*ПРИЛОЖЕНИЕ 2*

**Текст программы**

#pragma once

#include<iostream>

namespace Project1 {

using namespace System;

using namespace System::ComponentModel;

using namespace System::Collections;

using namespace System::Windows::Forms;

using namespace System::Data;

using namespace System::Drawing;

using namespace System::Net::NetworkInformation;

using namespace System::Text;

/// <summary>

/// —водка дл¤ MyForm

/// </summary>

public ref class MyForm : public System::Windows::Forms::Form

{

public:

MyForm(void)

{

InitializeComponent();

//

//TODO: добавьте код конструктора

//

}

protected:

/// <summary>

/// ќсвободить все используемые ресурсы.

/// </summary>

~MyForm()

{

if (components)

{

delete components;

}

}

private: System::Windows::Forms::TextBox^ textBox1;

protected:

private: System::Windows::Forms::TextBox^ textBox2;

private: System::Windows::Forms::Button^ button1;

private: System::Windows::Forms::RichTextBox^ richTextBox1;

private: System::Windows::Forms::Button^ button2;

private: System::Windows::Forms::Label^ label1;

private: System::Windows::Forms::Label^ label2;

private: System::Windows::Forms::Label^ label3;

private: int a = 0;

private: System::Windows::Forms::ComboBox^ comboBox1;

private: System::Windows::Forms::ComboBox^ comboBox2;

private: System::Windows::Forms::PictureBox^ pictureBox1;

private: System::Windows::Forms::Label^ label4;

private: System::Windows::Forms::Label^ label5;

private: System::Windows::Forms::TextBox^ textBox3;

private: System::Windows::Forms::TextBox^ textBox4;

private:

/// <summary>

/// Обязательная переменная конструктора.

/// </summary>

System::ComponentModel::Container ^components;

#pragma region Windows Form Designer generated code

/// <summary>

/// Требуемый метод для поддержки конструктора — не изменяйте

/// содержимое этого метода с помощью редактора кода.

/// </summary>

void InitializeComponent(void)

{

this->textBox1 = (gcnew System::Windows::Forms::TextBox());

this->textBox2 = (gcnew System::Windows::Forms::TextBox());

this->button1 = (gcnew System::Windows::Forms::Button());

this->richTextBox1 = (gcnew System::Windows::Forms::RichTextBox());

this->button2 = (gcnew System::Windows::Forms::Button());

this->label1 = (gcnew System::Windows::Forms::Label());

this->label2 = (gcnew System::Windows::Forms::Label());

this->label3 = (gcnew System::Windows::Forms::Label());

this->comboBox1 = (gcnew System::Windows::Forms::ComboBox());

this->comboBox2 = (gcnew System::Windows::Forms::ComboBox());

this->pictureBox1 = (gcnew System::Windows::Forms::PictureBox());

this->label4 = (gcnew System::Windows::Forms::Label());

this->label5 = (gcnew System::Windows::Forms::Label());

this->textBox3 = (gcnew System::Windows::Forms::TextBox());

this->textBox4 = (gcnew System::Windows::Forms::TextBox());

(cli::safe\_cast<System::ComponentModel::ISupportInitialize^>(this->pictureBox1))->BeginInit();

this->SuspendLayout();

//

// textBox1

//

this->textBox1->Location = System::Drawing::Point(51, 32);

this->textBox1->MaxLength = 5;

this->textBox1->Name = L"textBox1";

this->textBox1->Size = System::Drawing::Size(100, 20);

this->textBox1->TabIndex = 0;

this->textBox1->KeyPress += gcnew System::Windows::Forms::KeyPressEventHandler(this, &MyForm::textBox2\_KeyPress);

//

// textBox2

//

this->textBox2->Location = System::Drawing::Point(51, 75);

this->textBox2->MaxLength = 5;

this->textBox2->Name = L"textBox2";

this->textBox2->Size = System::Drawing::Size(100, 20);

this->textBox2->TabIndex = 1;

this->textBox2->KeyPress += gcnew System::Windows::Forms::KeyPressEventHandler(this, &MyForm::textBox2\_KeyPress);

//

// button1

//

this->button1->Location = System::Drawing::Point(76, 213);

this->button1->Name = L"button1";

this->button1->Size = System::Drawing::Size(75, 23);

this->button1->TabIndex = 2;

this->button1->Text = L"Переход";

this->button1->UseVisualStyleBackColor = true;

this->button1->Click += gcnew System::EventHandler(this, &MyForm::button1\_Click);

//

// richTextBox1

//

this->richTextBox1->Location = System::Drawing::Point(723, 22);

this->richTextBox1->Name = L"richTextBox1";

this->richTextBox1->Size = System::Drawing::Size(373, 243);

this->richTextBox1->TabIndex = 3;

this->richTextBox1->Text = L"";

//

// button2

//

this->button2->Location = System::Drawing::Point(1021, 280);

this->button2->Name = L"button2";

this->button2->Size = System::Drawing::Size(75, 23);

this->button2->TabIndex = 4;

this->button2->Text = L"Очистить";

this->button2->UseVisualStyleBackColor = true;

this->button2->Click += gcnew System::EventHandler(this, &MyForm::button2\_Click);

//

// label1

//

this->label1->AutoSize = true;

this->label1->Location = System::Drawing::Point(26, 13);

this->label1->Name = L"label1";

this->label1->Size = System::Drawing::Size(87, 13);

this->label1->TabIndex = 5;

this->label1->Text = L"Операнд 1 (dec)";

//

// label2

//

this->label2->AutoSize = true;

this->label2->Location = System::Drawing::Point(26, 59);

this->label2->Name = L"label2";

this->label2->Size = System::Drawing::Size(87, 13);

this->label2->TabIndex = 6;

this->label2->Text = L"Операнд 2 (dec)";

//

// label3

//

this->label3->AutoSize = true;

this->label3->Location = System::Drawing::Point(723, 3);

this->label3->Name = L"label3";

this->label3->Size = System::Drawing::Size(26, 13);

this->label3->TabIndex = 7;

this->label3->Text = L"Лог";

//

// comboBox1

//

this->comboBox1->BackColor = System::Drawing::SystemColors::Window;

this->comboBox1->DropDownStyle = System::Windows::Forms::ComboBoxStyle::DropDownList;

this->comboBox1->Font = (gcnew System::Drawing::Font(L"Microsoft Sans Serif", 8.25F, System::Drawing::FontStyle::Bold, System::Drawing::GraphicsUnit::Point,

static\_cast<System::Byte>(204)));

this->comboBox1->FormattingEnabled = true;

this->comboBox1->Items->AddRange(gcnew cli::array< System::Object^ >(2) { L"+", L"-" });

this->comboBox1->Location = System::Drawing::Point(12, 31);

this->comboBox1->Name = L"comboBox1";

this->comboBox1->RightToLeft = System::Windows::Forms::RightToLeft::No;

this->comboBox1->Size = System::Drawing::Size(33, 21);

this->comboBox1->TabIndex = 8;

//

// comboBox2

//

this->comboBox2->BackColor = System::Drawing::SystemColors::Window;

this->comboBox2->DropDownStyle = System::Windows::Forms::ComboBoxStyle::DropDownList;

this->comboBox2->Font = (gcnew System::Drawing::Font(L"Microsoft Sans Serif", 8.25F, System::Drawing::FontStyle::Bold, System::Drawing::GraphicsUnit::Point,

static\_cast<System::Byte>(204)));

this->comboBox2->FormattingEnabled = true;

this->comboBox2->Items->AddRange(gcnew cli::array< System::Object^ >(2) { L"+", L"-" });

this->comboBox2->Location = System::Drawing::Point(12, 74);

this->comboBox2->Name = L"comboBox2";

this->comboBox2->RightToLeft = System::Windows::Forms::RightToLeft::No;

this->comboBox2->Size = System::Drawing::Size(33, 21);

this->comboBox2->TabIndex = 9;

//

// pictureBox1

//

this->pictureBox1->Location = System::Drawing::Point(168, 12);

this->pictureBox1->Name = L"pictureBox1";

this->pictureBox1->Size = System::Drawing::Size(534, 253);

this->pictureBox1->TabIndex = 10;

this->pictureBox1->TabStop = false;

//

// label4

//

this->label4->AutoSize = true;

this->label4->Location = System::Drawing::Point(26, 156);

this->label4->Name = L"label4";

this->label4->Size = System::Drawing::Size(83, 13);

this->label4->TabIndex = 14;

this->label4->Text = L"Операнд 2 (bin)";

//

// label5

//

this->label5->AutoSize = true;

this->label5->Location = System::Drawing::Point(26, 110);

this->label5->Name = L"label5";

this->label5->Size = System::Drawing::Size(83, 13);

this->label5->TabIndex = 13;

this->label5->Text = L"Операнд 1 (bin)";

//

// textBox3

//

this->textBox3->Location = System::Drawing::Point(12, 172);

this->textBox3->MaxLength = 5;

this->textBox3->Name = L"textBox3";

this->textBox3->ReadOnly = true;

this->textBox3->Size = System::Drawing::Size(139, 20);

this->textBox3->TabIndex = 12;

//

// textBox4

//

this->textBox4->Location = System::Drawing::Point(12, 129);

this->textBox4->MaxLength = 5;

this->textBox4->Name = L"textBox4";

this->textBox4->ReadOnly = true;

this->textBox4->Size = System::Drawing::Size(139, 20);

this->textBox4->TabIndex = 11;

//

// MyForm

//

this->AutoScaleDimensions = System::Drawing::SizeF(6, 13);

this->AutoScaleMode = System::Windows::Forms::AutoScaleMode::Font;

this->ClientSize = System::Drawing::Size(1120, 327);

this->Controls->Add(this->label4);

this->Controls->Add(this->label5);

this->Controls->Add(this->textBox3);

this->Controls->Add(this->textBox4);

this->Controls->Add(this->pictureBox1);

this->Controls->Add(this->comboBox2);

this->Controls->Add(this->comboBox1);

this->Controls->Add(this->label3);

this->Controls->Add(this->label2);

this->Controls->Add(this->label1);

this->Controls->Add(this->button2);

this->Controls->Add(this->richTextBox1);

this->Controls->Add(this->button1);

this->Controls->Add(this->textBox2);

this->Controls->Add(this->textBox1);

this->Name = L"MyForm";

this->Text = L"АЛУ";

this->Load += gcnew System::EventHandler(this, &MyForm::MyForm\_Load);

(cli::safe\_cast<System::ComponentModel::ISupportInitialize^>(this->pictureBox1))->EndInit();

this->ResumeLayout(false);

this->PerformLayout();

}

#pragma endregion

void fromDecToBin(int x, int m[], bool s)

{

int div = 3;

int mod;

int i = 0;

while (div > 1) {

div = x / 2;

mod = x % 2;

x = x / 2;

m[i] = mod;

i++;

}

m[i] = div;

if (!s) { m[15] = 1; }

int tmp = 0;

int r[16]{};

for (int i = 15; i >= 0; i--) {

r[tmp] = m[i];

tmp++;

}

//richTextBox1->Text += "op: ";

for (int i = 0; i <= 15; i++) {

m[i] = r[i];

//richTextBox1->Text += m[i];

}

//richTextBox1->Text += "b\n";

}

void mul(int op1[], int op2[], int result[]) {

int tmp\_sign1 = op1[0];

int tmp\_sign2 = op2[0];

op1[0] = 0;

op2[0] = 0;

int i = 15; //Счётчик разрядов op2

bool tr = false; //Признак переноса

bool c = false;

bool ov = false; //Признак переполнения

while (i != -1) {

tr = false;

if (op2[i] == 1) {

for (int j = 15; j >= 0; j--){

if ((result[j] == 1 && op1[j] == 1) && tr) {

tr = true;

result[j] = 1;

continue;

}

if ((result[j] == 1 && op1[j] == 1) && !tr) {

tr = true;

result[j] = 0;

continue;

}

if (((result[j] == 0 && op1[j] == 1) || (result[j] == 1 && op1[j] == 0)) && tr) {

tr = true;

result[j] = 0;

continue;

}

if (((result[j] == 0 && op1[j] == 1) || (result[j] == 1 && op1[j] == 0)) && !tr) {

tr = false;

result[j] = 1;

continue;

}

if (result[j] == 0 && op1[j] == 0 && tr) {

tr = false;

result[j] = 1;

continue;

}

if (result[j] == 0 && op1[j] == 0 && !tr) {

tr = false;

result[j] = 0;

continue;

}

}

if (result[31] == 1) { c = true; }

richTextBox1->Text += "1 + A ";

for (int i = 0; i <= 15; i++) {

richTextBox1->Text += op1[i];

}

richTextBox1->Text += "\n";

richTextBox1->Text += "\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n";

if (result[0] == 1) { ov = true; }

richTextBox1->Text += " = ";

for (int i = 0; i <= 31; i++) {

richTextBox1->Text += result[i];

}

richTextBox1->Text += " | C - " + c + " & OV - " + ov + "\n";

}

for (int h = 32 - 1; h >= 0; h--)

{

if (h < 1) result[h] = 0; else

result[h] = result[h - 1];

if (h < 1 && tr) { result[h] = 1; }

}

richTextBox1->Text += "0 --> ";

for (int i = 0; i <= 31; i++) {

richTextBox1->Text += result[i];

}

richTextBox1->Text += "\n";

i--;

}

op1[0] = tmp\_sign1;

op2[0] = tmp\_sign2;

if (op1[0] != op2[0]) result[0] = 1;

richTextBox1->Text += "\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n";

richTextBox1->Text += "Res: ";

for (int i = 0; i <= 31; i++) {

richTextBox1->Text += result[i];

}

richTextBox1->Text += " | C - " + tr + " & OV - " + ov + "\n";

}

void equal(int op1[], int op2[], int result[]){

for (int i = 0; i <= 15; i++) {

if (op1[i] == 0 && op2[i] == 0) {

result[i] = 1;

}

if (op1[i] == 1 && op2[i] == 0) {

result[i] = 0;

}

if (op1[i] == 0 && op2[i] == 1) {

result[i] = 0;

}

if (op1[i] == 1 && op2[i] == 1) {

result[i] = 1;

}

}

richTextBox1->Text += "Equal: ";

for (int i = 0; i <= 15; i++) {

richTextBox1->Text += result[i];

}

}

void fromBinToDec(int m[]){

int r = 0;

for (int i = 0; i <= 31; i++){

r += m[31 - i] \* pow(2, i);

}

richTextBox1->Text += "Res: " + r + "d\n";

}

private: System::Void MyForm\_Load(System::Object^ sender, System::EventArgs^ e) {

comboBox1->SelectedIndex = 0;

comboBox2->SelectedIndex = 0;

pictureBox1->Image = Image::FromFile("graph.png");

}

private: System::Void button1\_Click(System::Object^ sender, System::EventArgs^ e) {

if (textBox1->Text == "" || textBox2->Text == ""){

MessageBox::Show("op1 or op2 is empty", "Ошибка");

}

else {

switch (a) {

case 0: {

richTextBox1->Text += "op1: " + textBox1->Text + "d\n";

richTextBox1->Text += "op2: " + textBox2->Text + "d\n";

textBox4->Text = comboBox1->Text;

textBox3->Text = comboBox2->Text;

int op1 = Convert::ToInt32(textBox1->Text);

int op2 = Convert::ToInt32(textBox2->Text);

int op1\_bin[16]{};

int op2\_bin[16]{};

if (op1 > 32767 || op2 > 32767) {

MessageBox::Show("op1 || op2 > 32767", "Ошибка");

}

else {

bool sign = true;

if (comboBox1->SelectedIndex == 0) { sign = true; }

else { sign = false; }

fromDecToBin(op1, op1\_bin, sign);

if (comboBox2->SelectedIndex == 0) { sign = true; }

else { sign = false; }

fromDecToBin(op2, op2\_bin, sign);

}

for (int i = 0; i <= 15; i++) {

textBox4->Text += op1\_bin[i];

}

for (int i = 0; i <= 15; i++) {

textBox3->Text += op2\_bin[i];

}

pictureBox1->Image = Image::FromFile("graph0.png");

a++;

break;

}

case 1: {

textBox4->Text = comboBox1->Text;

textBox3->Text = comboBox2->Text;

int op1 = Convert::ToInt32(textBox1->Text);

int op2 = Convert::ToInt32(textBox2->Text);

int op1\_bin[16]{};

int op2\_bin[16]{};

if (op1 > 32767 || op2 > 32767) {

MessageBox::Show("op1 || op2 > 32767", "Ошибка");

}

else {

bool sign = true; //Проверка знака

if (comboBox1->SelectedIndex == 0) { sign = true; }

else { sign = false; }

fromDecToBin(op1, op1\_bin, sign);

if (comboBox2->SelectedIndex == 0) { sign = true; }

else { sign = false; }

fromDecToBin(op2, op2\_bin, sign);

}

richTextBox1->Text += "op1: ";

for (int i = 0; i <= 15; i++) {

richTextBox1->Text += op1\_bin[i];

textBox4->Text += op1\_bin[i];

}

richTextBox1->Text += "b\n";

richTextBox1->Text += "op2: ";

for (int i = 0; i <= 15; i++) {

richTextBox1->Text += op2\_bin[i];

textBox3->Text += op2\_bin[i];

}

richTextBox1->Text += "b\n";

pictureBox1->Image = Image::FromFile("graph1.png");

a++;

break;

}

case 2: {

int op1 = Convert::ToInt32(textBox1->Text);

int op2 = Convert::ToInt32(textBox2->Text);

int op1\_bin[16]{};

int op2\_bin[16]{};

if (op1 > 32767 || op2 > 32767) {

MessageBox::Show("op1 || op2 > 32767", "Ошибка");

}

else {

bool sign = true; //Проверка знака

if (comboBox1->SelectedIndex == 0) { sign = true; }

else { sign = false; }

fromDecToBin(op1, op1\_bin, sign);

if (comboBox2->SelectedIndex == 0) { sign = true; }

else { sign = false; }

fromDecToBin(op2, op2\_bin, sign);

}

int mul\_result[32]{};

richTextBox1->Text += "Здесь в колонке 'В', сверху вниз, записаны разряды множителя, начиная с младших. А в следующем столбце - символика действий ";

richTextBox1->Text += "предпринимаемых в зависимости от значения соответствующего разряда множителя.Смысл этих символов следующий :\n";

richTextBox1->Text += " + A - число A прибавляется к регистру С;\n";

richTextBox1->Text += " --> - содержимое регистра С сдвигается на один разряд вправо;\n";

richTextBox1->Text += " ' = ' - показывается значение частичного произведения полученного после сложения, которое заносится в регистр С.\n\n";

richTextBox1->Text += "B ";

for (int i = 0; i <= 31; i++) {

richTextBox1->Text += mul\_result[i];

}

richTextBox1->Text += "\n";

mul(op1\_bin, op2\_bin, mul\_result);

fromBinToDec(mul\_result);

int equal\_result[16]{};

equal(op1\_bin, op2\_bin, equal\_result);

pictureBox1->Image = Image::FromFile("graph2.png");

a++;

break;

}

default: {

a = 0;

pictureBox1->Image = Image::FromFile("graph.png");

break;

}

}

}

} private: System::Void button2\_Click(System::Object^ sender, System::EventArgs^ e) {

richTextBox1->Clear();

}

private: System::Void textBox2\_KeyPress(System::Object^ sender, System::Windows::Forms::KeyPressEventArgs^ e)

{

if (((e->KeyChar >= '0') && (e->KeyChar <= '9')) || e->KeyChar == 8) // Если вводятся цифры от 0 до 9 или нажимается backspace то "далее"

return;

e->Handled = true; // Остальные символы запрещены для ввода

}

};

}