2800 Biscayne Blvd
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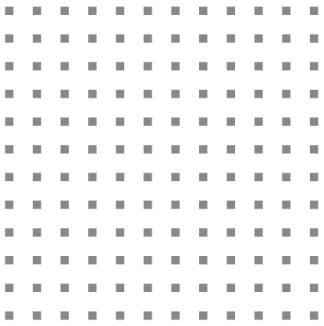
neocis

Software Assessment

Part 1:

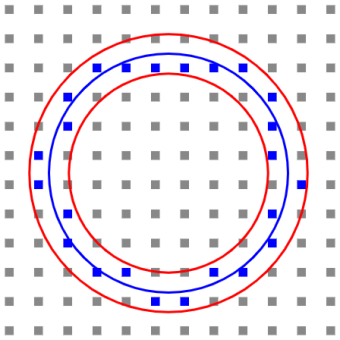
Design a program capable of digitizing circles. The system should start with a single window containing a 20x20 grid of square points similar to this:



All points should start out grey. The user can then click to place the center of a circle, and then drag to set its radius, similar to various graphics programs. The circle should be drawn on the screen.

When the user releases the mouse button, the program should highlight the points (make them blue) that correspond to the edge of the circle, in such a way that there is a continuous single line of points which most closely approximate the location of the edge of the circle.

Then, two additional circles should be created corresponding to the largest and smallest radius of the highlighted points such that the two red circles enclose all parts of all highlighted points.



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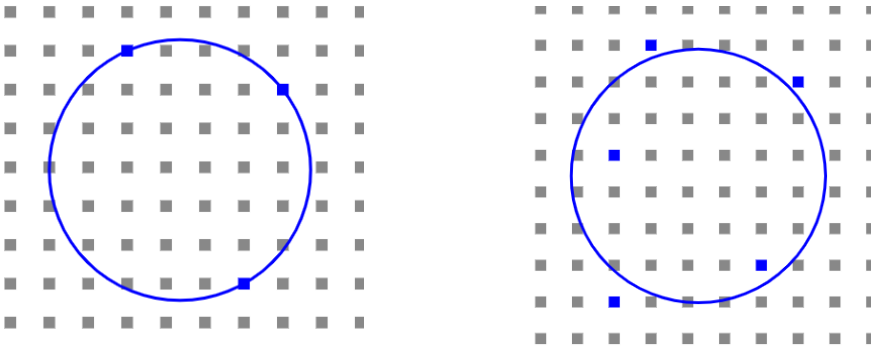
Part 2:

Now create a new program, similar to Part 1, which allows the user to toggle points on the grid on and off. Add a button at the bottom of the window called “Generate”. When the user clicks the “Generate” button, generate a circle that best fits the highlighted points. Create an iterative least squares-based algorithm that does not rely on an external library or code to find the best fit. Document each step of the algorithm in detail, including your reasoning for each step.



General Guidelines for both parts:

Your solution should be easily executable, and well documented. All algorithms should be documented in full, and a synopsis of program execution should be provided.

Ways to Improve your Chances:

- Good code design & structure
- An object-oriented solution
- Good documentation!
- Modify Part 2 to generate ellipses.

Requirements for submission

- Turn your result in by the end of the second day. Earlier if possible.
- Please use any standard development language (e.g. C/C++, Java, JavaScript or equivalent) except Python. LabView, MATLAB or equivalent are not considered to be standard development languages.
- Attach all documentation and source code to your email reply.
- Ideally, include a working Windows executable, executable jar file or equivalent of your solution. If that is not practical, include all instructions for properly compiling and executing your application on Windows.