```cpp
#define _USE_MATH_DEFINES
#include<iostream>
#include<cmath>
#include<opencv2/opencv.hpp>

using namespace std;
using namespace cv;

int main(int argc, char **argv)
{
  string file_src = "src_bin_circle_mask.bmp";
  Mat img_src = imread(file_src, 0);//入力画像(グレースケール）の読み込み
  if (!img_src.data) {
    cout << "error" << endl;
    return -1;
  }

  Rect rect = boundingRect(img_src);
  double aspectratio_cv = (double)(rect.height) / rect.width;
  cout << aspectratio_cv << endl;
  Mat img_dst = img_src.clone();
  rectangle(img_dst, Point(rect.x, rect.y), Point(rect.x + rect.width, rect.y + rect.height), 255, 1);
  imshow("dst", img_dst);

  const int width = img_src.cols;
  const int height = img_src.rows;
  //面積
  double area = 0;
  for (int y = 0; y < height; y++) {
    for (int x = 0; x < width; x++) {
      if (img_src.data[y*width + x] == 255)area++;
    }
  }
  //周囲長
  /*****p146 周囲長をもとめるC言語プログラムを参考にここを作成しましょう********/
  int ini_x, ini_y;
  for (int y = 0; y < height; y++) {
    for (int x = 0; x < width; x++) {
      if (img_src.data[y * width + x] == 255) {
        ini_y = y;
        ini_x = x;
        goto INI_OK;
      }
    }
  }
INI_OK:

  //int rot_x[4] = { 0,1,0,-1 };
  //int rot_y[4] = { 1,0,-1,0 };
  int rot_x[8] = { -1,0,1,1, 1, 0,-1,-1 };
  int rot_y[8] = {  1,1,1,0,-1,-1,-1, 0 };
  int rot = 0;
  double perimeter = 0;
  int now_x, now_y;
  int pre_x = ini_x;
  int pre_y = ini_y;
  while (true) {
    for (int i = 0; i < 8; i++) {
```

```
      now_x = pre_x + rot_x[(rot + i) % 8];
      now_y = pre_y + rot_y[(rot + i) % 8];
      if (now_x < 0 || now_x > width - 1 || now_y < 0 || now_y > height - 1) {
        continue;
      }
      if (img_src.data[now_y * height + now_x] == 255) {
        pre_x = now_x;
        pre_y = now_y;
        if ((rot + i) % 8 == 0 || (rot + i) % 8 == 2 || (rot + i) % 8 == 4 || (rot + i) % 8 == 6) {
          //perimeter += 1.41421356;
          perimeter += sqrt(2);
        }
        else perimeter++;
        rot += i + 7;
        break;
      }
    }
    if (pre_x == ini_x && pre_y == ini_y)break;
  }


  //円形度
  double roundness = 4 * M_PI*area / perimeter / perimeter;

  cout << "面積　" << area << endl;
  cout << "周囲長　" << perimeter << endl;
  cout << "円形度　" << roundness << endl;

  //imshow(win_src, img_src);
  //imshow(win_dst, img_src);

  waitKey(0);
  return 0;
}
perimiter.cpp
perimiter.cpp を表示しています。
```