**THE ASCII CODE**

In any computing system, data – of any type – is stored as numbers. Moreover, they are represented in base 2. Consequently, in order to store characters in the computer, it is necessary to use a representation of **characters** by numbers. One such representation is **the ASCII Code**.

**Introduction**

ASCII is a form of computer **representation of characters** used in all programming languages ​​studied in high school, possibly alongside other representations.

The standard ASCII code encodes characters using 7 bits, so it allows 27=128 characters to be encoded. There aren't too many! In fact, only the letters of the English alphabet, the numbers 0 to 9, punctuation marks and operators, and other symbols are encoded. The letters specific to other Latin alphabets (so-called letters with **diacritics**, such as ă Ă Î â Âș Ș Ș ș Ș ţ Ș Ș Ș Ș Ř Ř are completely missing (we note that there are two types of Ș and two types of Ţ), as well as letters from other alphabets: Cyrillic, Hebrew, Arabic, Chinese, etc. The Extended ASCII code, or the code, can be used to memorize these letters **UNICODE**.

Through the ASCII code, each character represented in this code is associated with a number. These numbers (also called ASCII codes) are found in the range 0 .. 127. ASCII characters are divided into two categories:

* printable characters – those with ASCII codes in the range 32 126, including heads: all characters that have a well-defined graphic representation are found here:
* capital letters: A ... Z,
* lowercase letters: a ... z,
* the numbers 0 .. 9,
* the punctuation marks .,:;!?'"
* characters representing arithmetic or other operations: + - / \* <> = (){}[]
* other characters: ~`@#$%^&\_\|
* **space character**
* unprintable, or control characters – with the codes 0 .. 31 and 127. They were used earlier to control data transmission. Non-printable characters do not have a well-defined graphical representation – depending on the operating system used, the graphical representations of these characters can be very different, or even missing altogether. Among these characters, we mention two, of greater importance in the studied programming languages:
* the character with the code 0, also called the **null character**, denoted in C++ with '\0' - represents the end of a string of characters in memory
* character with code 10, called **Line Feed**, denoted in C++ with '\n' – produces a newline when displayed on the screen or in a file.

**Useful observations**

* uppercase letters and lowercase letters are different – ​​they have different ASCII codes
* the ASCII codes of the uppercase (or lowercase) letters are in order: 'A' has the code 65, 'B' has the code 66, .. , 'Z' has the code 90. Two consecutive characters in the alphabet have consecutive ASCII codes! Also, the letter 'a' has the code 97, etc.
* the ASCII codes of lowercase letters are greater than the ASCII codes of uppercase letters ('a' > 'Z') and the difference between the ASCII codes of two letters (lowercase – uppercase) is 32.
* the digits have consecutive codes: the character '0' has the code 48, the character '1' has the code 49, etc. \*We note that the character '0' does not have the ASCII code 0, but 48.
* the space character is a printable character. **Space** has ASCII code 32.

