

*Поговорим о C++...*

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# Объекты, типы и значения

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# Объект

- ❖ Объект - место в памяти, имеющее тип, который определяет вид информации, разрешенной для хранения.
- ❖ Переменная - именованный объект
- ❖ Типы:
  - ❖ Строки - string
  - ❖ Целый числа - int
  - ❖ Другие типы...



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# Ввод-вывод текста

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- ❖ Вывод текста: cout << переменная или константа
- ❖ Ввод текста: cin >> переменная

# Объявление переменной

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- ❖ тип название;
- ❖ тип название = значение;
  
- ❖ int age = 25;
- ❖ string s;
- ❖ string name = “Ann”;

CppApp - Microsoft Visual Studio

File Edit View GitExt Project Build Debug Profiler Team Tools Architecture Test Analyze Window Help

Quick Launch (Ctrl+Q) Elizaveta Golenok EG

Debug x86 Local Windows Debugger

CppApp.cpp X CppApp

(Global Scope) main()

```
1 #include "stdafx.h"
2 #include <iostream>
3 #include <string>
4
5 using namespace std;
6
7 int main()
8 {
9     cout << "Please, input your name and press enter" << endl;
10    string name;
11    cin >> name;
12
13    cout << "Your name: " + name << endl;
14    return 0;
15 }
```

Solution Explorer

Search Solution Explorer (Ctrl+F)

Solution 'CppApp' (1 project)

- CppApp
  - Debug
    - CppApp.tlog
    - CppApp.log
    - CppApp.obj
    - CppApp.pch
    - vc140.idb
    - vc140.pdb
  - CppApp.cpp
  - packages.config
  - ReadMe.txt
  - stdafx.cpp
  - stdafx.h
  - targetver.h

Properties

main VCCodeFunction

C++

| Name         | Value   |
|--------------|---|
| Name         | main  |
| File         | c:\Users\elizaveta\Documents\Visual Studio 2017\Projects\CppApp\CppApp\main.cpp |
| FullName     | main  |
| IsDefault    | False   |
| IsDelete     | False   |
| IsFinal      | False   |
| IsInjected   | False   |
| IsInline     | False   |
| IsOverloaded | False   |
| IsSealed     | False   |
| IsTemplate   | False   |
| TypeString   | int   |

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CppApp.cpp

CppApp

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C++

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C++

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C++

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# Определение

- ❖ Определение - инструкция, вводящая новое имя в программе и выделяющая память для переменной

```
string  
name    Elizaveta
```

```
Please, input your name and press enter
Elizaveta
Your name: Elizaveta
```

afx.h"  
tream>  
ing>

```
5     using namespace std;
6
7     int main()
8     {
9         cout << "Please i
```

# Типы

- ❖ int - целое число
- ❖ int a = 1;
- ❖ int a = 2
- ❖ int a = 5.5;
- ❖ int a = "sdsd";

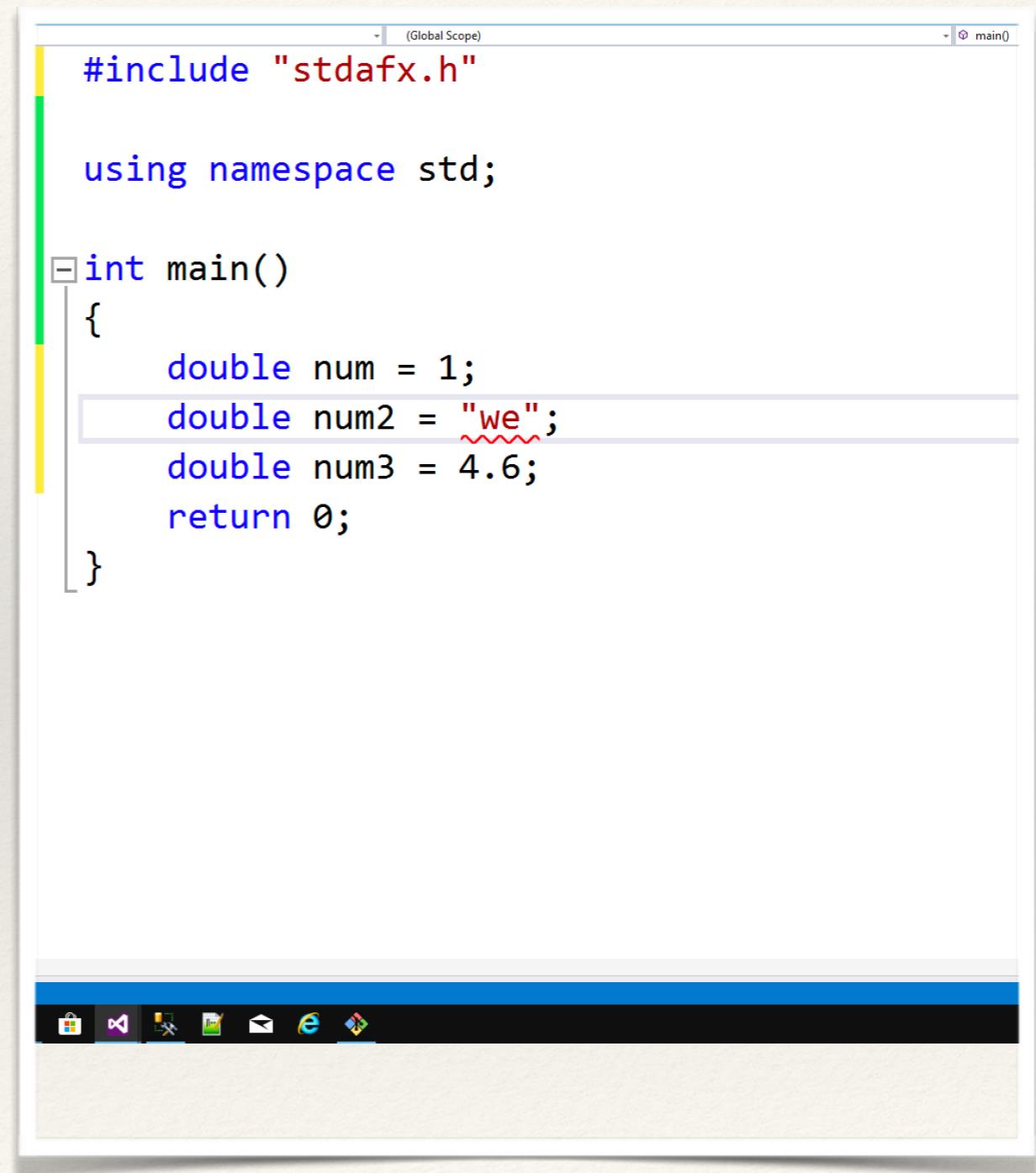
```
#include "stdafx.h"
#include <iostream>
#include <string>

using namespace std;

int main()
{
    int num = 1;
    int num2 = "we";
    int num3 = 4.6; //num = 4!!!
    return 0;
}
```

# Типы

- ❖ double - число с плавающей точкой
- ❖ double a = 1;
- ❖ double a = 2.4;
- ❖ double a = 4.6e+1;
- ❖ double a = 4.3fgwewe;
- ❖ double a = “sdsd”;



The screenshot shows a Windows desktop environment with a code editor window open. The window title is "main()". The code editor displays the following C++ code:

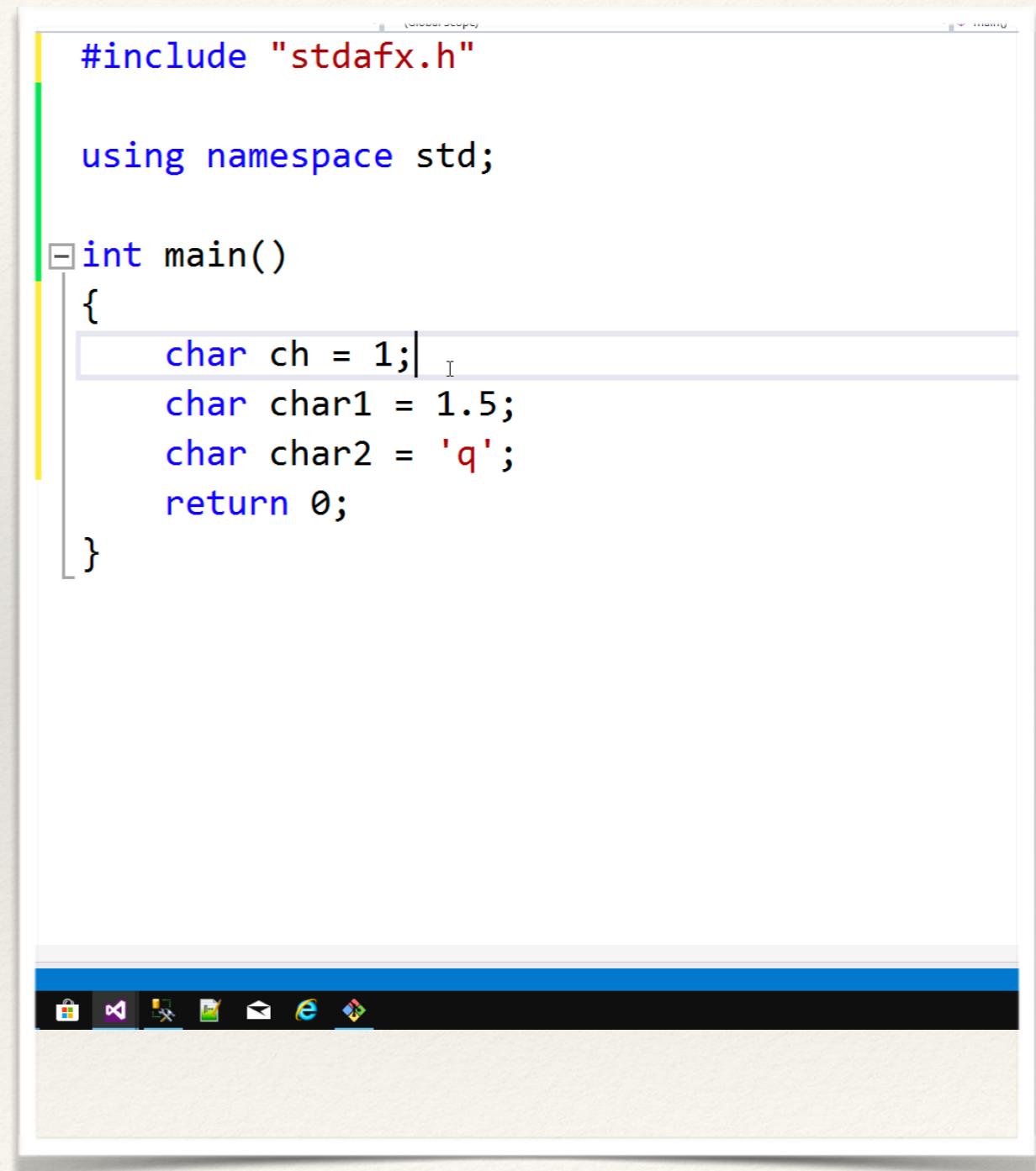
```
#include "stdafx.h"
using namespace std;

int main()
{
    double num = 1;
    double num2 = "we";
    double num3 = 4.6;
    return 0;
}
```

The line "double num2 = "we";" is highlighted with a red wavy underline, indicating a syntax error. The code editor interface includes a status bar at the bottom showing various icons.

# Типы

- ❖ char - символ
- ❖ char a = 'r';
- ❖ char a = 2.4;
- ❖ char a = 'fsd';
- ❖ char a = "dfdg";



A screenshot of a Windows operating system desktop. In the center is a code editor window titled "Untitled - Visual Studio 2010". The code in the editor is:

```
#include "stdafx.h"

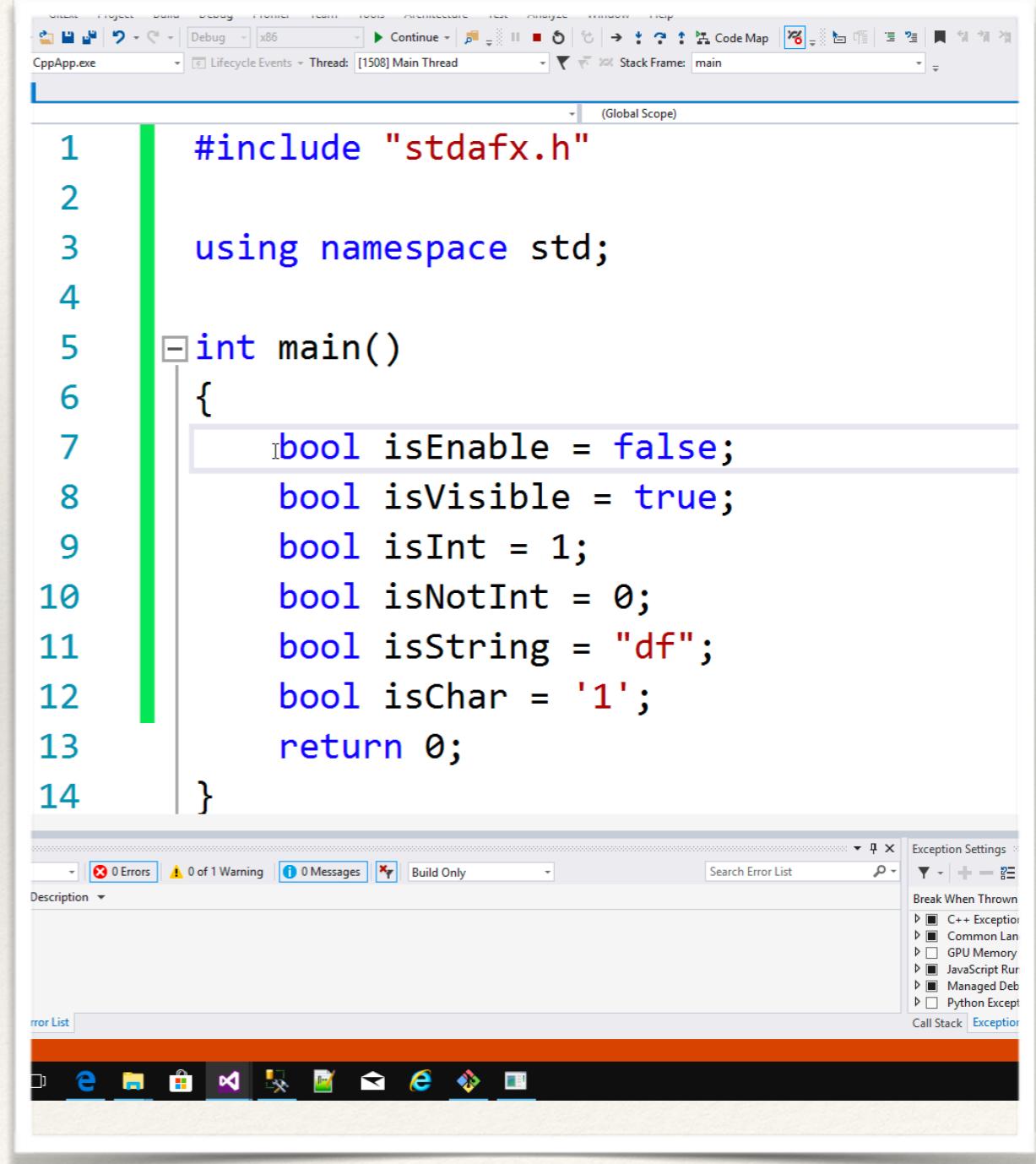
using namespace std;

int main()
{
    char ch = 1;
    char char1 = 1.5;
    char char2 = 'q';
    return 0;
}
```

The code editor has color-coded syntax highlighting: blue for keywords like #include, using, namespace, int, and return; red for strings like "stdafx.h" and "std"; and black for comments and regular text. The code is written in C++.

# Типы

- ❖ bool - логический тип
  - ❖ false
  - ❖ true



The screenshot shows the Microsoft Visual Studio IDE interface. The code editor displays the following C++ code:

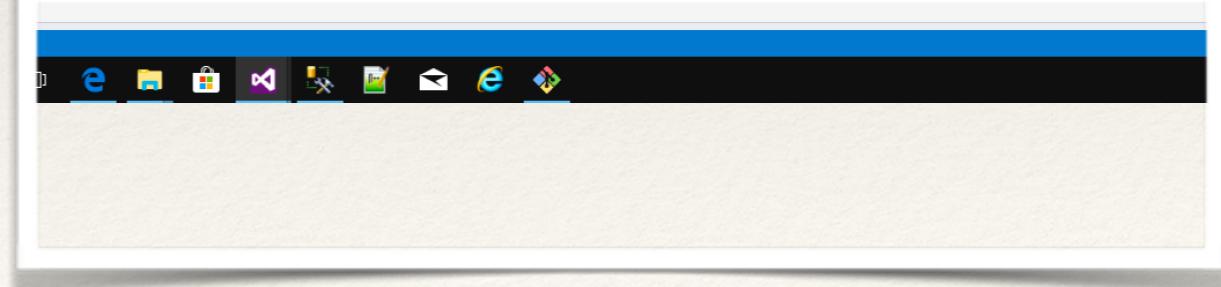
```
#include "stdafx.h"
using namespace std;
int main()
{
    bool isEnabled = false;
    bool isVisible = true;
    bool isInt = 1;
    bool isNotInt = 0;
    bool isString = "df";
    bool isChar = '1';
    return 0;
}
```

The code editor has syntax highlighting where 'bool' is blue, variable names are black, and strings are red. A green vertical bar highlights the first few lines of the code. The status bar at the bottom shows '0 Errors', '0 of 1 Warning', '0 Messages', and 'Build Only'. The bottom right corner shows the Windows taskbar with several pinned icons.

# Типы

- ❖ string - строковый тип,  
необходимо подключить  
`<string>`
- ❖ `string a = "str";`
- ❖ `string name = "My Name";`

```
1 #include "stdafx.h"
2 #include <string>
3
4 using namespace std;
5
6 int main()
7 {
8     string name = "Ann";
9     string surname = 345;
10    string test = sdfsfdf;
11
12 }
```



CppApp (Debugging) - Microsoft Visual Studio

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Process: [11228] CppApp.exe Lifecycle Events Thread: [12496] Main Thread Stack Frame: main

Quick Launch (Ctrl+Q)

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CppApp.cpp (Global Scope) main()

```
1 #include "stdafx.h"
2 #include <string>
3 #include <iostream>
4
5 using namespace std;
6
7 int main()
8 {
9     string name;
10    int age;
11
12    cout << "Please input name and press 'enter'" << endl;
13    cin >> name;
14
15    cout << "Please input age and press 'enter'" << endl;
16    cin >> age;
17
18    cout << "Your name - " << name << ", age - " << age;
19
20    return 0;
21 }
```

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C:\Users\elizaveta\Documents\Visual Studio 2015\Projec...



1 Please input name and press 'enter'  
2 Elizaveta  
3 Please input age and press 'enter'  
4 25  
5 Your name - Elizaveta, age - 25

8 {

9     string name;  
10    int age;

# Базовые операции и операторы

---

- ❖ double sum = 3 + 5;
  - ❖ double sum2 = sum + 10;
  - ❖ double sum3 = sum + sum2;
- 
- ❖ Используем операции +,-,\*,-
  - ❖ = - присвоить

# Базовые операции и операторы

---

- ❖ double sum = 3 + 5;
- ❖ sum = (3 + 5);
- ❖ sum = 8;
- ❖ sum = 5 + 7 \* 3;
- ❖ sum = 5 + (7 \* 3);
- ❖ sum = 5 + 21;
- ❖ sum = 26;

|                                | <b>bool</b>         | <b>char</b>         | <b>int</b>          | <b>double</b>       | <b>string</b>       |
|--------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Присваивание                   | =                   | =                   | =                   | =                   | =                   |
| Сложение                       |                     |                     | +                   | +                   |                     |
| Конкатенация                   |                     |                     |                     |                     | +                   |
| Вычитание                      |                     |                     | -                   | -                   |                     |
| Умножение                      |                     |                     | *                   | *                   |                     |
| Деление                        |                     |                     | /                   | /                   |                     |
| Остаток                        |                     |                     | %                   |                     |                     |
| Инкремент на 1                 |                     |                     | ++                  | ++                  |                     |
| Декремент на 1                 |                     |                     | --                  | --                  |                     |
| Инкремент на <b>n</b>          |                     |                     | + = n               | + = n               |                     |
| Добавить в конец               |                     |                     |                     |                     | + =                 |
| Декремент на <b>n</b>          |                     |                     | - = n               | - = n               |                     |
| Умножить и присвоить           |                     |                     | * =                 | * =                 |                     |
| Поделить и присвоить           |                     |                     | / =                 | / =                 |                     |
| Найти остаток и присвоить      |                     |                     | % =                 |                     |                     |
| Считать из <b>a</b> в <b>x</b> | <b>s &gt;&gt; x</b> |
| Записать <b>x</b> в <b>a</b>   | <b>s &lt;&lt; x</b> |
| Равно                          | ==                  | ==                  | ==                  | ==                  | ==                  |
| Не равно                       | !=                  | !=                  | !=                  | !=                  | !=                  |
| Больше                         | >                   | >                   | >                   | >                   | >                   |
| Больше или равно               | >=                  | >=                  | >=                  | >=                  | >=                  |
| Меньше                         | <                   | <                   | <                   | <                   | <                   |
| Меньше или равно               | <=                  | <=                  | <=                  | <=                  | <=                  |

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# Упражнения

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- ❖ Напишите Ваш возраст с точностью до месяца
- ❖ Напишите Ваш возраст с точностью до дня
- ❖ Посчитайте - сколько секунд в месяце
- ❖ Посчитайте - сколько минут в году

---

# Домашнее задание

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- ❖ Посчитайте - сколько минут в январе
- ❖ Посчитайте сколько грамм молока в 3л бутылке
- ❖ Посчитайте - сколько в Вашем доме квартир
- ❖ Посчитайте - сколько окон в Вашем доме

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# Самостоятельная работа

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- ❖ Что такое инкремент / декремент?
- ❖ Что такое конкатенация?
- ❖ Операции сравнения
- ❖ Составные операторы присваивания
- ❖ Типы и объекты в памяти

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# Литература для подготовки

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- ❖ Б. Страуструп - “Программирование, практика и использование C++” - Глава 3-3.8 (включительно)