



# WORKBOOK

<http://agb.gymnaslo.cz>



**Subject: Computer science**

**Teacher:** .....

**Student:** .....

**School year:** ...../.....

## Topic: Variables and Constants

### What are variables?

Variables are names given to blocks of the computer's memory. The names are used to store values in these blocks of memory.

Variables can hold values which are either numbers, strings or Boolean. We already know what numbers are. Strings are made up of letters. Boolean variables can have one of two values, either True or False.



## Using variables

You must always declare a variable before you use it. We use the *var* statement to do this. You must also choose what type of variable it is. Here is a table of the different variable types:

Byte	0 to 255
Word	0 to 65535
ShortInt	-128 to 127
Integer	-32768 to 32767
LongInt	-4228250000 to 4228249000
Real	floating point values
Char	1 character
String	up to 255 characters
Boolean	true or false

Here is an example of how to declare an integer variable named i:

```
program Variables;  
  
var  
  i: Integer;  
  
begin  
end.
```

To assign a value to a variable we use :=.

```
program Variables;  
  
var  
  i: Integer;  
  
begin  
  i := 5;  
end.
```

You can create 2 or more variables of the same type if you separate their names with commas. You can also create variables of a different type without the need for another *var* statement.

```
program Variables;  
  
var  
  i, j: Integer;  
  s: String;  
  
begin  
end.
```

When you assign a value to a string variable, you must put it between single quotes. Boolean variables can only be assigned the values True and False.

```
program Variables;  
  
var  
  i: Integer;  
  s: String;  
  b: Boolean;  
  
begin  
  i := -3;  
  s := 'Hello';  
  b := True;  
end.
```

## Calculations with variables

Variables can be used in calculations. For example you could assign the value to a variable and then add the number 1 to it. Here is a table of the operators that can be used:

+	Add
-	Subtract
*	Multiply
/	Floating Point Divide
div	Integer Divide
mod	Remainder of Integer Division



The following example shows a few calculations that can be done:

```
program Variables;  
  
var  
    Num1, Num2, Ans: Integer;  
  
begin  
    Ans := 1 + 1;  
    Num1 := 5;  
    Ans := Num1 + 3;  
    Num2 := 2;  
    Ans := Num1 - Num2;  
    Ans := Ans * Num1;  
end.
```

Strings hold characters. Characters include the the letters of the alphabet as well as special characters and even numbers. It is important to understand that integer numbers and string numbers are different things. You can add strings together as well. All that happens is it joins the 2 strings. If you add the strings '1' and '1' you will get '11' and not 2.

```
program Variables;  
  
var  
    s: String;  
  
begin  
    s := '1' + '1';  
end.
```

You can read vales from the keyboard into variables using *Readln* and *ReadKey*. *ReadKey* is from the *crt* unit and only reads 1 character. You will see that *ReadKey* works differently to *Readln*

```
program Variables;  
  
uses crt;  
  
var  
  i: Integer;  
  s: String;  
  c: Char;  
  
begin  
  Readln(i);  
  Readln(s);  
  c := ReadKey;  
end.
```

Printing variables on the screen is just as easy. If you want to print variables and text with the same *Writeln* then separate them with commas.

```
program Variables;  
  
var  
  i: Integer;  
  s: String;  
begin  
  i := 24;  
  s := 'Hello';  
  Writeln(i);  
  Writeln(s, ' world');  
end.
```