C# programming language. The beginning

Course

Programming Languages

Semester 2, FIIT

Mayer S.F.

Mikhalkovich S.S

LECTURE # 2, 3. Basic constructions

Conditional if statement

```
string answer;
            if (answer == "yes")
            {
                // Block of code executes if the value of the
                // answer variable is "yes".
            }
            else
            {
                // Block of code executes if the value of the
                // answer variable is not "yes".
            }
```

Else if clauses

```
string answer;
            if (answer == "yes")
            {
                // Block of code executes if the value of the
                // answer variable is "yes".
            }
            else if (answer == "I_don't_know")
            {
                // Block of code executes if the value of the
                // answer variable is "I_don't_know".
            }
            else
            {
                // Block of code executes if the value of the
                // answer variable is neither above answers.
            }
```

Switch Statement

```
string answer=Console.ReadLine();
switch (answer)
 {
    case "yes":
        // Block of code executes if the value of answer is
        // "yes".
         break;
    case "I_don't_know":
         // Block of code executes if the value of answer is
         // "I_don't_know".
         break;
    case "no":
         // Block of code executes if the value of answer is
         // "no".
         break;
    default:
         // Block executes if none of the above conditions
         // are met.
         break;
  }
```

Samples

```
if (a<b)
  min = a;
else min = b;
```

Logical **and**

```
if (i==0 && i!=1)
  i++;
else i--;
```

```
if (x<y)
{
  var t = x;
  x = y;
  y = t;
}
```

Logical **or**

```
if (i > 0 || i % 2 == 0 )
  i+=2;
```

```
switch (i)
{
  case 1:
    WriteLine("First");
    break;
  case 2:
  case 3:
    WriteLine("Second");
    break;
  default:
    WriteLine("Third");
    break;
}
```

Ternary operator

```
int five = 5;
bool answer = five == 5 ? true : false; // answer = true
```

Ternary operator

```
var rand = new Random();
var weather = rand.Next(-20,20);
string s = weather > 5 ? "good" : "bad";
Console.WriteLine($"{weather} = {s}");
```

Tasks

Lesson #2, task 2

All the rest of Lesson #2 students have to do themselves https://labs-org.ru/c-sharp2-eng/

Loops

For loops & Foreach loops

```
for (int i = 0; i < 10; i++)
                {
                    // Code to execute
                }
```

```
string s = "loops";
    // Process each character in the s:
    foreach (char c in s)
                {
                    // Code to execute
                }
```

An example of how to use a foreach loop **to iterate the characters of a string:**

```
string s = "loops";
            // process each character in the s:
            foreach (char c in s)
            {
                Console.Write($"{c} "); // l o o p s
            }
```

An example of how to use a foreach loop **to iterate a string array:**

```
string[] names = new string[5] {
        "Ivan", "Max","Olga","Maria","Mike"
};
            // process each name in the array
            foreach (string name in names)
            {
                Console.Write($"{name} ");
                // output: Ivan Max Olga Maria Mike
            }
```

while

```
string answer = Console.ReadLine();
while (answer != "Quit") // "Quit" - is a special value to
end the loop
            {
                // Process the data
                answer = Console.ReadLine();
            }
```

Do while

```
string answer;
do
     {
        // Process the data
        answer = Console.ReadLine();
     } while (answer != "Quit");
```

Loops samples

```
i=5; j=0;
while (i>0)
{
  i--;
  j++;
}
```

```
i=5; j=0;
while (i>0)
{
  i--;
  j++;
}
```

```
for (int i=0; i<10; i++)
  Write($"{i} ");
```

```
for (var i=1; i<100; i*=2)
  Write($"{i} ");
```

```
foreach (var x in a)
  Write($"{x} ");
```

Lecture task

Lesson #3, task 6

All the rest of Lesson #3 students have to do themselves https://labs-org.ru/c-sharp3-eng/

Exceptions

Exceptions

Exceptions are the best mechanism for error handling. An exception throws by a code with run-time error, and catches by a code that can handle an error. If the exception is not handled by a program, then the program terminates with crash.

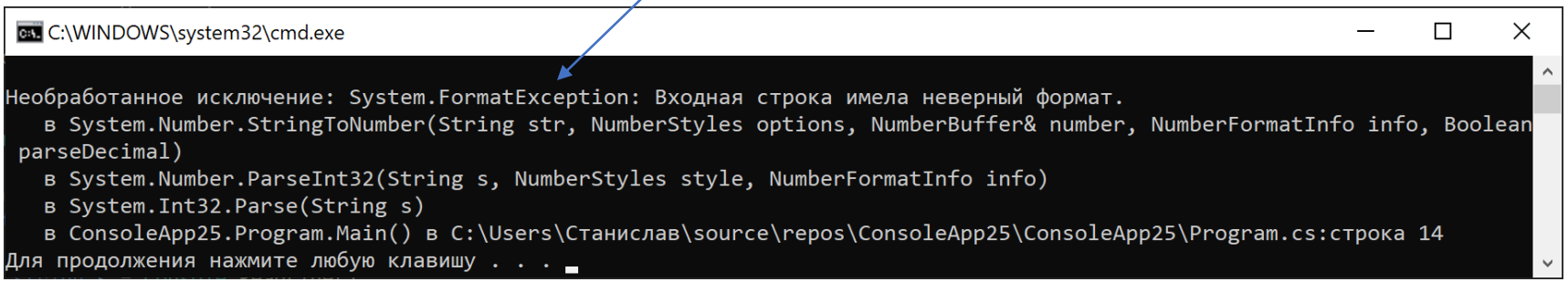
An exception in C# is an object of an Exception class or some inherited class. Name of a class defines type of exception.

Example. Bad input.

```
static void Main()
{
    string s = Console.ReadLine();
    var a = int.Parse(s);
}
```

```
abc
```

Exception type:
System.FormatException



Exception handling

1 case – without an Exception

```
try
{
    string s = Console.ReadLine();
    int i = int.Parse(s);

    Console.WriteLine("NextLine");
}
catch (Exception e)
{
    Console.WriteLine("We catch the exception !!!");
}

Console.WriteLine("everything is good!");
```

23

```
1323
NextLine
everything is good!
```

Exception handling

2 case – with an Exception

```
try
{
    string s = Console.ReadLine();
    int i = int.Parse(s);

    Console.WriteLine("NextLine");
}
catch (Exception e)
{
    Console.WriteLine("We catch the exception !!!");
}

Console.WriteLine("everything is good!");
```

hello

```
fdgh
We catch the exception !!!
everything is good!
```

Exception handling

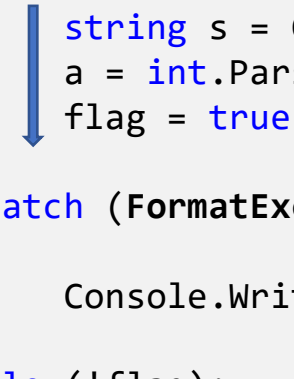
The exceptions are handled in **try … catch** block.

When inside **try** block an exception appears, the program execution goes to the first appropriate exception handler – **catch** block.

If there are no handlers for the created exception, the program terminates with an error message.

Example. Bad input.

```
int a = 0;
bool flag = false;
do {
    try
    {
        string s = Console.ReadLine();
        a = int.Parse(s);
        flag = true;
    }
    catch (FormatException e)
    {
        Console.WriteLine(e.Message + " Repeat input");
    }
} while (!flag);
Console.WriteLine(a + " OK");
```



Exception handling

The exceptions are handled in try … catch block.

When inside try block an exception appears, the program execution goes to the first appropriate exception handler – catch block.

If there are no handlers for the created exception, the program terminates with an error message.

Example. Bad input.

```
int a = 0;
bool flag = false;
do {
    try
    {
        string s = Console.ReadLine();
        a = int.Parse(s);
        flag = true;
    }
    catch (FormatException e)
    {
        Console.WriteLine(e.Message + " Повторите ввод");
    }
} while (!flag);
Console.WriteLine(a + " OK");
```

Exception handling 2

Type value exceeding:

```
int a = int.Parse(Console.ReadLine());
int power = int.Parse(Console.ReadLine());
int result;
if (Math.Pow(a,power)> int.MaxValue)
{
    throw new InvalidOperationException("exceeds maximum Int32");
}
else
{
    result = (int)Math.Pow(a, power);
}
```

Lecture task

Lesson #4, lab 3

All the rest of Lesson #4 students have to do themselves https://labs-org.ru/c-sharp3-eng/