```
/*************************************************************************
   ***********
  Andrzej Borucki
  www.algorytm.org
  Algorytm kreslenia odcinkow
*************************************************************************
   **********/
#include <QtGui>
#include <windows.h>
#include "window.h"

Window::Window()
    : QWidget()
{
    label = new QLabel(tr("Image"));

    QGridLayout *layout = new QGridLayout;
    btn1 = new QPushButton("std");
    btn2 = new QPushButton("bresenham");
    layout->addWidget(btn1, 0, 1);
    layout->addWidget(btn2, 1, 1);
    layout->addWidget(label, 0, 0);
    setLayout(layout);
    connect( btn1, SIGNAL(clicked()), SLOT(draw_clicked()) );
    connect( btn2, SIGNAL(clicked()), SLOT(bresenham_clicked()) );
}

void bresenham(int x1, int y1, int x2, int y2, int color, uchar *
   bits, int bytesPerLine)
{
    int d, dx, dy, ai, bi, xi, yi;
            int pxi, pyi;
            int x = x1, y = y1;
            // determining the direction of drawing
            if (x1 < x2)
            {
                xi = 1;
                pxi = 4;
                dx = x2 - x1;
            }
            else
            {
                xi = -1;
                pxi = -4;
                dx = x1 - x2;
            }
            // determining the direction of drawing
            if (y1 < y2)
```

```
{
    yi = 1;
    pyi = bytesPerLine;
    dy = y2 - y1;
}
else
{
    yi = -1;
    pyi = -bytesPerLine;
    dy = y1 - y2;
}
// first pixel
//SetPixel(x, y, color);
uchar* p = bits + y * bytesPerLine + x * 4;
*((int*)p) = color;
// the leading axis OX
if (dx > dy)
{
    ai = (dy - dx) * 2;
    bi = dy * 2;
    d = bi - dx;
    // loop for x
    while (x != x2)
    {
        // factor test
        if (d >= 0)
        {
            x += xi;
            p += pxi;
            y += yi;
            p += pyi;
            d += ai;
        }
        else
        {
            d += bi;
            x += xi;
            p += pxi;
        }
        //SetPixel(x, y, color);
        *((int*)p) = color;
    }
}
// the leading axis OY
else
{
    ai = (dx - dy) * 2;
    bi = dx * 2;
```

```
                d = bi - dy;
                // loop for y
                while (y != y2)
                {
                    // factor test
                    if (d >= 0)
                    {
                        x += xi;
                        p += pxi;
                        y += yi;
                        p += pyi;
                        d += ai;
                    }
                    else
                    {
                        d += bi;
                        y += yi;
                        p += pyi;
                    }
                    //SetPixel(x, y, color);
                    *((int*)p) = color;
                }
            }
}

void Window::draw_clicked()
{
    btn1->setEnabled(false);
    QImage myImage(100,100,QImage::Format_RGB32);
    QPainter p;
    p.begin(&myImage);
    p.setPen(QPen(QColor(Qt::color1)));
    p.setBrush(QBrush(QColor(Qt::color0), Qt::NoBrush));
    LARGE_INTEGER n1,n2,f;
    QueryPerformanceCounter(&n1);
    for(int i=0; i<1000*1000; i++)
      p.drawLine(rand()%100, rand()%100, rand()%100, rand()%100);
    QueryPerformanceCounter(&n2);
    p.end();
    btn1->setEnabled(true);

    label->setPixmap(QPixmap::fromImage(myImage));
    QueryPerformanceFrequency(&f);
    QMessageBox msgBox;
    msgBox.setText("time
       "+QString::number(double(n2.QuadPart-n1.QuadPart)/f.QuadPart
       ));
    msgBox.exec();
```

```
}

void Window::bresenham_clicked()
{
    QImage myImage(100,100,QImage::Format_RGB32);
    uchar * bits = myImage.bits();
    LARGE_INTEGER n1,n2,f;
    QueryPerformanceCounter(&n1);
    for(int i=0; i<1000*1000; i++)
        bresenham(rand()%100, rand()%100, rand()%100, rand()%100,
           255, bits, myImage.bytesPerLine());
    QueryPerformanceCounter(&n2);
    label->setPixmap(QPixmap::fromImage(myImage));
    QueryPerformanceFrequency(&f);
    QMessageBox msgBox;
    msgBox.setText("time
       "+QString::number(double(n2.QuadPart-n1.QuadPart)/f.QuadPart
       ));
    msgBox.exec();
}
```