- **Source Code**

- ***MainWindow.h***

```
#ifndef MAINWINDOW_H
#define MAINWINDOW_H

#include <QMainWindow>

QT_BEGIN_NAMESPACE
namespace Ui {
class MainWindow;
}
QT_END_NAMESPACE

class MainWindow : public QMainWindow
{
    Q_OBJECT

public:
    MainWindow(QWidget *parent = nullptr);
    ~MainWindow();

private slots:
    void on_pushButton_clicked();
    void paint_recursive(int, int, int, int, int);
    void DDA(int, int, int, int);
private:
    Ui::MainWindow *ui;
};
#endif // MAINWINDOW_H
```

- ***MainWindow.cpp***

```
#include "mainwindow.h"
#include "ui_mainwindow.h"
#include <iostream>
using namespace std;
QImage img(500,500,QImage::Format_RGB888);
MainWindow::MainWindow(QWidget *parent)
```

```
    : QMainWindow(parent)
    , ui(new Ui::MainWindow)
{
    ui->setupUi(this);
}

MainWindow::~MainWindow()
{
    delete ui;
}

void MainWindow::on_pushButton_clicked()
{
    int level;
    level = ui->textEdit->toPlainText().toInt();
    //int x1=20,x5=300;
    //int y1=280,y5=280;
    paint_recursive(level,50,400,350,400);
    paint_recursive(level,350,400,200,140);
    paint_recursive(level,200,140,50,400);
    ui->label->setPixmap(QPixmap::fromImage(img));
}

void MainWindow::paint_recursive(int order, int x1, int y1, int x5,
int y5)
{
    int deltaX, deltaY, x2, y2, x3, y3, x4, y4;
    if(order == 1)
    {
        DDA(x1,y1,x5,y5);
    }
    else
    {
        deltaX = (x5-x1)/3;
        deltaY = (y5-y1)/3;
        x2 = x1+deltaX;
        y2 = y1+deltaY;
        x3 = int((x1+x5)/2+sqrt(3)*(y1-y5)/6);
        y3 = int((y1+y5)/2+sqrt(3)*(x5-x1)/6);
        x4 = x1+deltaX*2;
        y4 = y1+deltaY*2;
        paint_recursive(order-1,x1,y1,x2,y2);
```

```
        paint_recursive(order-1,x2,y2,x3,y3);
        paint_recursive(order-1,x3,y3,x4,y4);
        paint_recursive(order-1,x4,y4,x5,y5);
    }
}

void MainWindow::DDA(int x1, int y1, int x2, int y2)
{
    float dx,dy,length,xinc,yinc,x,y;
    dx = x2-x1;
    dy = y2-y1;
    if(abs(dx) > abs(dy))
    {
        length = abs(dx);
    }
    else{
        length = abs(dy);
    }
    xinc = dx/length;
    yinc = dy/length;
    int sign;
    if(dx>0){
        sign = 1;
    }else if(dx == 0){
        sign = 0;
    }else{
        sign = -1;
    }
    int sign1;
    if(dy>0){
        sign1 = 1;
    }else if(dy == 0){
        sign1 = 0;
    }else{
        sign1 = -1;
    }
    x = x1+0.5*sign;
    y = y1+0.5*sign1;
    int i = 0;
    while(i<length){
        img.setPixel(int(x),int(y),qRgb(255,255,255));
        x=x+xinc;
```

```
        y=y+yinc;
        i=i+1;
    }
}
```

- **Output**