

2. VARIABLES. OPERATORS. BUILT-IN FUNCTIONS

2.1. DATA STORING IN PROGRAMS

Stremnev A.Y., 2017

Variable

named field of computer memory to store data of specific type

Basic operations with variables

CREATING (declaration)	Dim <Name> As <Type>	Dim a As Integer Dim b As Double Dim c As Boolean Dim d As String
INITIALIZING (inputing value)	<Name> = <Value>	a=3 b=3.51 c=True d="ABCDE"
READING (getting value)	<ИМЯ>	b=Sqr(a)+1 Msgbox c & b & d

Integer - type for storage of the integers (numbers) with values from -32000 to +32000

Double - type for numbers which have up to 300 digits in the whole and fractional part

Boolean - type for logical values: True or False

String - type for texts which have up to 2^{16} symbols

Variant - type for any values

2. VARIABLES. OPERATORS. BUILT-IN FUNCTIONS

2.2. MSGBOX

MsgBox

function which task is to show dialog with specified text (message); waits for pressing any button in dialog; returns the code of pressed button

`MsgBox(<Message>[, <Buttons>] [, <Title>]...)`

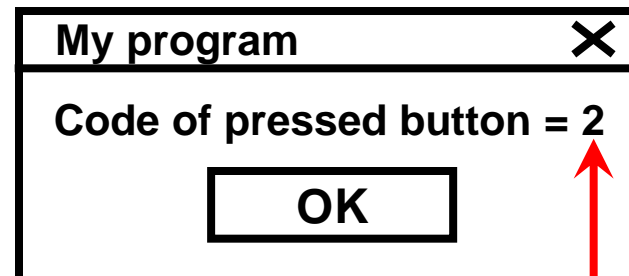
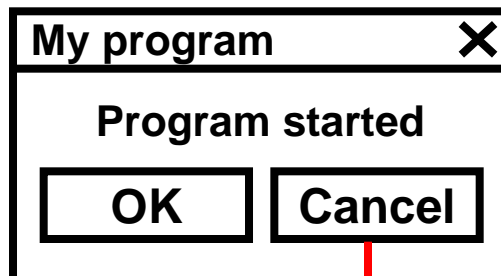
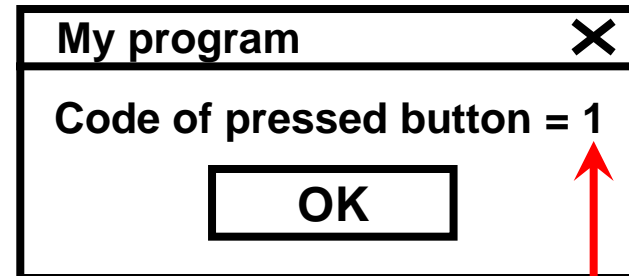
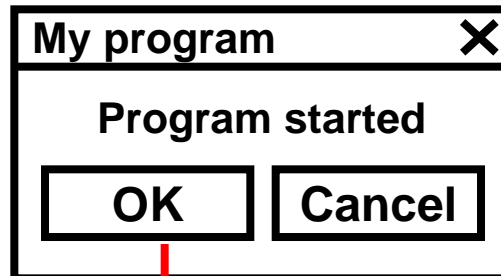
Sub Primer()

Dim i As Integer

i=Msgbox ("Program started",vbOKCancel,"My program")

MsgBox "Code of pressed button = " & i,,"Myprogram"

End Sub



2. VARIABLES. OPERATORS. BUILT-IN FUNCTIONS

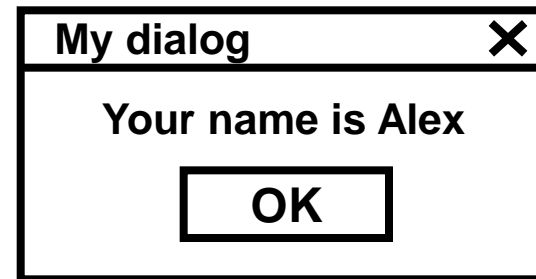
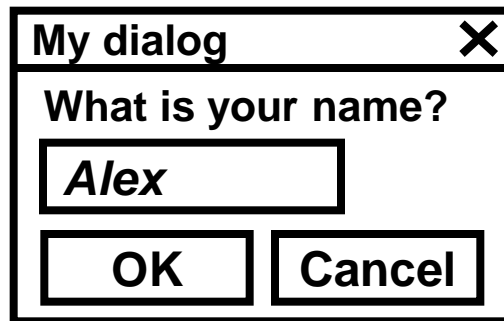
2.3. INPUTBOX

InputBox

function to show a dialog box with a message and inputbox-control; waits for text input and clicking OK or Cancel, returns the text typed in inputbox

InputBox(<Message>[, <Title>] [, <Default value>])

```
Sub Primer()  
Dim perem As String  
perem=InputBox("What is your name?", "My dialog", "Alex")  
MsgBox "Your name is " & perem,,"My dialog"  
End sub
```



InputBox returns empty string ("") after Cancel-button pressing.

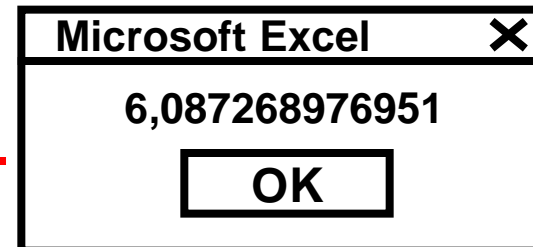
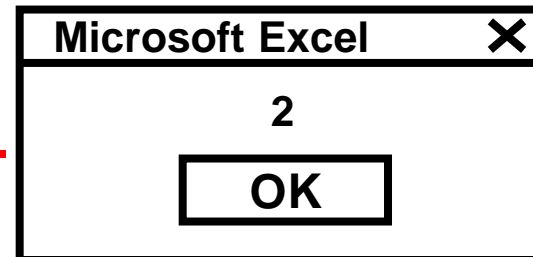
2. VARIABLES. OPERATORS. BUILT-IN FUNCTIONS

2.4. MATH OPERATORS

+, -, *, /	<number>+<number>...	arithmetic actions
\	<number>\<number>...	exact division (the integer part from division)
mod	<number> mod <number>...	the remainder of the division
^	<number1>^<number2>...	number1 to number2 power (for number1<0, number2 must be integer)

Program for expression calculation: $x = \text{exact division}(7 / 3) * (3 + 3,5^{-2,5})$

```
Sub Primer()  
Dim x As Double  
x=7\3  
Msgbox x  
x=x*(3+3.5^(-2.5))  
Msgbox x  
End Sub
```



2. VARIABLES. OPERATORS. BUILT-IN FUNCTIONS

2.5. MATH FUNCTIONS

Sin, Cos, Tan	Sin(<number>)	trigonometric functions
Atn	Atn(<number>)	arctangent of a number
Abs	Abs(<number>)	absolute value of a number
Exp	Exp(<number>)	exhibitor of number (e^{number})
Log	Log(<number>)	natural logarithm of a number
Sqr	Sqr(<number>)	root from a number
Rnd	Rnd()	random value from the range [0;1)
CInt	CInt(<number>)	rounding of a number
Fix	Fix(<number>)	getting of integer part of a number

Program for expression calculation:

```
Sub Primer()  
  Dim x As Double  
  x = CInt(Rnd() * 30 + 20)  
  MsgBox x  
  x = Cos(x * Atn(1)*4 / 180)  
  MsgBox x  
End Sub
```

$x = \cos(\text{random integer from the range } [20^\circ \dots 50^\circ])$

Microsoft Excel dialog boxes showing the results of the MsgBox statements:

- First dialog box: 41
- Second dialog box: 0,754709580222772

2. VARIABLES. OPERATORS. BUILT-IN FUNCTIONS

2.6. TEXT OPERATORS AND FUNCTION

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&	<string> & <string>...	connection of text strings
UCase	UCase(<string>)	converts string to upper case
Right	Right(<string>, <integer>)	returns of specified number of symbols from the end of string
Chr	Chr(<integer>)	returns of symbol by its code; Chr(13) - emulates Enter press
Len	Len(<string>)	returns quantity of symbols in text string
Mid	Mid(<string>,<number1> ,<number2>)]	returns specified number (n2) of symbol form the specified position (n1) from string
InStr	InStr(<string1>,<string2>)	returns first position of string1 in string2; without result - returns 0

Program for return penultimate symbol from the string in upper case:

```
Sub Primer()  
Dim s As String  
s = "Abcdefgh"  
s = Mid(s, Len(s) - 1, 1)  
s = UCase(s)  
MsgBox s  
End Sub
```

