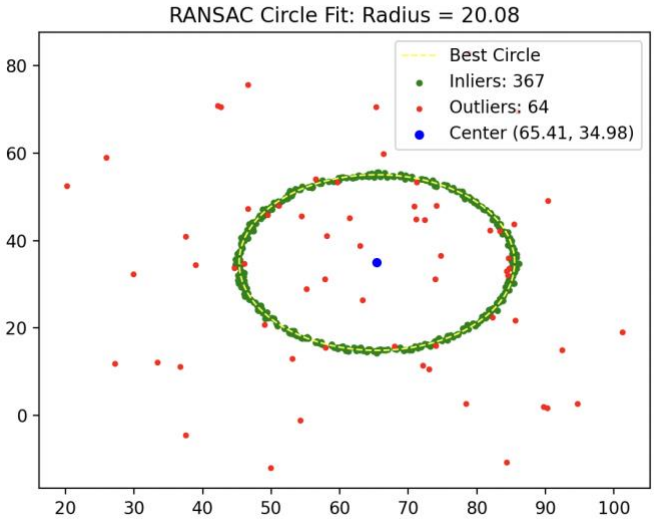
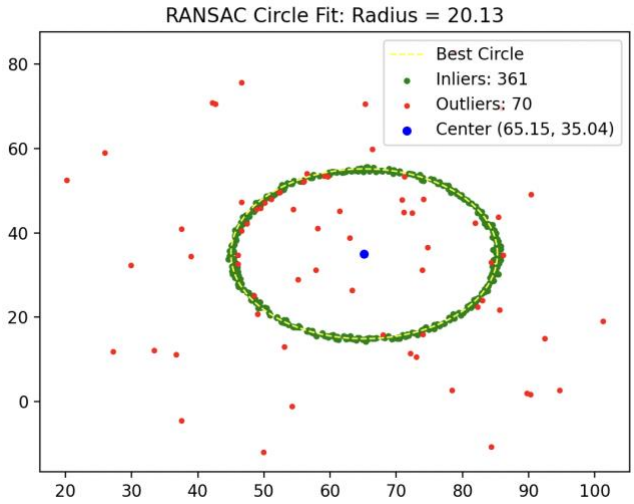
Assignment 5 RANSAC circle fitting – Report

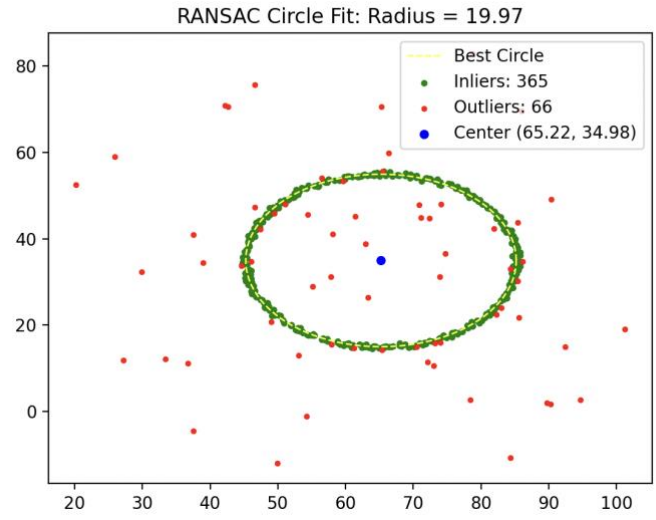
- Dataset used: RANSACdata09.txt
- After 15 runs:

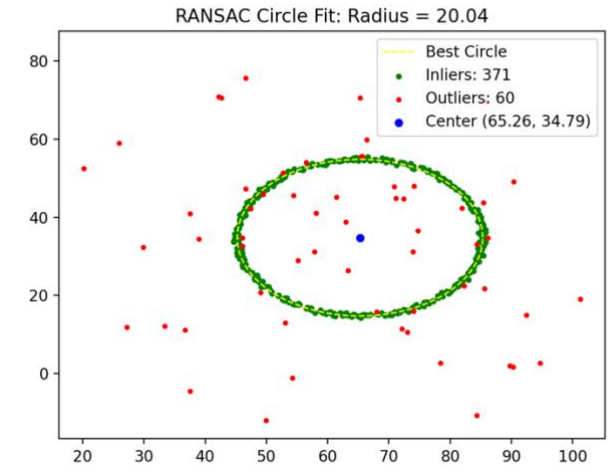
```
Number of iterations for each run: [25. 42.  7. 14. 85.  2. 10. 10.  4. 44.  1. 12. 16.  6.  4.]
Mean number of iterations: 18.80
Mean Circle Parameters:
Center X: 65.30
Center Y: 34.86
Radius: 20.03
```

- Plots of points with corresponding best circle fittings:









My experience and improvement:
I found that the assignment was valuable to fully understand the algorithm, as I am a "hands-on" type of learner. It was tricky to find a good threshold (t) and minimum

number of required inliers (d) since I didn't know anything about the ratio of inliers/outliers or expected noise level in the dataset. Having to manually set these parameters which the algorithm is dependent on is a drawback in my opinion. My approach was to first run the circle fitting with a relatively large, fixed number of iterations, and tweak the threshold along the way until I got a similar output each time. In the end I landed on a threshold of 0.7. From this trial and error, I noticed that the number of inliers were usually in the range 360-370 and decided that 360 inliers seemed to be a good tradeoff between robustness and computational efficiency (i.e. number of iterations needed).

The drawback from above can be addressed by implementing an adaptive approach to parameter selection in the RANSAC algorithm, which adjusts the parameters based on characteristics of the observed data.

Source code:
The source code can be found at:
https://github.com/mortened/RANSAC-circle