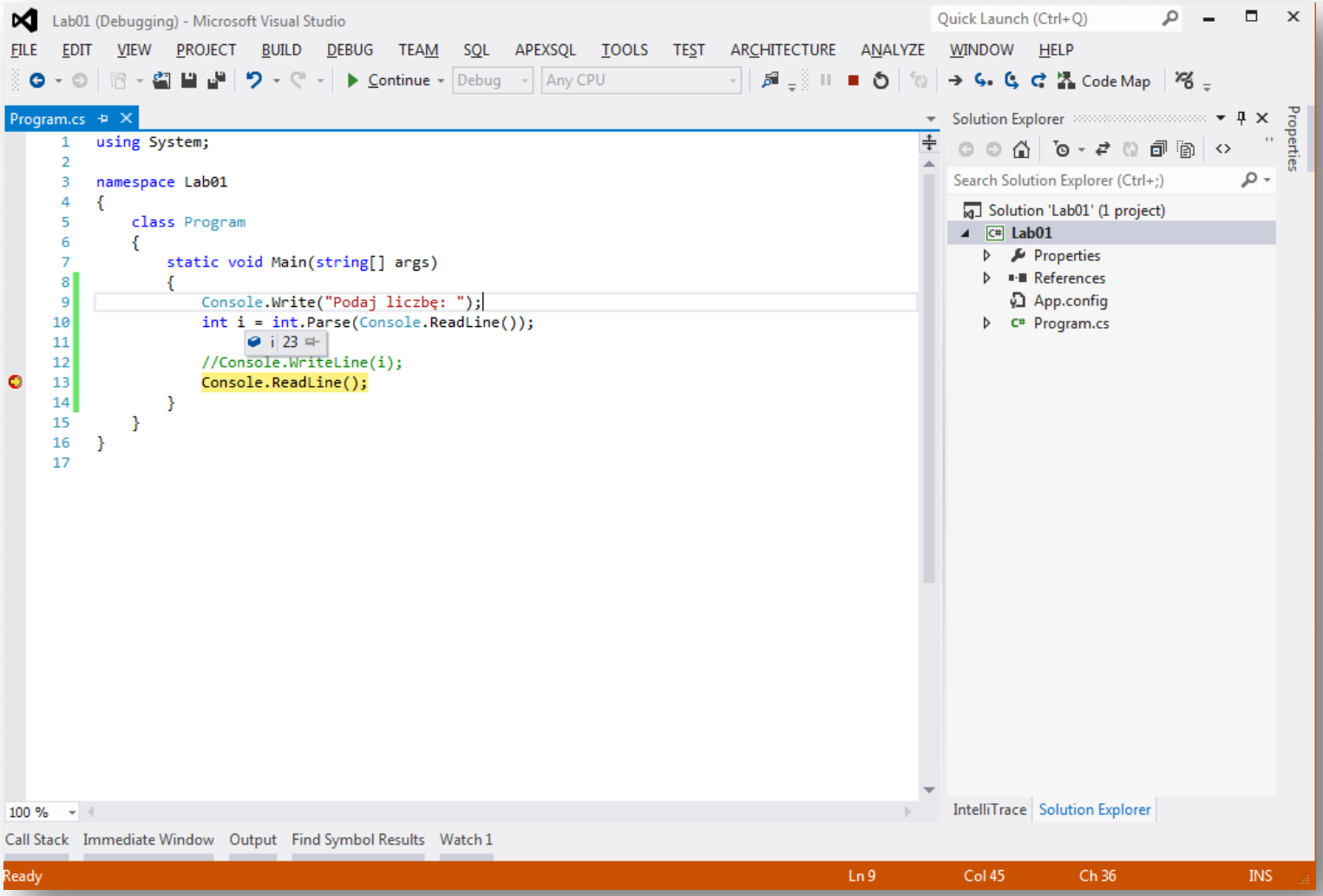
Visual Studio Code



Microsoft Visual Studio



Debugger


Lab01 (Debugging) - Microsoft Visual Studio
Quick Launch (Ctrl+Q)
FILE EDIT VIEW PROJECT BUILD DEBUG TEAM SQL APEXSQL TOOLS TEST ARCHITECTURE ANALYZE WINDOW HELP
Continue
Debug
Any CPU
Code Map
Program.cs
using System;
namespace Lab01
{
class Program
{
static void Main(string[] args)
{
Console.Write("Podaj liczbę: ");
int i = int.Parse(Console.ReadLine());
i 23
//Console.WriteLine(i);
Console.ReadLine();
}
}
}
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'Lab01' (1 project)
Lab01
Properties
References
App.config
Program.cs
Properties
100 %
IntelliTrace
Solution Explorer
Call Stack
Immediate Window
Output
Find Symbol Results
Watch 1
Ready
Ln 9
Col 45
Ch 36
INS

Basic keyboard shortcuts

- Ctrl + F5 – run
- F5 – run with debug
- Ctrl + Shift + B – build
- Ctrl + K, D – auto-format
- Ctrl + K, C – comment
- Ctrl + K, U – uncomment

How to run your app?

- From IDE
- Directly from the OS…
- … Where is my program!?

Summary

- What is a programming language?
- What is a variable?
- What are types and why do we need them?
- How to communicate with a user?
- What is the structure of a basic program
- What tools will we use?