



УВОД В ПРОГРАМИРАНЕТО

C++



Системна конзола

Често системната конзола наричаме:

- Конзола
- Системна конзола
- Компютърна конзола

Дефиниция:

- устройството, чрез което подаваме **команди** на компютъра в текстов вид и получаваме резултатите от тяхното изпълнение отново като текст.

Windows → Command prompt(cmd)
Linux & Mac → Terminal



Представяне на текст

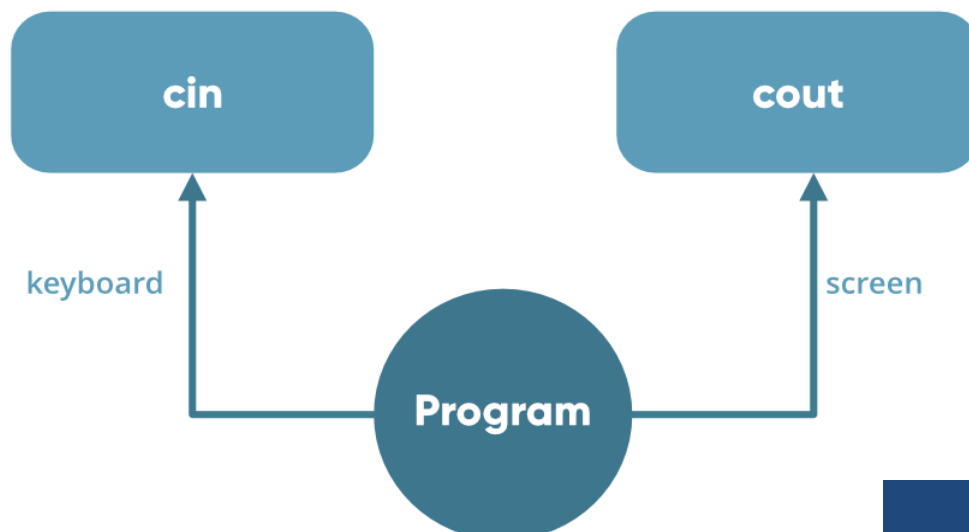
- Data is bytes of 1s and 0s
- Interpreted in different ways
- Interpretation & size = data type
- Characters (text) is just another interpretation of binary data
- Text is just a sequence of characters
- A character (letter, symbol, etc.) is just one or more bytes
- The binary representation of a number
- Interpreted as a code point from a character set (charset)
- Character set – a group of characters (Latin, Cyrillic, etc.)
- Code point – unique number assigned to a character in a charset
- E.g. ASCII code point 65 (0x41) is 'A' (English capital letter A)
- Unicode unifies charsets to represent all the world's characters

0	1	2	3	4
H	E	L	L	O



Console input and output

- ***Input/Output*** in C++ - под формата на поредица от байтове или по-популярните streams
- ***Input Stream***: If the direction of flow of bytes is from the device(for example, Keyboard) to the main memory then this process is called input.
- ***Output Stream***: If the direction of flow of bytes is opposite, i.e. from main memory to device(display screen) then this process is called output.





Променливи/Variables

- Променлива(variable) е името, с което ще обозначаваме място/местоположение в паметта.
 - То е основната единица за запазване/съхранение в програмирането.
 - Variables can be changed
 - All the operations done on the variable effect the memory location.
 - In C++, all the variables must be declared before use.
- **How to declare variables?**
 - **Difference between variable declaration and definition**
 - **Types of variables(*local* and *static* variables)?**



Data Types

DATA TYPE	SIZE (IN BYTES)	RANGE
short int	2	-32,768 to 32,767
unsigned short int	2	0 to 65,535
unsigned int	4	0 to 4,294,967,295
int	4	-2,147,483,648 to 2,147,483,647
long int	4	-2,147,483,648 to 2,147,483,647
unsigned long int	4	0 to 4,294,967,295
long long int	8	$-(2^{63})$ to $(2^{63})-1$
unsigned long long int	8	0 to 18,446,744,073,709,551,615
signed char	1	-128 to 127
unsigned char	1	0 to 255
float	4	
double	8	
long double	12	
wchar_t	2 or 4	1 wide character

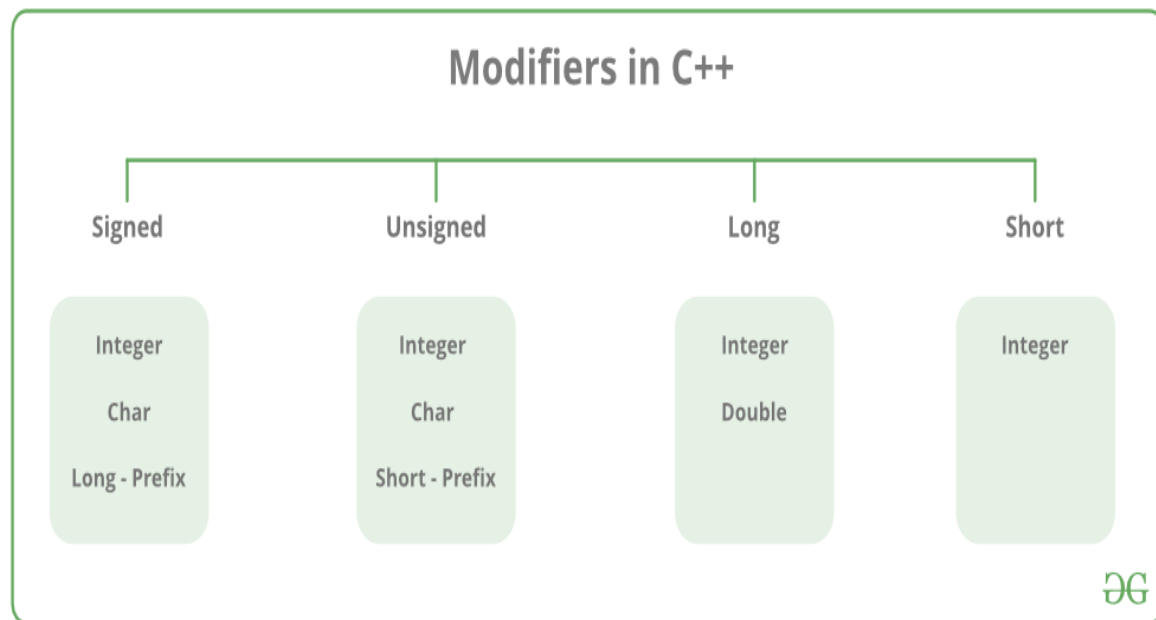


Data Types

Type	Bit width	Description	Range
bit	1	To define a bit of data	0 - 1
Char	8	Character or small integer.	signed: -128 to 127 unsigned: 0 to 255
Short Int	16	Used to define integer numbers	signed: -32768 to 32767 unsigned: 0 to 65535
Long int	32	Used to define integer numbers	signed: -2147483648 to 2147483647 unsigned: 0 to 4294967295
Float	32	Define floating point number	1.175e-38 to 3.40e+38
Double	32	Used to define largest integer numbers	1.175e-38 to 3.40e+38 Note: in other C ref 64 bit
bool	8	Boolean value.	true or false
* (pointer)	width of memory	Use for addressing memory	Range of memory



Data Types





Arithmetic operations

Arithmetic Operators

Operators	Meaning	Example	Result
+	Addition	4+2	6
-	Subtraction	4-2	2
*	Multiplication	4*2	8
/	Division	4/2	2
%	Modulus operator to get remainder in integer division	5%2	1



Arithmetic operations

Introduction to C++

Compound Assignment Operators

- Lets suppose variable **A** hold 8 and **B** hold 3.

Operator	Example (int A=8, B=3)	Result
+=	A += B or A = A + B	11
-=	A -= 3 or A = A - 3	5
*=	A *= 7 or A = A * 7	56
/=	A /= B or A = A / B	2
%=	A %= 5 or A = A % 5	3
a=b	Value of b will be assigned to a	



Other operators

- Increment and decrement (++ , --)

OPERATOR	MEANING
++a	Increment a by 1, then use new value of a
a++	Use value of a, then increment a by 1
--b	Decrement a by 1, then use new value of a
b--	Use value of a, then decrement a by 1

- Relational and comparison operators (==, !=, >, <, >=, <=)

Operators	Meaning	Example	Result
<	Less than	5<2	False
>	Greater than	5>2	True
<=	Less than or equal to	5<=2	False
>=	Greater than or equal to	5>=2	True
==	Equal to	5==2	False
!=	Not equal to	5!=2	True



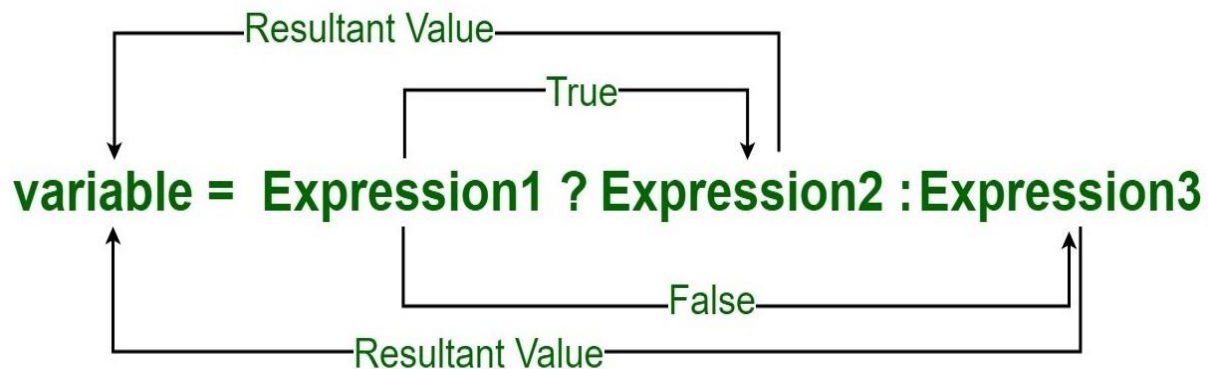
Other operators

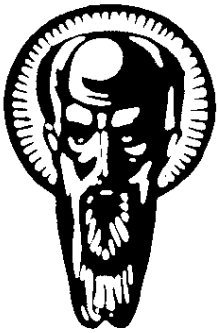
- Comma operator (,)
- Sizeof
- Logical Operators

<u>a</u>	<u>b</u>	<u>a && b</u>	<u>a b</u>	<u>!a</u>	<u>!b</u>
false	false	false	false	true	true
false	true	false	true	true	false
true	false	false	true	false	true
true	true	true	true	false	false

- Ternary operator

variable = *Expression1* ? *Expression2* : *Expression3*





ВЪПРОСИ