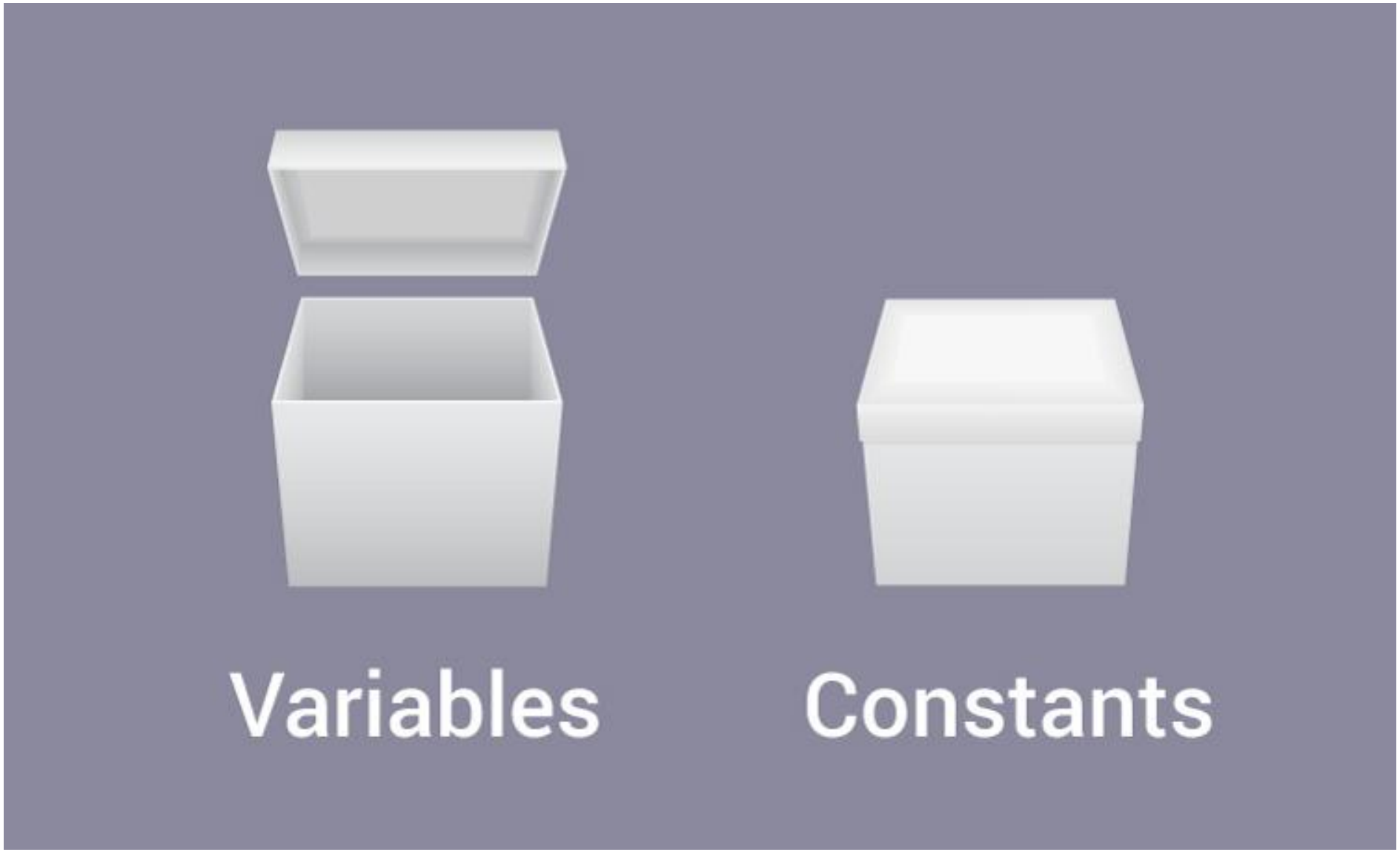
High and low level programming languages. Basics of programming languages

Objectives: describe programming languages, dividing them into types: low- and high-level;

explain variables, constants and identifiers and apply them correctly when programming.


Variables
Constants

Variables

In programming, a variable is a container (storage area) to hold data.
To indicate the storage area, each variable should be given a unique name (identifier).
Variable names are just the symbolic representation of a memory location. For example:

```
int playerScore = 95;
```

Here, playerScore is a variable of integer type. The variable is assigned value: 95.
The value of a variable can be changed, hence the name 'variable'.
In C programming, you have to declare a variable before you can use it.

Rules for naming a variable in C

1. A variable name can have letters (both uppercase and lowercase letters), digits and underscore only.
2. The first letter of a variable should be either a letter or an underscore. However, it is discouraged to start variable name with an underscore. It is because variable name that starts with an underscore can conflict with system name and may cause error.
3. There is no rule on how long a variable can be. However, only the first 31 characters of a variable are checked by the compiler. So, the first 31 letters of two variables in a program should be different.
   C is a strongly typed language. What this means it that, the type of a variable cannot be changed.

Constants

A constant is a value or an identifier whose value cannot be altered in a program. For example: 1, 2.5, "C programming is easy", etc.
As mentioned, an identifier also can be defined as a constant.

```
const double PI = 3.14
```

here, PI is a constant. Basically what it means is
that, PI and 3.14 is same for this program.
Below are the different types of constants you can use
in C.

1. Integer constants

An integer constant is a numeric constant (associated with number) without any fractional or exponential part. There are three types of integer constants in C programming:

- decimal constant(base 10)
- octal constant(base 8)
- hexadecimal constant(base 16)

For example:

```
Decimal constants: 0, -9, 22 etc
Octal constants: 021, 077, 033 etc
Hexadecimal constants: 0x7f, 0x2a, 0x521 etc
```

In C programming, octal constant starts with a 0 and hexadecimal constant starts with a 0x.

2. Floating-point constants

A floating point constant is a numeric constant that has either a fractional form or an exponent form. For example:

```
-2.0
0.0000234
-0.22E-5
```

Note: E-5 = 10^{-5}

3. Character constants

A character constant is a constant which uses single quotation around characters. For example: 'a', 'l', 'm', 'F'

4. Escape Sequences

Sometimes, it is necessary to use characters which cannot be typed or has special meaning in C programming. For example: newline(enter), tab, question mark etc. In order to use these characters, escape sequence is used.

For example: `\n` is used for newline. The backslash `( \ )` causes "escape" from the normal way the characters are interpreted by the compiler.

5. String constants

String constants are the constants which are enclosed in a pair of double-quote marks. For example:

```
"good"                          //string constant
""                              //null string constant
"      "                        //string constant of six white space
"x"                            //string constant having single character.
"Earth is round\n"              //prints string with newline
```

6. Enumeration constants

Keyword enum is used to define enumeration types. For example:

```
enum color {yellow, green, black, white};
```

Here, `color` is a variable and `yellow`, `green`, `black` and `white` are the enumeration constants having value 0, 1, 2 and 3 respectively. For more information, visit page: C Enumeration.