Shaastra - Mixels Online Prelims - Problem Statement

1. Rect O' Mania

Description:

A binary image is one in which each pixel is either white or black. The input in this problem is a binary image which contains a number of non-overlapping white rectangles in a black background. The rectangles can be in any orientation. You are expected to find the centre of the rectangle(s) and also find the angle of rotation of each rectangle with respect to the horizontal.

Note: Measure the angle between the axis parallel to the longer edge of the rectangle passing through centre and measure the angle in anti-clockwise direction from the horizontal.

Input format:

Input format:
<program> <input image>

Example :
<program> input.jpg

Output format:
N
X1, Y1, D1
X2, Y2, D2
.
.
.
Xn, Yn, Dn

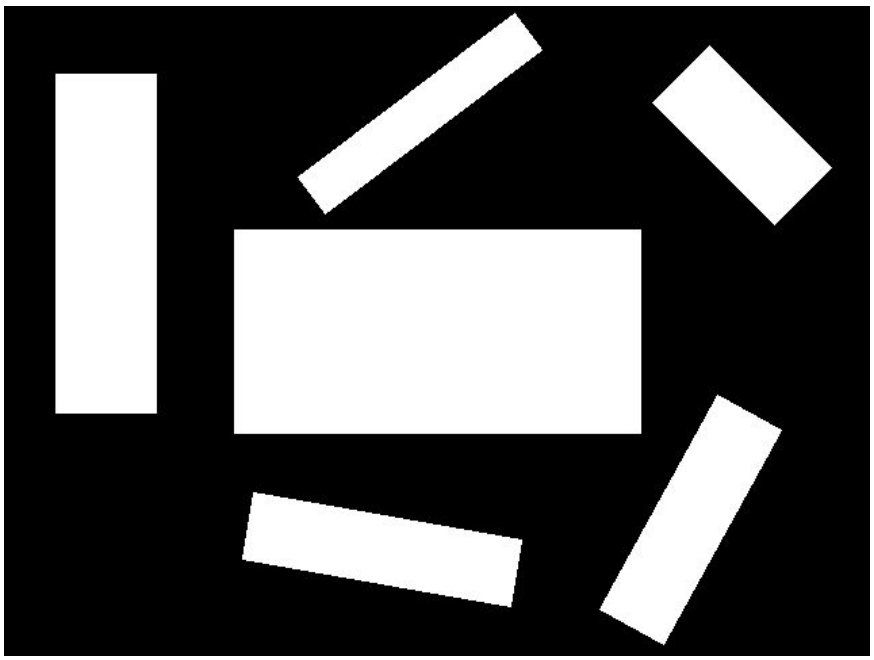
Where
N is the number of rectangles detected
Xi is the X coordinate of the i th rectangle
Yi is the Y coordinate of the i th rectangle
Di is the Angle (See Note Carefully) in degrees (0 <= D < 180)

N, Xi, Yi, Di are integers. The ordering must be in **terms of size (Largest -> Smallest)**

Answers are accepted with an error or +1/-1 in the coordinates (i.e., X-1, X+1, X) and +2/-2 in the angle.

Evaluation Criteria:
This question has binary scoring pattern. If your answer is correct you will be awarded 40 points.

Sample Input Image:



Sample Output:

6
320,240,0
75,175,90
279,401,170
507,379,61
545,95,135
307,79,37

2. PI Detector

Description:

Given an image you have to estimate the number of circular-shaped objects in the image. The image will have any number of planar circular objects or projections of 3D spheres. The objects can be of any color. You can assume there will be a contrast between the color of the object and the background.

Input format:

<program> <input image>

Example :
<program> input.jpg

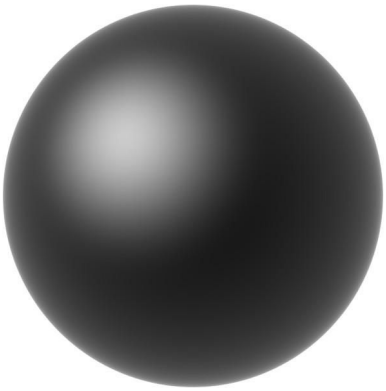
Output format:

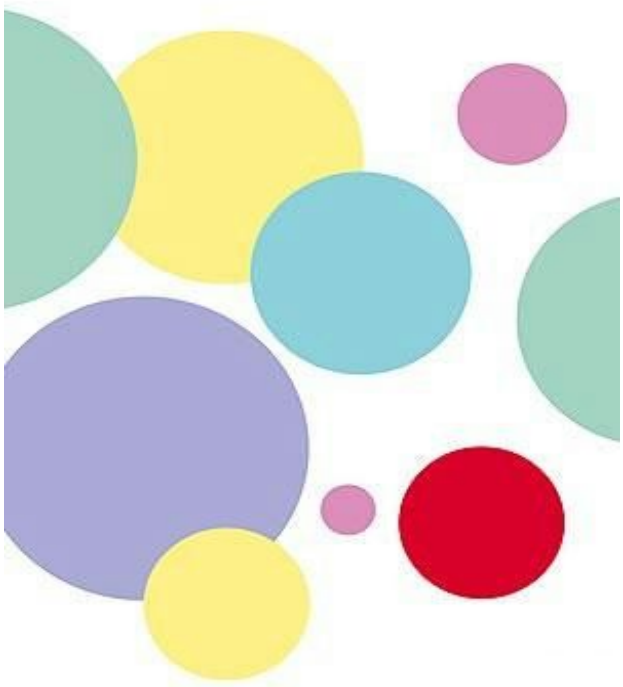
Total number of circular objects

Evaluation Criteria:

If X is the total number of such objects in the image, and N is the predicted output, then the score awarded will be max(0 , {40 - 40*|N-X|/X})
This will be evaluated for each test case, and the average score across all test cases will be the final score for this question.

Sample Input 1:





Sample Output:

1

9

3. CVScanner

Description:
You are given a raw image of a sheet of paper (as shown in the sample). You are required to give an output image which correctly segments and orients the sheet.

Input format:

<program> <input image> <output image name>

Example :
<program> input.jpg output.jpg

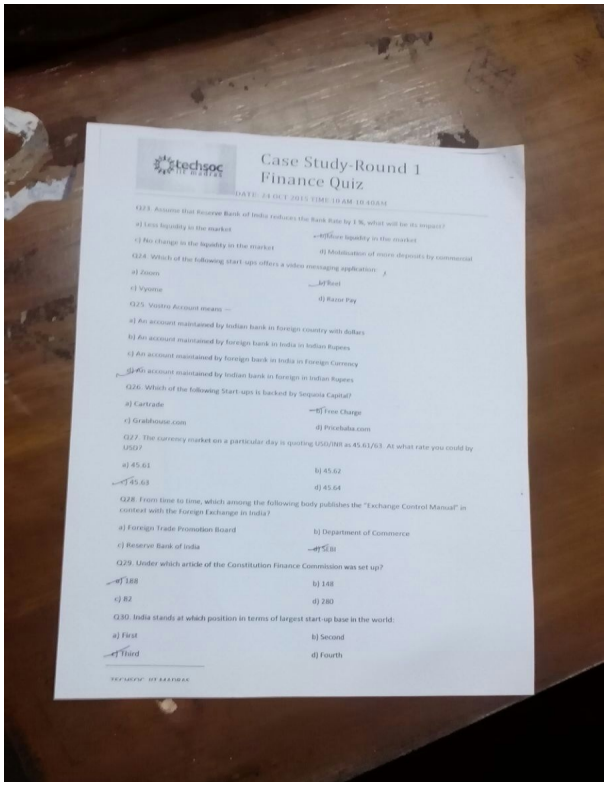
Output format:

The final image should be written to the filename given in the command line.

Evaluation Criteria:

Partial marks are awarded for each step in the solution.

Sample input :



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Case Study-Round 1
Finance Quiz

DATE: 24 OCT 2015 TIME: 10 AM-10.40AM

Q23. Assume that Reserve Bank of India reduces the Bank Rate by 1 %, what will be its impact?

a) Less liquidity in the market
b) More liquidity in the market
c) No change in the liquidity in the market
d) Mobilisation of more deposits by commercial

Q24. Which of the following start-ups offers a video messaging application:

a) Zoom
b) Reel
c) Vyome
d) Razor Pay

Q25. Vostro Account means –

a) An account maintained by Indian bank in foreign country with dollars
b) An account maintained by foreign bank in India in Indian Rupees
c) An account maintained by foreign bank in India in Foreign Currency
d) An account maintained by Indian bank in foreign in Indian Rupees

Q26. Which of the following Start-ups is backed by Sequoia Capital?

a) Cartrade
b) Free Charge
c) Grabhouse.com
d) Pricebaba.com

Q27. The currency market on a particular day is quoting USD/INR as 45.61/63. At what rate you could by USD?

a) 45.61
b) 45.62
c) 45.63
d) 45.64

Q28. From time to time, which among the following body publishes the "Exchange Control Manual" in context with the Foreign Exchange in India?

a) Foreign Trade Promotion Board
b) Department of Commerce
c) Reserve Bank of India
d) SEBI

Q29. Under which article of the Constitution Finance Commission was set up?

a) 188
b) 148
c) 82
d) 280

Q30. India stands at which position in terms of largest start-up base in the world:

a) First
b) Second
c) Third
d) Fourth

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Sample output :

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4. Shape Detector

Description:

Given an image you have to estimate the geometric shapes and their respective numbers in the image. The image will have any number of shapes. The objects can be of any color. You can assume there will be a contrast between the color of the object and the background.

Input format:

<program> <input image>

Example :

<program> input.jpg

Output format:

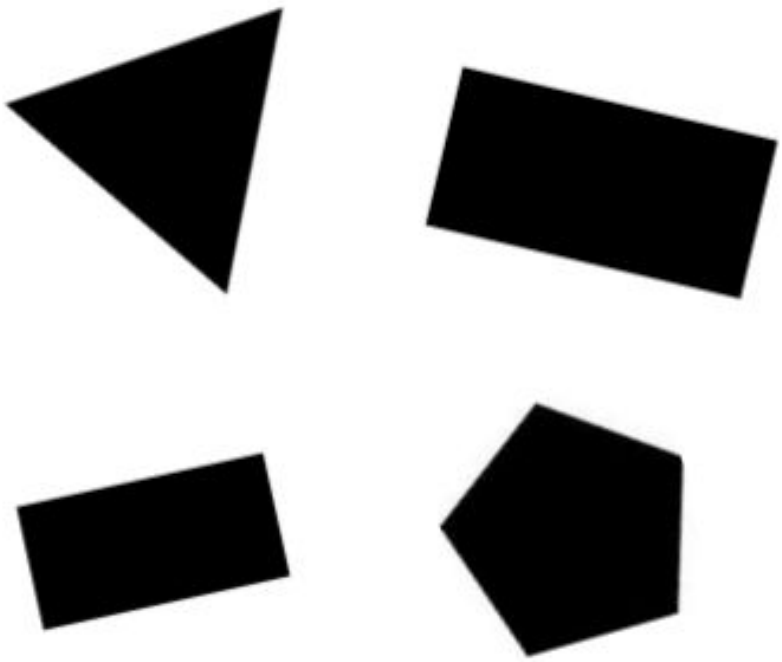
<number_of_vertices_for _the_shape> - <number_of_such_shapes>

Evaluation Criteria:

Points will be awarded for correctly estimating the shapes present in the image.

If Xi is the total number of each shape in the image, and Ni is the predicted output, then the score awarded will be max(0 , {40 - 40*|Ni-Xi|/Xi})
This will be evaluated for each test shape and each case, and the average score across all test cases will be the
final score for this question.

Sample Input :



Sample output:

3 - 1
4 - 2
5 - 1