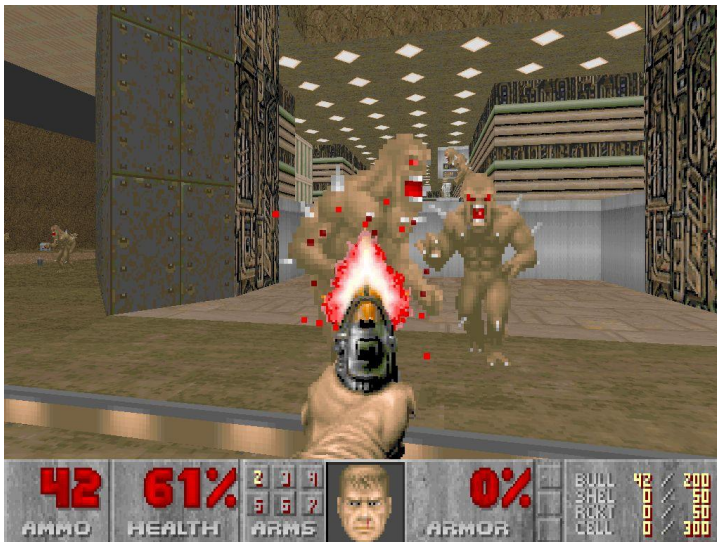


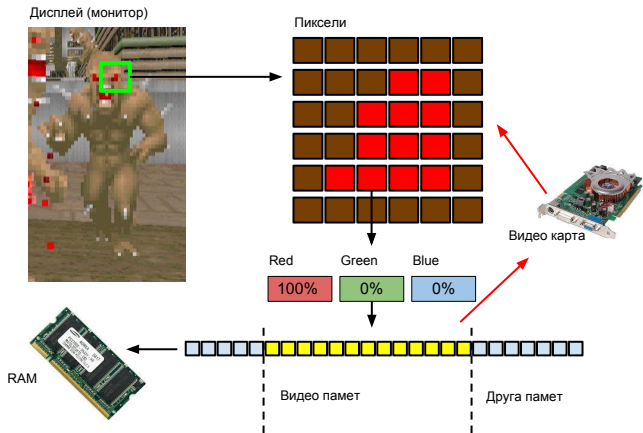
Въведение в курса. Програми, езици от високо ниво,
базова структура на програма, променливи, вход и
изход, условен оператор и цикъл

7 октомври 2016 г.

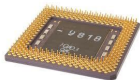
Програмиране?



Как работи?



Програми

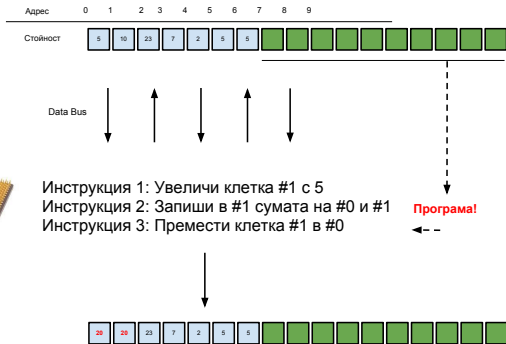


ЕЗИК ОТ ВИСОКО НИВО

```
int a = 5;
int b = 10;
```

```
b = b + 5;
b = a + b;
a = b;
```

КОМПИЛАТОР--->



Променливи

- Стойност

```
int a = 5;  
int b = 10;
```



- Адрес

- Присвояване на стойност

```
b = a + b;
```

- Последователност на операциите

```
int a = 5;  
int b = 10;  
b = a + b;  
b = a + b;
```

Език за програмиране C++

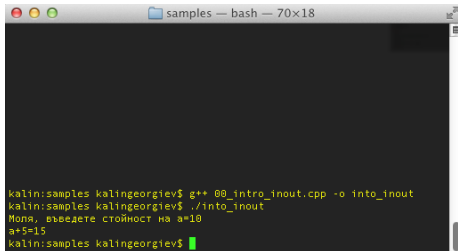
Базова структура. Вход/изход

```
#include <iostream>
using namespace std;

int main ()
{
    int a;

    cout << "Please, input the value of a=";
    cin >> a;
    cout << "a+5=" << a+5 << endl;

    return 0;
}
```



```
kalin:samples kalingeorgiev$ g++ 00_intro_inout.cpp -o into_inout
kalin:samples kalingeorgiev$ ./into_inout
Моля, въведете стойност на a=10
a+5=15
kalin:samples kalingeorgiev$
```

- Променлива
- Константи: низови, числови
- Аритметични операции
- Конзола

Пример: Средно аритметично

```
#include <iostream>
using namespace std;

int main ()
{

    int a,b,c; //DOUBLE!!!

    cout << "Please ,_input_the_value_of_a=";
    cin >> a;
    cout << "Please ,_input_the_value_of_b=";
    cin >> b;
    cout << "Please ,_input_the_value_of_c=";
    cin >> c;

    cout << "average=" << (a+b+c)/3 << endl;

    return 0;

}
```

Условен оператор

- Проверка на условие:

```
int a;  
  
cin >> a;  
  
if (a > 5) {  
    cout << "a is greater than 5";  
} else {  
    cout << "a is less than or equal to 5";  
}
```

- Прости видове условия за числа: >, >=, <, <=, ==, !=

Вложени оператори

```
int a = 701;

if (a > 20){
    if (a < 200){
        cout << "CASE_1";
    } else if (a < 700) {
        cout << "CASE_2";
    } else {
        cout << "CASE_3";
    }
}
```

Вложени оператори

```
int a = 701;

if (a > 20){
    if (a < 200){
        cout << "CASE_1";
    } else if (a < 700) {
        cout << "CASE_2";
    } else {
        cout << "CASE_3";
    }
}
```

```
int a = 701;

if (a > 20){
    if (a < 200){
        cout << "CASE_1";
    }
    else
        if (a < 700) {
            cout << "CASE_2";
        }
}
else {
    cout << "CASE_3";
}
```

Пример: най-голямото от 3 числа

```
if (a > b){
    if (b > c){
        cout << "max_=" << a << endl;
    } else if (a > c)
        cout << "max_=" << a << endl;
    } else {
        cout << "max_=" << c << endl;
    }
} else //b >= a {
    if (a > c){
        cout << "max_=" << b << endl;
    } else if (b > c)
        cout << "max_=" << b << endl;
    } else {
        cout << "max_=" << c << endl;
    }
}
```

```
if (a > b){
    if (b > c || a > c){
        cout << "max_=" << a << endl;
    } else {
        cout << "max_=" << c << endl;
    }
} else {
    if (a > c || b > c){
        cout << "max_=" << b << endl;
    } else {
        cout << "max_=" << c << endl;
    }
}

if (a > b && a > c){
    cout << "max_=" << a << endl;
} else if (b > a && b > c) {
    cout << "max_=" << b << endl;
} else {
    cout << "max_=" << c << endl;
}
```

Пример: най-голямото от 3 числа

```
if (a > b){
    if (b > c){
        cout << "max_=" << a << endl;
    } else if (a > c)
        cout << "max_=" << a << endl;
    } else {
        cout << "max_=" << c << endl;
    }
} else //b >= a {
    if (a > c){
        cout << "max_=" << b << endl;
    } else if (b > c)
        cout << "max_=" << b << endl;
    } else {
        cout << "max_=" << c << endl;
    }
}
```

```
if (a > b){
    if (b > c || a > c){
        cout << "max_=" << a << endl;
    } else {
        cout << "max_=" << c << endl;
    }
} else {
    if (a > c || b > c){
        cout << "max_=" << b << endl;
    } else {
        cout << "max_=" << c << endl;
    }
}
```

```
if (a > b && a > c){
    cout << "max_=" << a << endl;
} else if (b > a && b > c) {
    cout << "max_=" << b << endl;
} else {
    cout << "max_=" << c << endl;
}
```

Пример: най-голямото от 3 числа

```
if (a > b){
    if (b > c){
        cout << "max_=" << a << endl;
    } else if (a > c)
        cout << "max_=" << a << endl;
    } else {
        cout << "max_=" << c << endl;
    }
} else //b >= a {
    if (a > c){
        cout << "max_=" << b << endl;
    } else if (b > c)
        cout << "max_=" << b << endl;
    } else {
        cout << "max_=" << c << endl;
    }
}
```

```
if (a > b){
    if (b > c || a > c){
        cout << "max_=" << a << endl;
    } else {
        cout << "max_=" << c << endl;
    }
} else {
    if (a > c || b > c){
        cout << "max_=" << b << endl;
    } else {
        cout << "max_=" << c << endl;
    }
}

if (a > b && a > c){
    cout << "max_=" << a << endl;
} else if (b > a && b > c) {
    cout << "max_=" << b << endl;
} else {
    cout << "max_=" << c << endl;
}
```

Булеви (логически) операции AND (\wedge) и OR (\vee)

<code>&&</code>	true	false
true	true	false
false	false	false

<code> </code>	true	false
true	true	true
false	true	false

Пример: Корени на $ax^2 + bx + c = 0$

```
double a, b, c;

cin >> a >> b >> c;

int D = b*b - 4*a*c;

if (D < 0){
    cout << "NO roots!";
} else if (D == 0) {
    cout << "ONE root, x=" << (-b)/2*a << endl;
} else {
    cout << "TWO roots, x1=" << (-b-sqrt(D))/2*a << endl <<
        "x2=" << (-b+sqrt(D))/2*a << endl;
}
}
```

Циклични процеси

Пример: Средно аритметично (отново)

```
#include <iostream>
using namespace std;

int main ()
{

    int a,b,c; //DOUBLE!!!

    cout << "Please ,_input_the_value_of_a=";
    cin >> a;
    cout << "Please ,_input_the_value_of_b=";
    cin >> b;
    cout << "Please ,_input_the_value_of_c=";
    cin >> c;

    cout << "average=" << (a+b+c)/3 << endl;

    return 0;

}
```

Пример: Средно аритметично на 10 числа

```
#include <iostream>
using namespace std;

int main ()
{
    int number, sum = 0;

    for (int counter = 0; counter < 10; counter++){
        cout << "Please enter number #" << counter << ":";
        cin >> number;
        sum = sum + number;
    }

    cout << "The average is " << sum / 10;
}
```