Program Lab1\_proc\_vvod;

// Determining the Console Program Type

{$APPTYPE CONSOLE}

uses

System.SysUtils;

{

Create a program that calculates matrix expressions. Find

the value of a given matrix expression using subprograms

that do not use global parameters.

}

// ((2\*A)+B)\*B-(0.5\*A)

const nmax =20;

// Determining the type for matrixes

Type

TMatrix = Array [1..nmax,1..nmax] of Real;

// Declaring the initial matrixes used in the expression

// Variable declaration section

Var

A,B,Temp1,Temp2,Temp3:TMatrix;

str,st,i,j:integer;

{

Temp1, Temp2, Temp3 - arrays that keep the value of

intermediate calculations.

}

// Subprogram for calculating the sum of matrixes

{

Two matrixes (X1, Y1) of the same size are given.

The subprogram returns the matrix that is equal

to the result of summation or subtraction of

the given matrixes.

}

Procedure SumMat(Const X1,Y1:TMatrix;

Const Sign: Boolean;

Var Res:TMatrix);

// Variable declaration section

Var

i,j,k:integer;

{

i,j – counter variables;

k – sign variable.

}

Begin

// Determining the coefficient value

If Sign then

k:=1

Else

k:=-1;

For i:=1 to 3 do

For j:=1 to 3 do

Res[i,j]:=X1[i,j]+k\*Y1[i,j];

End;

// Subprogram for multiplying the matrix by a number

{

The X1 matrix and the multiplier M1 are given. The

subprogram returns the value of the matrix multiplied by

a number.

}

Procedure MultiplyMatConst(Const N1:Real;

Const X1:TMatrix;

Var Res:TMatrix);

// Declaring counter variables

Var

i,j:integer;

Begin

For i:=1 to 3 do

For j:=1 to 3 do

Res[i,j]:=N1\*X1[i,j];

End;

// Subprogram for multiplying the matrixes

{

Two matrixes (X1, Y1) of the same size are given.

The subprogram returns the matrix that is equal

to the result of the multiplication of the matrixes.

}

Procedure MultiplyMat(Const X1,Y1:TMatrix;

Var Res:TMatrix);

// Declaring counter variables

Var

i,j,l: Integer;

Begin

For i:=1 to 3 do

For j:=1 to 3 do

Begin

// Initializing the value of the matrix element

Res[i,j]:=0;

For l:=1 to 3 do

Res[i,j]:=Res[i,j]+X1[i,l]\*Y1[l,j];

End;

End;

// Subprogram for outputting the matrix

{

A matrix X1 is given. The procedure outputs the

formatted values of the matrix elements.

}

Procedure OutputMat(Const X1:TMatrix);

// Declaring counter variables

Var

i,j:Integer;

Begin

For i:=1 to 3 do

Begin

For j:=1 to 3 do

Write(X1[i,j]:6:1);

Writeln

End;

Writeln

End;

Begin

// Outputting the initial matrixes

randomize;

repeat

write('Количество строк Str= ');

readln(str);

write('Количество столбцов St= ');

readln(st);

until (str in [1..nmax])and(st in [1..nmax]);

Writeln('A');

for i:=1 to str do

begin

for j:=1 to st do

begin

a[i,j]:=random(20);

end;

writeln;

end;

OutputMat(A);

Writeln('B');

for i:=1 to str do

begin

for j:=1 to st do

begin

b[i,j]:=random(20);

end;

writeln;

end;

OutputMat(B);

// (A - B) \*A + 2\*B

// Subtracting B matrix from A

SumMat(A,B,False,Temp1);

// Multiplying Temp1 and A matrixes

MultiplyMat(Temp1,A,Temp2);

// Multiplying the B matrix by 2

MultiplyMatConst(2,B,Temp3);

Writeln('(A + 2\*B)\*(3\*A - B)');

//Adding to the calculated value Temp3 matrix

SumMat(Temp2,Temp3,True,Temp2);

OutputMat(Temp2);

Readln

End.