

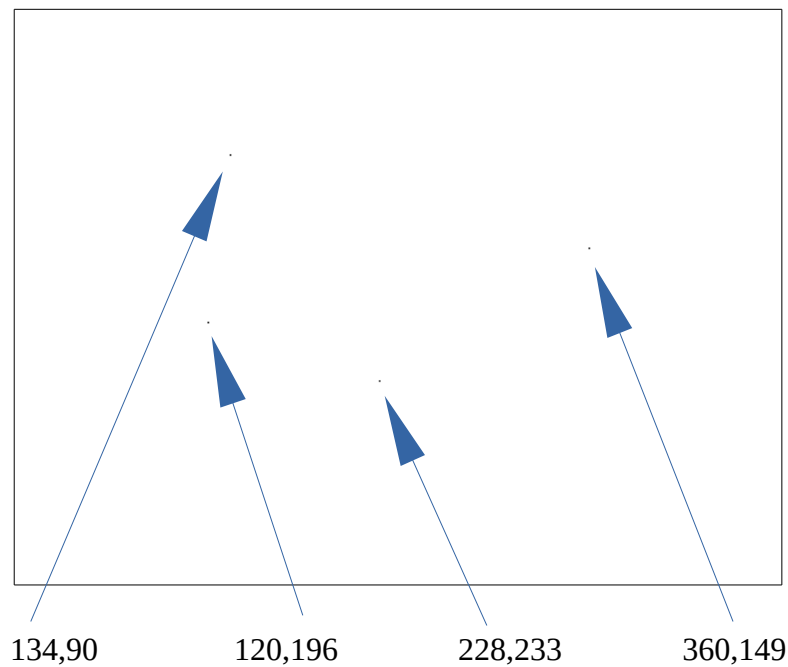
CPT120 Introduction To Programming Assignment 3

In this assignment, you will create a road combination finder function called `showRoads(picture)`.

The 'picture' that is given to the function is an image with a solid white background and has an arbitrary number of black dots (pixels).

One example instance of Example of input:

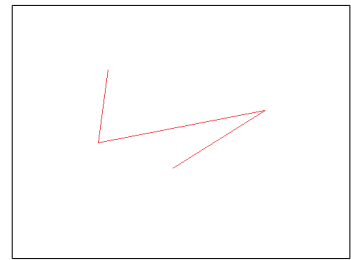
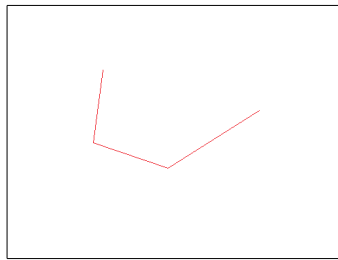
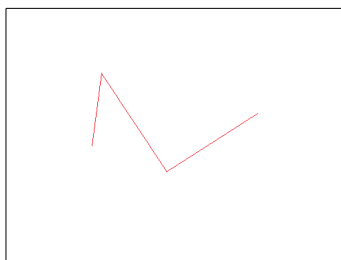
The image below is 480x360 pixels (the border is drawn for clarity only) and has (4) black dots:



Your function must first detect black dots (pixels) on the image. An image can have zero or more.

Then your function must draw lines using the `addLine` function in JES to show all the combinations of connections that could be made for the original input picture. In each combination, the lines must not have disconnections. Each combination should be shown on a separate image (hint: create a copies of the original input image).

For example, here are 3 combinations possible for the above:



Finally you must print the lengths of the lines for each combination. The distance between any two points (say x_1, y_1 and x_2, y_2) can be calculated using the following formula:

$\text{distance_between_two_points} = \sqrt{\text{pow}(x1-x2,2)+\text{pow}(y1-y2,2)}$

For example, in the three example combinations shown above, the distance of the entire line can be calculated as a sum of its 3 smaller segments (d1, d2 and d3):

$d1 = \sqrt{\text{pow}(120-134,2)+\text{pow}(196-90,2)} = 106.92053123698928$

$d2 = \sqrt{\text{pow}(134-228,2)+\text{pow}(90-233,2)} = 171.1286066091815$

$d3 = \sqrt{\text{pow}(228-360,2)+\text{pow}(233-149,2)} = 156.46085772486356$

$\text{total_distance} = d1+d2+d3 = 434.5099955710343$

Your code must work for any number of line segments, not just for 3. I.e. the image can have any number of black dots (pixels) and you must try all combinations of lines that go through each dot. The above are only examples.

Submission:

Submission must be made via Blackboard->Assignments->Assignment 3 submission link. For up to date deadlines, see Blackboard->Course Documents.

This is an individual assessment and all submitted work must be your own. RMIT takes plagiarism very seriously, therefore please familiarise yourself with the RMIT plagiarism policy.