
• • •

15
09.04.2002 .

2002

: . . , . . , . .
- .,

C++.

, , , , ,
, , .
.

. - . .

C++ Builder –
,
,
, Word, Excel
, C++ Builder
,
-
. C++ Builder, Delphi, Borland.
C++ Builder Delphi.
Delphi Object Pascal,
C++ Builder ++. Pascal
Delphi, ++,
Pascal.
,
,
,
.
.
.
.

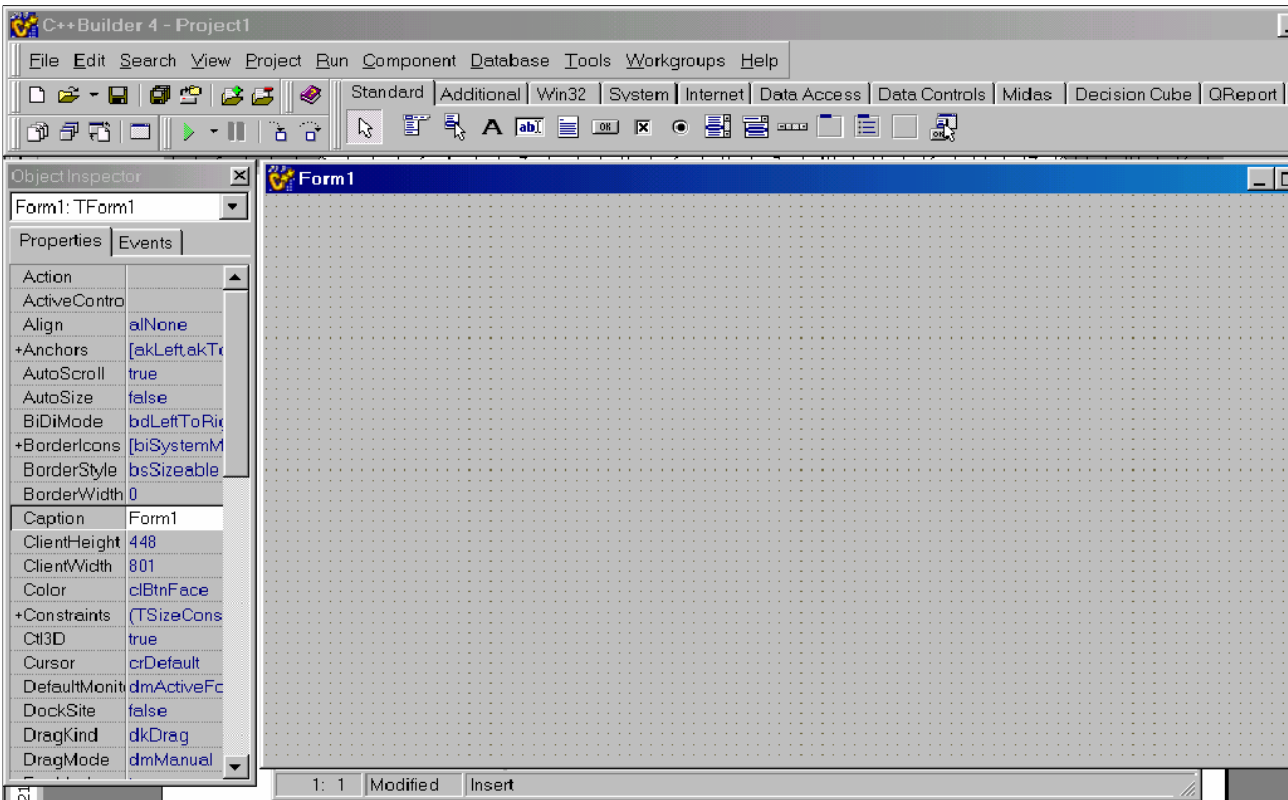
1

C++ BUILDER

C++ Builder Delphi

C++ Builder

. 1.1.



1.1 –

C++ Builder

1.1

Delphi,

C++ Builder

:

Properties ()

Events ()

;

<F12>;
File/Save
Project As;
<F9>,
Run/Run,

1.2 C++ Builder

C++ Builder, Delphi, :
C++ Builder (.cpp) WinMain,
Project1.

Delphi Delphi .dpr

(.cpp).
.h
Open Source/ Header File.

Unit1. C++ Builder

Delphi .pas. Delphi
implementation.

1.3 ++

++ (, , ,
)
- main - (WIN32) WinMain -
Windows.

WinMain

Delphi,

Project/View Source.

++

C++ Builder

```

//-----
#ifndef Unit1H
#define Unit1H
//-----
#include <Classes.hpp>
#include <Controls.hpp>
#include <StdCtrls.hpp>
#include <Forms.hpp>
//
//      (      include),
//
//-----
//      TForm1
class TForm1 : public TForm
{
__published: // IDE-managed Components
//
    TLabel *Label1;
    TButton *Button1;
    void __fastcall Button1Click(TObject *Sender);

private: // User declarations
//
//      ,      ,      ,
//
public: // User declarations
//
//      ,      ,      ,
//

__fastcall TForm1(TComponent* Owner);
};
//-----
extern PACKAGE TForm1 *Form1;
//-----
//      ,      ,      ,
//      ;
//
//
#endif

```

- #.

include.

-

Delphi**Uses.****include,**

-

include

-

:

```
#include <math.h> //
#include <Math.hpp> //
```

```
math.h
Math.hpp
```

1.

-

TForm1. __published

-

```
    : Label1      TLabel    Button1      TButton.
        Button1Click -
```

-

```
Button1.      private   public
                public,
```

-

private,

PACKAGE

-

//-----

```
#include <vcl.h>
#pragma hdrstop
#include "Unit1.h"
```

//-----

```
#pragma package(smart_init)
#pragma resource "*.dfm"
```

```
//
//                   (            include),
//
```

// *Form1*

TForm1 *Form1;

//-----

// *Form1*

```
__fastcall TForm1::TForm1(TComponent* Owner)
    : TForm(Owner)
```

```
{
//
//
}
//-----
//
//
//
//
//
//
```

```
void __fastcall TForm1::Button1Click(TObject *Sender)
```

```
{
Close();
}
//-----
```

Button1Click.

1.4

$R=12,54$

$L=24,88$

$$S = \pi R^2 + \pi RL,$$

$$V = \frac{1}{3} \pi R^2 H,$$

$H -$

$$, H = \sqrt{L^2 - R^2} .$$

$R \quad L$

. 1.2.

```
//-----
#include <vcl.h>
#pragma hdrstop
#include "Unit1.h"
//-----
#pragma package(smart_init)
#pragma resource "*.dfm"
#include <math.h> //
TForm1 *Form1;
//-----
```

1.2 –

```

__fastcall TForm1::TForm1(TComponent* Owner)
    : TForm(Owner)
{ Label4->Visible=0;           //                               Label4
  Label5->Visible=0;           // Label5
}
//-----

void __fastcall TForm1::Button2Click(TObject *Sender)
{
  Close();
}
//-----

void __fastcall TForm1::Button1Click(TObject *Sender)
{
  double R,L;
  R=StrToFloat(Edit1->Text);
  L=StrToFloat(Edit2->Text);
  double S,V,H;
  const float Pi=3.14159;
  S=Pi*R*(R+L);
  H=sqrt(pow(L,2)-pow(R,2));
  V=Pi*R*R*H/3;
  Label4->Visible=1;
  Label5->Visible=1;
  Label4->Caption="                               S="+FloatToStr(S);
  Label5->Caption="                               V="+FloatToStr(V);
}

```

Label4 **Label5**

Button1Click.

{ }

()

double R,L;

R L.

const float Pi=3.14159;

R=StrToFloat(Edit1->Text);

R

Edit1.

Delphi,

StrToFloat.

«-» «>»,

++

Delphi.

R

r

Delphi

1)

:=.

2)

, Edit1.Text

3)

1

C++Builder.

++.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

C++Builder?

?

?

include?

?

Button1.

-800.

0,1·10⁻⁵.

9

Edit1.

10

$$: x^2 - \frac{\cos(a + \sqrt{b})}{\ln(1 + 2^x)}.$$

1

$$: S = p(p-a)(p-b)(p-c), \quad p = (a+b+c)/2; \quad a, b, c -$$

$$(x_1, y_1), (x_2, y_2)$$

$$\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}.$$

2

$$L, \quad \dot{L}$$

$$T = 2\pi\sqrt{LC}, \quad v = \frac{1}{T}.$$

3

$$\vec{a} = (a_1, a_2) \quad \vec{b} = (b_1, b_2)$$

$$\cos \alpha = \frac{\vec{a} \cdot \vec{b}}{|\vec{a}| \cdot |\vec{b}|}.$$

$$|\vec{a}| = \sqrt{a_1^2 + a_2^2}.$$

$$\vec{a} \cdot \vec{b} = a_1 b_1 + a_2 b_2.$$

4

5

$$- a, b, c ($$

).

6

$$\rho = \frac{|ax_0 + y_0 + cz_0 + d|}{\sqrt{a^2 + b^2 + c^2}},$$

$$22 - 4y - 20z - 45 = 0 \quad 3x - y + 5z + 1 = 0.$$

7

$$\lambda = 0,03 \quad n = 1000 \quad \tau = 3 \cdot 10^{-7} \quad \tau = 7 \cdot 10^{-4}, \quad W_1 = P_1 \tau;$$

$$, k = c\tau/\lambda, c = 30. \quad = W_1 n; \quad k$$

8

$$ax^2 + bx + c = 0,$$

$$a, b, c (\quad , \quad a \neq 0$$

$$). \quad a = 2, b = -8, c = -10$$

9

$$2x/a + b - 12 = 0$$

$$a, b. \quad a, b$$

10

11

$$S = t^3 - \sqrt{t}.$$

12

13

$$Z = (v_1 + v_2 + v_3)/3, \quad v_1, v_2, v_3 -$$

 R_1, R_2, R_3

$$V = 4/3 \pi R^3.$$

14

$$L = 0,04, \quad = 10^{-6}, \quad U = 100.$$

$$I = U \sqrt{\frac{C}{L}}; \quad W = \frac{LI^2}{2}.$$

15

16

 $a, b, c.$

$$(, \quad a, \quad 0,5 \sqrt{2b^2 + 2c^2 - a^2} \cdot a,$$

 b, c

17

$$n = 2, \quad L = 0,5, \quad \Delta W = 3.$$

$$W_1 = \frac{\Delta W}{n^2 - 1}$$

$$I_1 = \sqrt{\frac{2W_1}{L}}.$$

18

 $a, b, c.$

$$(, \quad a,$$

$$\frac{1}{b+c} \sqrt{bc(a+b+c)(b+c-a)}. \quad a, b, c$$

19

20

$$Z = (R_1 + R_2 + R_3)/3, \quad R_1, R_2, R_3 -$$

 V_1, V_2, V_3

$$R = \sqrt[3]{\frac{3V}{4\pi}}.$$

21

 x

$$\operatorname{sh}(x) \cdot \operatorname{tg}(x+1) - \operatorname{tg}^2(2 + \operatorname{sh}(x-1)), \quad \operatorname{sh}(x) = \frac{e^x - e^{-x}}{2}.$$

 x

22

 a, b, c

$$0,5 \sqrt{2b^2 + 2c^2 - a^2}.$$

 $a,$

23

$$\left(\frac{t}{T} \right) = \frac{u}{U_{\max}} \quad \left(\frac{u}{U_{\max}} = \sqrt{\frac{n}{n+1}} \right)$$

$$\frac{t}{T} = \frac{\arccos \sqrt{\frac{n}{n+1}}}{2\pi}$$

24

b. $V = h(S_1 + \sqrt{S_1 S_2} + S_2)/3$; $S_1, S_2 -$
 a, b, h

25

$\cdot = \quad / \quad \cdot 100 \%$, 2% .

26

$= 120(\ln \frac{2\lambda}{\pi d} - 0,577)$, $\lambda = (3 + 0,1 n)$. $n \quad d$

27

a. $R = \frac{a}{2 \sin(\pi/n)}$,

$r = \frac{a}{\operatorname{tg}(\pi/n)}$.

28

r. $V = h(S_1 + \sqrt{S_1 S_2} + S_2)/3$; $S_1, S_2 -$ R, r, h

29

(ρ, ϕ) , $\rho = \sqrt{x^2 + y^2}$, $\operatorname{tg} \phi = y/x$.

30

$S = t^3 - 3t^2 + 2$.

T. T . ()

2

++

2.1

++

++

++

:

```

char, int, float double,
short ( ), long ( ), signed ( ,
unsigned ( ).
:
int a,b,c;
short t;
unsigned int ui;
a=17;
b=-197;
c=0xa7c;
t=-32767;
ui=0xff;
double g;
g=-0.123E-3;

```

Delphi

var

```

typedef
typedef double Ar[10];
Ar 10
Ar A = {1,2,3,4,5,6,7,8,9,10};

```

Delphi

1)
2)

type.

var.

2.1

Delphi

++.

2.1

++	()		Delphi
Char	1	-128...126	Char
unsigned char	1	0...255	Byte
Short	2	-32 768...32 767	SmallInt
unsigned short	2	0...65 535	Word
Int	4	-2 147 483 648...2 147 483 647	Integer
unsigned int	4	0...4 294 967 295	Cardinal
Float	4	$3.4 \cdot 10^{-38} \dots 3.4 \cdot 10^{38}$	Single
double	8	$1.7 \cdot 10^{-308} \dots 1.7 \cdot 10^{308}$	Real
long double	10	$3.4 \cdot 10^{-4932} \dots 1.1 \cdot 10^{4932}$	Extended
bool	1	true, false	Boolean

2.2

, :
 char 'a', \n', 9'
 int 1, 123, -346
 float 123.23, 4.34E-3, 4E+5
 double 123.23, 12312311, -0.987
 .
 0 .
 .
 :
 0 FFFF 01
 0x10 055
 0x1F1A 07777
 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, , , , D, E, F.
 ,
 , " " "
 , " " - ,
 ' ' -
 , \n' - , \0' - ,

const.

```
const float Pi=3.14159;
```

```
const float Pi2=2*Pi;
const float   =Pi/180;
```

Delphi 1) **const**
 2) ,
 3)

#, #13.

2.3

1)

```
double a=5.4, b=2;
int c=a*b;
```

10, 10.8.

2)

```
int m=1, n=2; double A=m / n;
=0.
```

m n -

```
int m=1;
double n=2;
double A=m / n;
```

3)

```
double a=300, b=200;
short c = a*b;
```


60 000.

32 767.

-5536 -
sh rt

()

2

double A= (double) m / n;

m

n

double,

Delphi

2.4

2.4.1

2.2.

2.2

-			
+			X+Y
-			X-Y
*			X*Y
/			X / Y
%			I % 6
++	()		i++ ++i
--	()		i-- --i

Delphi

mod.

- /

div.

++ () -- ().

```

    ,      --      .      ++      -
      (      )      (
    ).
  
```

```

    ,      .      -
  
```

```

    i = i+1; ++i; i++;
  
```

```

    int i = 1, j;
    j = i++ * i++;
    i      3,      j      1.
  
```

```

    int i = 1, j;
    j = ++i * ++i;
    :      i      3,      j      9.
  
```

2.4.2

```

    : == (      ), != (      ), <, >, <=, >=
  
```

```

    true (      )      false (      ).
  
```

```

    0      false,      -      true.
  
```

```

    int tr, fal;
    tr = (101<=105);
    fal= (101>105);
  
```

```

    fal      0.      tr      1,
  
```

```

    if (A == 2)...;
  
```

```

    if (A = 2)...;
  
```

```

    && -      (AND)
    || -      (OR)
    ! -      (NOT)
  
```

2.4.3

(2.3)

2.3

=			$X = Y$
+=		,	$X += Y$
-- =		,	$X -= Y$
*=		,	$X *= Y$
/=			$X /= Y$
%=			$X \% = Y$
<=			$X <= Y$
>=			$X >= Y$
&=	-		$X \& = Y$
^=	-		$X \wedge = Y$
|=	-		$X |= Y$

if ((f=x-y)>0) ...;

a=b=c=x*y;

x*y,

c,

b

X+=Y

«=»,

X=X+Y,

2.4.4

(. 2.4)

2.4

~		~X	~1011=0100
&		X & Y	1011 & 1010=1010
|		X | Y	1011 | 1010=1011
^		X ^ Y	1011 ^ 1010=0001
<<		X << 2	1011 << 2=1100
>>		Y >> I	1011 >> 2=0010

(~)

0- 1, 1- 0.

&, |, ^

b-

a	b	a & b	a ^ b	a | b
0	0	0	0	0
1	0	0	1	1
0	1	0	1	1
1	1	1	0	1

on/of (/).

8

ch

on,

if (ch & 4) ...

4=00000100.

a^b^a

a.

a^a

0.

>> <<

n

n

2ⁿ.
2ⁿ.

=9: 00001001,

=9 << 3 01001000
x=9 >> 3 00000001
x=9 >> 5 00000000

>> <<

2.4.5

()
++ -- ~ !
* / %
+ -
>> <<
< <= > >=
== !=
&
^
&&

2.5

```

Pascal.
{
}
void.
:
double Sum (double X1, double X2, int A)
void square(int &a)

```

Delphi

var.

```

void F1(void)
void F1()

```

Delphi

return.

return

```

double Sum (double X1, double X2, int A)
{
    return A* (X1+X2);
}

```

Abort.

Delphi

Exit.

```

double Sum (double, double, int);
void square(int &);
void F1(void);

```

Delphi

interface.

2.6

2.6.1

if

```

if, Pascal,
:
if ( ) ;
:
if ( ) ;
else ;

```

```

else.      lse-      ,      -
.
-      ,      .      -
      ,      ,      .
                                0,

if (x= =0) ShowMessage("      ");
else ShowMessage("      ");

if (!x) ShowMessage("      ");
else ShowMessage("      ");

if (J = =0)
{ ShowMessage("      ");
  result = 0; } else      result = I / J;

                                else

                                1      ( , )

,
.....
//
int nomer(float x, float y)
{
  if((x= =0)|| (y= =0))
  { ShowMessage("      ");
    return 0;
  } else
  if ((x>0)&&(y>0))return 1;
  else if ((x<0)&&(y>0))return 2;
  else if ((x<0)&&(y<0))return 3;
  else return 4;
}
//
void __fastcall TForm1::Button1Click(TObject *Sender)
{
  float x=StrToFloat(Edit1->Text);
  float y=StrToFloat(Edit2->Text);
  Edit3->Text=IntToStr(nomer(x,y));
}

```

2

$$f(x) = \begin{cases} \sin(x - 9,6), & x \leq -2 \\ 1 + \cos(2x + 4), & -2 < x \leq 1,5 \\ \frac{1}{x^2}, & x > 1,5 \end{cases}$$

Delphi	break	switch	case.	case.	Pascal
---------------	--------------	---------------	--------------	--------------	---------------

$$L = \begin{cases} x^2, & n = 1; \\ x/n, & n = 2; \\ x + n, & n = 3; \\ x, & n = 4 \end{cases}$$

n:

```

.....
double parametr(float x,int n)
{ double L;
  switch (n)
  {
    case 1:{L=x*x;break;}
    case 2:{L=x/n;break;}
    case 3:{L=x+n;break;}
    case 4:{L=x;break;}
  }
  return L; }

```

2.6.3 *goto*

, Pascal, , , -

goto.

Delphi		goto,		label
---------------	--	--------------	--	--------------

2.6.4 *for*

```

for ( 1; 2; 3) ; 2 -
  1, . . . 3 .
  2. ( -
), 3, 2, -

```

2**false (),****for**

$$S = \sum_{i=1}^{10} i.$$

```
int s = 0;
for (int i = 1; i <= 10; i++)
  s += i;
```

()**:**

```
int s, i;
for (s = 0, i = 1; i <= 10; s += i++);
```

1**s i.****for****1, 2 3****2,****break.****1**

$$P = \prod_{i=1}^{12} \frac{i-2}{i+1} \sum_{k=1}^i \frac{2k(k-4)}{(k+3)(k-2)}.$$

```
.....
double P_func()
```

```
{
  double P=1;
  for(int i=1;i<=12;i++)
    if (i!=2)
      { double s=0;
        for (int k=1;k<=i;k++)
          if ((k!=2)&&(k!=4))
            s+=2*(k-4)*(double)k/((k+3)*(k-2));
          P*=(i-2)*s/(i+1);
        }
  return P;
}
```

2

$$f(x) = e^{-x} \sin\left(\frac{\pi}{2} + x\right) \quad [a, b]$$

```
.....
#include <math.h> //
```

//

```
.....
```

```

float f(float);           //          f
float integr(float,float); //        integr

//
float f(float x)
{
  return exp(-x)*sin(M_PI_2+x);
}

//
float integr(float a,float b) // , b -
{
  const int n=200;
  float h=(b-a)/n;
  float s=f(a)+f(b);
  for (int i=1;i<=n-1;i++)
  {
    float x;
    x=a+i*h;
    s+=2*f(x);
  }
  return h*s/2;
}

```

2.6.5 *while do-while*

```

while ( condition ) while ( condition ) :
  statement ;
  ,
  ,
  ,
  ,
do-while ( condition ) :
do {
  statement ;
} while ( condition );
false,
,
,

```

Delphi	Pascal	repeat-until	while	repeat-until.
,	,	until	,	,

1
[*a*, *b*] *h*.

$$f(x) = x^2 + 2x - 4$$

```

.....
//
float f(float x)
{
    return x*x+2*x-4;
}

//
void TForm1::Tab(float a,float b,float h)
{ float x=a;
  while (x<=b)
  { float y; y=f(x);
    Memo1->Lines->Add(FormatFloat("0.0",x)+" "+FormatFloat("0.00",y));
    x+=h;
  }
}

```

FormatFloat,

$$f(x) = e^{-x} \sin\left(\frac{\pi}{2} + x\right).$$

```

.....
#include <math.h> //
.....
//
float f(float x)
{
    return exp(-x)*sin(M_PI_2+x);
}

//
float f1(float x)
{
    return -exp(-x)*cos(x)-exp(-x)*sin(x);
}

//
float f2(float x)
{
    return 2*exp(-x)*sin(x);
}

//
float nyuton(float a,float b,int &ier)
// , b -
// ier -
// ; , I,

```

```
//      0 -
{ const float eps=1E-6;
  float x0,g;
  if (f(b)*f2(b)>0)
    { x0=b;ier=0;}
  else if (f(a)*f2(a)>0)
    {x0=a; ier=0;}
  else {ier=1;Abort;}
do { float xn;
     xn=x0-(f(x0)/f1(x0));
     g=fabs(xn-x0);
     x0=xn;
   } while (g>eps);
return x0;
}
```

2

++

++.

```
1
2
3
4
5
6
7
8
9
```

$a = 5; b = 2; p = c = (++b) - (--a);$
 $: p = 1;$
 $a \quad b \quad s1, \quad i$
if.
for, while, do while.
 $n.$
 x
 $n ($
 $).$

1

N.

$$s = \sum_{i=0}^N a_i^2, \quad a_i = \begin{cases} i/3 & , & 3; \\ i/(i-3) & , & 3. \end{cases}$$

2

$$s = \sum_{i=1}^N \prod_{j=1}^i \frac{j!}{i!}$$

3

$$\varepsilon: 0 < \varepsilon < 0.1. \quad \{a_i\}_{i=1}^\infty \quad a_i = 1/i. \quad -$$

$$N \quad (N > M). \quad |a_i - a_{i-1}| < \varepsilon.$$

4

$$s = \sum_{k=M}^N k^2 \ln(k!).$$

5

$$N. \quad s = \sum_{i=1}^N \frac{i!}{(N+i)!}.$$

6

$$S = \max(x+y+z, xyz) + 3\max(xy^2, z^2).$$

7

$$F = (M! + N!) / (M+N)!$$

8

$k-$

9

$$i^3 - 17 \cdot i \cdot N^2 + N^3 \quad (i = 1, 2, \dots, N)$$

10

11

$$z = \begin{cases} i-k & , & k; \\ k-i & k, & ; \\ k+i & . \end{cases}$$

12

$$(i = 1, 2, \dots), \quad A > 1 \quad B > A. \quad c_i = A^i$$

13

$$P = \min(a+b, 2a) + k \cdot \min(a-3b, 25),$$

$$k = \begin{cases} a^2 + b & , & b & , & = 2; \\ (1+b)/(2-a) & . \end{cases}$$

14

15

$$A > 0. \quad B_i$$

$$B_i = \sum_{k=1}^i k, \quad i = 1, 2, \dots$$

$$B_i, \quad A.$$

16	$\{r_i\}_{i=1}^{\infty}$	$r_i=1/i.$	-
	$A: 0 < A < 0.5.$	$r_i,$	$r_{i-1} > A \geq r_i.$
17		$A > 0.$	
		$s = \sum_{i=1}^{15} x_i,$	
	$x_1 = \begin{cases} \min(2A, 0.95) & \leq 1; \\ A/5 & 1 < A < 25; \\ A/25 & A \geq 25; \end{cases}$	$x_i = x_{i-1} + A/x_{i-1},$	$i = 2, 3, \dots, 15.$
18		$N.$	
	$s = \sum_{i=1}^N (a_i - i)^2,$	$a_i = \begin{cases} 3i & , & 2; \\ i(i-2) & , & 2. \end{cases}$	
19		N	$x.$
		$s_1 = \sum_{i=1}^N (\sin x)^i;$	$s_2 = \sum_{i=1}^N \sin x^i.$
20	pow()	.	
		$x, y.$	
	$z = \begin{cases} e^{x+3} & -1 \leq x \leq 1, y \geq 0; \\ 1 + |x| & \\ x^2 y & \end{cases}$.	
21		[0.2; 0.6]	0.1:
	$f(x, y) = \begin{cases} \ln \left| \frac{x}{1+y} \right|, & x \geq y, \\ \frac{1+x}{1+y} e^{-|x+y|}, & x < y. \end{cases}$		
22		$x > 0, 0 < \varepsilon \leq 10^{-6}$	k
	$\sqrt[k]{x}$:
	$y_0 = x;$	$y_{i+1} = y_i + \frac{1}{k} \left(\frac{x}{y_i^{k-1}} - y_i \right).$	
		$y_{i+1},$	$|y_{i+1} - y_i| < \varepsilon.$
23		$- a, b, c.$	-
24		.	
25			$x = (n2 + n-1)/(n2 + n + 1),$
		1	$10^{-5}.$
26	$n,$	.	:
	$(1/1! + | |) + (1/2! + | |) + \dots + (1/n! + |x|).$		
27	$n,$	.	:
	$(1/2 - \cos|x|)(2/3 - \cos 2|x|) \dots (n/n + 1 - \cos n|x|).$		

28 $n,$
 $(1 + \sin x/1!)(1 + \sin 2x/2!) \dots (1 + \sin nx/n!).$

29 , : « ».

30 , -

31 , : « -

» . (,) ,

32 , .

2.7

2.7.1

- []; :

int A[10];
 , [1] - , [9] - 10 . [0] -

Pascal,

(. 2.8.2).
 :

float r (int a[10])
 float r (int a[])
 float r (int *a)

1
 n .

$$f(x) = a_0 + a_1x + a_2x^2 + \dots + a_nx^n$$

```
.....
float r (float x,float a[],int n)
{
    float s=0;
    for(int i=0;i<=n;i++)
    s+=a[i]*IntPower(x,i);
    return s;
}
```



```

.....
//
void multiply(int u[3][3], int v[3][3],int w[3][3])
{ const int n=3;
  int i,j,k;
  for(i=0;i<n;i++)
    for(j=0;j<n;j++)
      {
        w[i][j]=0;
        for(k=0;k<n;k++)
          w[i][j]+=u[i][k]*v[k][j]; } }
//
void __fastcall TForm1::Button2Click(TObject *Sender)
{ int i,j,a[3][3],b[3][3],c[3][3];
  for(i=0;i<3;i++)
    for(j=0;j<3;j++)
      { a[i][j]=StrToInt(StringGrid1->Cells[j+1][i+1]);
        b[i][j]=StrToInt(StringGrid2->Cells[j+1][i+1]);
      }
  multiply(a,b,c);
  for(i=0;i<3;i++)
    for(j=0;j<3;j++)
      StringGrid3->Cells[j+1][i+1]=IntToStr(c[i][j]);
}

```

2.7.3

```

float farr[6]={ 1.1, 2.2, 3.3, 4.0, 5, 6};
int a[3][5]={ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15};
int a[3][5]={{ 1, 2, 3, 4, 5}, {6, 7, 8, 9, 10}, {11, 12, 13, 14, 15}};

```

```
int a[3][5]={1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11};
```

```
int a[3][5]={{1, 2, 3}, {4, 5, 6, 7, 8}, {9, 10, 11}};
```

1	2	3	4	5
6	7	8	9	10
11				

1	2	3		
4	5	6	7	8
9	10	11		

3

, . :
 , . , :
 1 , 15 .
 2 5 -
 3 n -
 StringGrid.
 4 n
 Memo.
 5 , -
 , 8 .
 6 ,

1 p p ,
 L L .
 2 , p L , p ,
 3 . , p L ,
 p . p .
 4 p . p L ,
 p ,
 5 p S .
 6 U p p p S .
 U V .
 V p .
 U V p p .
 .

7

p ,

8

p

9

10

11

12

13

 (n) .

14

 (15) .

15

 (n) .

16

 (n) ,

17

 $()$,

18

 $Y(n)$,

19

 (8) (8) . (16) ,

20

 (n) .

21

 (n) . $|a_{i+1} - a_i|$

22 (n). , -
 . -
 23 , (n) -
 .
 24 (12). -
 , - 5.
 25 (9) - , -
 , $|x_i - K|$. -
 26 (n) -
 .
 27 (10). , -
 ,
 28 $t_i \leq t_{i+1}$ ($i = 0, 1, \dots, 8$).
 (12). -
 . , -
 .

2.8

2.8.1

— ,
 .
 .
 * — ;
 — ; * — ,
 . :
 int *c; c int*, . . .
 NULL. NULL —
 :
 int *c=NULL;
 &. ,
 int y = 5;
 int *yPointer, x, *xPointer;
 yPointer = &y;
 y .
 , * , -
 .

```
x = *yPointer;
```

```

      x      5, . . . ,
yPointer.

```

```
xPointer = yPointer;
```

```
>=, =, ==, !=.
```

```
<, >, <=,
```

2.8.2

```
int b[7] = { 1, 2, 8, 5, 4, 6, 4}, *Pt;
```

```
Pt = b;
```

```
Pt = &b[0];
```

b.

— **Pt**

6-

b,

```
b[5] *(Pt+5).
```

8

```

.....
int poz(int a[4])
{
  int c=0,*pa;
  pa=a;
  for(int i=0;i<4;i++)
    if (*(pa+i)>0)c++;
  return c;
}

```

2.8.3

```

. 2.5 , (&).
. (*) , .
. * ,
. ,
& :
void sum(int *, int *); //
void sum(int *a, int *b) //
{
*a +=*b; //
}
int x = 5, y = 10;
sum(&x, &y); //
. 5 5 .
.
.....
const int n=5;

//
void transp(int *u)
{ int i,j;
for(i=0;i<n;i++)
for(j=i+1;j<n;j++)
{ int p=*(u+n*i+j);
*(u+n*i+j)=*(u+n*j+i);
*(u+n*j+i)=p; }
}

//
void __fastcall TForm1::Button1Click(TObject *Sender)
{ int i,j,a[n][n];
for(i=0;i<n;i++)
for(j=0;j<n;j++)
a[i][j]=StrToInt(StringGrid1->Cells[j+1][i+1]);
transp(&a[0][0]);
for(i=0;i<n;i++)
for(j=0;j<n;j++)
StringGrid2->Cells[j+1][i+1]=IntToStr(a[i][j]);
}

```


. (10 – 19)

10

11

12

13

14

15

16

17

18

19

. (20 – 28)

20 (<)

21 (>)

22

23

24

25

26

27

28

2.9

2.9.1

```

- char.
- 1 ,
- : ' ', '+', '*', '2'.
- ++
- ('\0').
- , . . .
-
- char*.
char s[] = "hello";
char *sp = "hello";
-
- 5,
- 6,
-
- s[0]='h', sp[5]='o'.
-
- 2.

```

2.9.2 *AnsiString*

++ Builder

- *AnsiString*.

Delphi. **AnsiString**

```

    = =, !=, >, <, >=, <=,      (      )      +.
    ,                               .      -
    ,                               ,
Delphi      string.
    AnsiString      ,      ,      ,
    ++ Builder.      ,      ,      Text
    ,      Caption      . .
    :
Label1->Caption = Edit1->Text + " " + Edit2->Text;
    ,      AnsiString      AnsiString
char*      .      char*      -
    c_str()      ,      -
    ,      AnsiString,      -
    :
    AnsiString S1;
    S1 = Edit1->Text;
    char *S2;
    S2 = S1.c_str();

AnsiString(char *S)
    AnsiString,
S.
    FloatToStr, IntToStr, StrToFloat, StrToInt
    AnsiString.
1
.

void __fastcall TForm1::Button1Click(TObject *Sender)
{
    char *str_ed, *razd=".,?!:; ", *p;
    AnsiString s;
    s=Edit1->Text;
    str_ed=s.c_str(); //      AnsiString
    //
    p=strtok(str_ed,razd); //      strtok
    if (p) ListBox1->Items->Add(p);
    while(p)
    {
        p=strtok(NULL,razd);
        if (p) ListBox1->Items->Add(p);
    }
}

    strtok,
    str_ed
    ,
    razd.

```

```

while(sl)
{ len=strlen(sl);
  for (j=0;j<len;j++)
  if(strchr(glas,sl[j])!=NULL) break; //
  if(j<len) //
  { for (k=0;k<j;k++) //j
    //
    { char b1=sl[0];
      for (p=0;p<len-1;p++)
      sl[p]=sl[p+1];
      sl[len-1]=b1;
    }
  }
  r+=sl; //
  r+=" ";
  sl=strtok(NULL,razd); //
}
Edit2->Text=r;
}

```

2.10

Delphi	(record)	(struct)
---------------	-----------------	-----------------

```

struct
{
    1: 1;
    2: 2;
    .....
    N: N;
};

struct
(
)
« ».
( );
struct student {
    AnsiString FIO, Gruppa;
    int Bal_math, Bal_inform;
};

FIO, Gruppa
student,

```

```

        ,
        .      Bal_math, Bal_inform -
        .
        :
student st, stArray[10], *stud;
        st      student,      stArray      10 -
stud      ,      student,
stud      student.
        ,      ,      , -
        .      -
        :
struct {
    AnsiString FIO, Gruppa;
    int Bal_math, Bal_inform;
} st, stArray[10], *stud;
        -      typedef.      ,
typedef struct {
    AnsiString FIO, Gruppa;
    int Bal_math, Bal_inform;
};

```

```

Delphi      (record)      -
      type.      var      -
        .

```

```

        (.) -
        (->).      :
st.FIO="      ";
stArray[2].Gruppa=" -12";
stArray[i].Bal_math=80;
stud->Bal_inform=95;
        ,      ,      ,      ++.
        ++
        ,      -      ,
tring,      student      Show,      AnsiS-
        :
struct student {
    AnsiString FIO, Gruppa;
    int Bal_math, Bal_inform;
    AnsiString Show()
    { return FIO+" "+Gruppa+" "+IntToStr(Bal_math)
      + " "+IntToStr(Bal_inform);
    }
};
        :
student z;
.....
Memo1->Lines->Add(z.Show());

```

Memo1

Show().

1.

2.1 –

1

```
void __fastcall TForm1::Button1Click(TObject *Sender)
```

```
{
```

```
struct student {
```

```
    AnsiString FIO, Gruppa;
```

```
    int Bal_math, Bal_inform;
```

```
    AnsiString Show()
```

```
    { return FIO+" "+Gruppa+" "+IntToStr(Bal_math)
```

```
    +" "+IntToStr(Bal_inform);
```

```
    }
```

```
    int SrBall()
```

```
    { return (Bal_math+Bal_inform)/2;
```

```
    }
```

```
};
```

```
student z;
```

```
//
```

```
«
```

```
»
```

```
AnsiString s1,s2;
```

```
z.FIO=Edit1->Text;
```

```
z.Gruppa=Edit2->Text;
```

```
z.Bal_math=StrToInt(Edit3->Text);
```

```
z.Bal_inform=StrToInt(Edit4->Text);
```

```
s1=z.Show();
```

```
//
```

```
int sr=z.SrBall();
```

```
//
```

```
if ((sr>=0)&&(sr<=59)) s2="
```

```
";
```

```
if ((sr>=60)&&(sr<=79)) s2="
```

```
";
```

```

if ((sr>=80)&&(sr<=94)) s2=" ";
if ((sr>=95)&&(sr<=100)) s2=" ";
Memo1->Lines->Add(s1+" "+s2);
}

```

2.

```

.
-
:
-
n-
-
.
n-
.
n-
a+ib.
a+ib.

```

```

typedef struct {
    float x,y; //
    void trig(float &mod,float &arg) //
        //
        { mod=sqrt(x*x+y*y); //
          arg=acos(x/mod); //
        }
    void i(float &a,float &b) //
        //
        { a=x*cos(y); //
          b=x*sin(y); //
        }
    void sqrtn(int n,int k, //
        // k- n-
        float &modn,float &argn)
        { modn=pow(x,1/(float)n);
          argn=(y+2*M_PI*k)/n;
        }
} TComplex; //

void __fastcall TForm1::Button1Click(TObject *Sender)
{ TComplex c,z;
  c.x=StrToFloat(Edit1->Text); //
  c.y=StrToFloat(Edit2->Text); //
  int n=StrToInt(Edit3->Text); //
  float mod,arg,a,b,modn,argn;
  c.trig(mod,arg); // c
  z.x=mod; z.y=arg; // ( z)
  int k;
  for (k=0;k<n;k++) // k n-
  { z.sqrtn(n,k,modn,argn); //
    z.x=modn; z.y=argn; //
  }
  z.i(a,b);
}

```

```

Memo1->Lines->Add(FloatToStr(a)+"*"+
    FloatToStr(b));
}
}

```

3. (-)
 « ».

```

typedef struct
{ int chis,znam; //
  AnsiString Put() //
  { AnsiString s;
    if (znam==0)s="" =0";else
    if (chis==0)s="0";
    else {
      if (chis*znam<0)s="-";
      chis=abs(chis); znam=abs(znam);
      if(znam==1)s+=IntToStr(chis);else
      s+=IntToStr(chis)+"/"+IntToStr(znam); }
    return s;
  }
}Racion; //

```

```

Racion Sokr(Racion a) //
{ int i,min;
  if (abs(a.chis)>abs(a.znam))min=abs(a.znam);
  else min=abs(a.chis);
  for (i=min;i>1;i--)
  if(a.chis%i==0 && a.znam%i==0)
  {a.chis/=i; a.znam/=i;}
  return a;
}

```

```

Racion Div(Racion a,Racion b) //
{ a=Sokr(a);
  b=Sokr(b);
  Racion c;
  c.chis=a.chis*b.znam;
  c.znam=a.znam*b.chis;
  c=Sokr(c);
  return c;
}

```

```

void __fastcall TForm1::Button1Click(TObject *Sender)
{ //
  Racion m; // ,
  m.chis=StrToInt(Edit1->Text);
  m.znam=StrToInt(Edit2->Text);
}

```

```

    m=Sokr(m);
    AnsiString s=m.Put();
    Edit3->Text=s;
}
//-----
void __fastcall TForm1::Button2Click(TObject *Sender)
{
    //
    Racion a,b,c; //
    a.chis=StrToInt(Edit1->Text);
    a.znam=StrToInt(Edit2->Text);
    b.chis=StrToInt(Edit4->Text);
    b.znam=StrToInt(Edit5->Text);
    c=Div(a,b);
    AnsiString s=c.Put();
    Edit6->Text=s;
}

    4. ( , , )
    « ». ,

//
// ( )
int tab_days[2][13]={{0,31,28,31,30,31,30,31,31,30,31,30,31},
                    {0,31,29,31,30,31,30,31,31,30,31,30,31}};
typedef struct
{ Word year,month,day; // , ,
  int day_of_year() //
  { int i,k,n=day; // , ,
    k=year%4==0 && year%100!=0||(year%400==0);
    //
    for(i=1;i<month;i++)
    n+=tab_days[k][i];
    return n;
  }
}DDate; //

void __fastcall TForm1::FormCreate(TObject *Sender)
{
  DateTimePicker1->Date=Now(); // DateTimePicker1
} //
//-----

void __fastcall TForm1::Button1Click(TObject *Sender)
{
  DDate d;
  // , , DateTimePicker1
  DecodeDate(DateTimePicker1->Date,d.year,d.month,d.day);
  Edit1->Text=IntToStr(d.day_of_year()); } //

```

5

·

· :

, ,

.

1 ?

2 ?

3 « »?

4 , -

5 **exemp.** « » -

- ; -

· ,

.

(-)

1 « (,), ».

2 ; (,),

3 ; (, ,),

4 ; (,),

5 ; (, ,),

.

« ».

(- , ,) :

6 (), ;

7 N ;

8 ,

9 , ; . (, 15 2002)

10 ; -
11 . -
12 ;
13 ;
14 ;
15 .
« » (- , ,) -
16 (), -
17 ;
18 , N ;
19 , .
20 , -
21 ; -
22 ; -
23 , -
24 ; -
(,) . -
25 ;
26 , ;
27 , ;
28 .

2.11

2.11.1

FILE.

FILE

stdio.h.

stdio.h:

```
#include <stdio.h>
```

```
FILE *f;
```

fopen

fopen:

```
FILE *fopen(const char *filename, const char *mode);
```

filename

mode

r	
r+	
a	
a+	
w	
w+	

```

    <<t> -          <<b>> -          ( <<+>> )
    fopen          , fopen          ,          NULL.
                                     fclose(FILE *).

```

```
#include <stdio.h>
```

```
.....
FILE *f;
```

```
if ((f=fopen("t.txt","rt"))==NULL) //
```

```
{ // fopen
```

```
    ShowMessage(" ");
```

```
    return;
```

```
}
```

```
.....//
```

```
fclose(f); //
```

fgets:

```
char *fgets (char *s, int n, FILE *stream);
```

fscanf:

```
int fscanf (FILE *stream, const char *format[, address,...]);
```

feof:

```
int feof (FILE *stream);
```

```
char s[80];
```

```
Memo1->Clear();
```

```
do {
```

```
    fgets(s,20,f);
```

```
    Memo1->Lines->Add(s);
```

```
    } while ( !feof(f));
```

fgets**Memo.**

,

« \n »

,

n-1**n = 20.**

20

19

fgets**feof**

« \n »,

Memo

```
if (s[strlen(s)-1]=='\n') s[strlen(s)-1]=0;
```

« \n ».

fscanf.

```
float r;
```

```
Memo1->Clear();
```

```
do {
```

```
    if (fscanf(g,"%e",&r)!=1)
```

```
        ShowMessage(" ");
```

```
    else Memo1->Lines->Add (FloatToStr(r));
```

```
    } while ( !feof(g));
```

fscanf**fscanf****fscanf.**

""%e"

g

r

float.

format,

2.5

2.5

i, I	,	- int, long
d, D		int, long
e, E		float
s		char s[]
c		char

fprintf:

fprintf (FILE *stream, const char *format [, argument,...]);

fscanf,

```
char s[20];
strcpy(s, "");
int year=1985;
fprintf (F, "
```

```
\n %s, %i . . \n", &s, year);
```

, 1985 . .

1.

10.

```
#include <stdio.h>
```

```
FILE *f;
char s[10];
```

```
// « »
void __fastcall TForm1::Button1Click(TObject *Sender)
{
  strcpy(s,Edit4->Text.c_str());
  if ((f=fopen(s,"rt"))==NULL)
    ShowMessage(" ");
  else { ShowMessage(" ");
        fclose(f); }
}
```

2.2 –

1

```
//      «      »
void __fastcall TForm1::Button2Click(TObject *Sender)
{
    Memo1->Lines->LoadFromFile(s);
}

//      «      »
void __fastcall TForm1::Button3Click(TObject *Sender)
{
    if ((f=fopen(s,"at"))==NULL)
        { ShowMessage("                ");
          return;}
    char N[20];
    strcpy(N,Edit1->Text.c_str());
    float price;
    price=StrToFloat(Edit2->Text);
    int kol;
    kol=StrToInt(Edit3->Text);
    fprintf(f,"%s %6.2f %i\n",&N,price,kol);
    fclose(f);
}

//      «      »
void __fastcall TForm1::Button4Click(TObject *Sender)
{
    if ((f=fopen(s,"rt"))==NULL)
        { ShowMessage("                ");
          return;}
}
```



```

char N[20]; float price; int kol;
Memo1->Lines->Add("");
Memo1->Lines->Add("          ,          <10");
do {
    fscanf(f, "%s%f%i", &N, &price, &kol);
    if (kol < 10)
        Memo1->Lines->Add(AnsiString(N) + " " + FloatToStrF(price, ffFixed, 6, 2) +
            " " + IntToStr(kol));
    } while (!feof(f));
fclose(f);
}

```

2.

```

#include <stdio.h>
.....
FILE *f;

//
void __fastcall TForm1::Button1Click(TObject *Sender)
{
    f=fopen("str.txt", "at");
    char s[80];
    strcpy(s, Edit1->Text.c_str());
    fprintf(f, "%s\n", &s);
    fclose(f);
}

//
void __fastcall TForm1::Button2Click(TObject *Sender)
{
    Memo1->Lines->LoadFromFile("str.txt");
}

//
void __fastcall TForm1::Button3Click(TObject *Sender)
{
    char s[80], key[10];
    strcpy(key, Edit2->Text.c_str());
    int k=0;
    if ((f=fopen("str.txt", "rt"))==NULL)
    { ShowMessage("          ");
      return;
    }
    do{
        fscanf(f, "%s", &s);
        if (!strcmp(s, key)) k++;
    } while (!feof(f));
    Memo1->Lines->Add("");
    Memo1->Lines->Add("          "+AnsiString(key)+"          ");
    Memo1->Lines->Add(IntToStr(k)+"          ");
    fclose(f); }

```



```

//
fwrite(s,sizeof(char),strlen(s)+1,T);
//
for (int k=0; k<15; k++)
{ fread(s+k,sizeof(char), 1,T);
  if (s[k] == '\0') break;
}

```

fread, **s+k**, **s[k]**,

ftell

```
long int ftell (FILE *f);
```

fseek.

```
int fseek (FILE *f, long k, int b);
```

k

b. **b**

b	
0	
1	
2	

b = 1, k

().

(1),

:

1.

10.

« »

(. 2.2).

```
#include <stdio.h>
```

```
.....
FILE *f;
```

```
char s[10];
```

```
struct tovar
```

```
{ char N[20];
```

```
float price;
```

```
int kol;
```

```
}; //
```

tovar

```
// « »
```

```
void __fastcall TForm1::Button1Click(TObject *Sender)
```

```

{
    strcpy(s,Edit4->Text.c_str());
    if ((f=fopen(s,"rb"))==NULL)
        ShowMessage("
    else { ShowMessage("
        fclose(f);
    }}
//
void __fastcall TForm1::Button2Click(TObject *Sender)
{
    if ((f=fopen(s,"rb"))==NULL)
        ShowMessage("
    return;
}
tovar t;
while (!feof(f))
{
    fread(&t,sizeof(tovar),1,f);
    Memo1->Lines->Add(AnsiString(t.N)+" "+
    FloatToStrF(t.price,ffFixed,6,2)+" "+IntToStr(t.kol));
}
fclose(f);
}

//
void __fastcall TForm1::Button3Click(TObject *Sender)
{
    if ((f=fopen(s,"ab"))==NULL)
        ShowMessage("
    return;
}
tovar t;
strcpy(t.N,Edit1->Text.c_str());
t.price=StrToFloat(Edit2->Text);
t.kol=StrToInt(Edit3->Text);
fwrite(&t,sizeof(tovar),1,f);
fclose(f);
}

//
void __fastcall TForm1::Button4Click(TObject *Sender)
{
    if ((f=fopen(s,"rb"))==NULL)
        ShowMessage("
    return;
}
Memo1->Lines->Add("");
Memo1->Lines->Add("
tovar t;
while(!feof(f))
    { fread(&t,sizeof(tovar),1,f);
      if (t.kol<10)

```

```

        Memo1->Lines->Add(AnsiString(t.N)+" "+
            FloatToStrF(t.price,ffFixed,6,2)+" "+IntToStr(t.kol));
    }
    fclose(f);
}

```

2.

```

#include <stdio.h>
.....
FILE *f;
char s[10];

//      «          »
void __fastcall TForm1::Button1Click(TObject *Sender)
{
    strcpy(s,Edit4->Text.c_str());
    if ((f=fopen(s,"rb"))==NULL)
        ShowMessage("          ");
    else { ShowMessage("          «          »");
        fclose(f);
    }
}

//      «          »
void __fastcall TForm1::Button2Click(TObject *Sender)
{
    if ((f=fopen(s,"rb"))==NULL)
        { ShowMessage("          ");
        return;
    }
    char N[20]; float price; int kol;
    while(!feof(f)) {
        for (int i=0;i<20;i++)
            { fread(N+i,sizeof(char),1,f);
              if (N[i]=='\0')break;}
        fread(&price,sizeof(float),1,f);
        fread(&kol,sizeof(int),1,f);
        Memo1->Lines->Add(AnsiString(N)+" "+
            FloatToStrF(price,ffFixed,6,2)+" "+IntToStr(kol));
    }
    fclose(f);
}

//      «          »
void __fastcall TForm1::Button3Click(TObject *Sender)
{
    if ((f=fopen(s,"ab"))==NULL)
        { ShowMessage("          ");
        return;}
}

```

```

char N[20]; float price; int kol;
strcpy(N,Edit1->Text.c_str());
price=StrToFloat(Edit2->Text);
kol=StrToInt(Edit3->Text);
fwrite(N,sizeof(char),strlen(N)+1,f);
fwrite(&price,sizeof(float),1,f);
fwrite(&kol,sizeof(int),1,f);
fclose(f);
}

//      «      »
void __fastcall TForm1::Button4Click(TObject *Sender)
{
if ((f=fopen(s,"rb"))==NULL)
{ ShowMessage("                ");
return;
}
Memo1->Lines->Add("");
Memo1->Lines->Add("                ,                <10");
char N[20]; float price; int kol;
while(!feof(f)) {
for (int i=0;i<20;i++)
{ fread(N+i,sizeof(char),1,f);
if (N[i]=='\0')break;}
fread(&price,sizeof(float),1,f);
fread(&kol,sizeof(int),1,f);
if (kol<10)
Memo1->Lines->Add(AnsiString(N)+" "+
FloatToStrF(price,ffFixed,6,2)+" "+IntToStr(kol));
}
fclose(f);
}

```

6

```

1                ?
2                ?
3                ?
4                .
5                ?
6                ?

```


15

16

1990 1999

1 000

« ».

17

18

N

N.

19

20

21

10

22

23

24

« »,

25

“tabl.txt”,

$$y = x^2 - x + 2$$

[-2, 2]

0,2.

26

N.

N

27

« »,

28

>10

int abs (int i)		stdlib.h
double ceil (double x)	:	math.h
double exp (double x)		math.h
double fabs (double x)		math.h
double floor (double x)	:	math.h
Extended IntPower (Extended Base, int Exponent)	Base Expo- nent	Math.hpp
double log (double x)		math.h
double log10 (double x)		math.h
Extended LogN (Extended Base, Extended X)	X Base	Math.hpp
double pow (double x, double y)		math.h
double sqrt (double x)		math.h
double acos (double x)		math.h
double asin (double x)		math.h
double atan (double x)		math.h
double cos (double x)		math.h
double sin (double x)		math.h
double tan (double x)		math.h
M_PI	π	

(*string.h*)

char * strcat (char *d, const char *s)	d; s	-
char * strchr (const char *s, char c)	NULL	s
int strcmp (const char *s1, const char *s2)	s1 s2; s1 = s2, >0 s1 > s2	<0 s1 < s2, =0
char * strcpy (char *d, const char *s)	s d;	d
char * strstr (const char *s1, const char *s2)	s1 s2	s2; s1 NULL
size_t strlen (const char *s)	s,	-
char * strupr (char *s)	s	(-
char * strtok (char *s1, const char *s2)	s1 s1	s2

	.....	3
1	C++ Builder	4
1.1	.....	4
1.2	C++ Builder.....	5
1.3	++.....	5
1.4	.....	8
	<i>1</i> C++Builder.	
	.....	10
2	++.....	13
2.1	++.....	13
2.2	.....	15
2.3	.....	16
2.4	.....	17
2.4.1	.....	17
2.4.2	.....	18
2.4.3	.....	19
2.4.4	.....	20
2.4.5	.....	21
2.5	.....	21
2.6	.....	22
2.6.1	if.....	22
2.6.2	switch.....	24
2.6.3	goto.....	25
2.6.4	for.....	25
2.6.5	while do-while.....	27
	<i>2</i> ++.....	29
2.7	.....	32
2.7.1	.....	32
2.7.2	.....	33
2.7.3	.....	34
	<i>3</i>	35
2.8	.....	37
2.8.1	.....	37
2.8.2	.....	38
2.8.3	.....	39
	<i>4</i>	40
2.9	.....	42
2.9.1	.....	42
2.9.2	AnsiString.....	42
2.10	.....	45

	5	.....	51
2.11		.....	53
2.11.1		.....	53
2.11.2		.....	58
	6	.....	62
1		.....	65
2		.....	65
		.....	65

• •

• •