SC 627 Assignment 1

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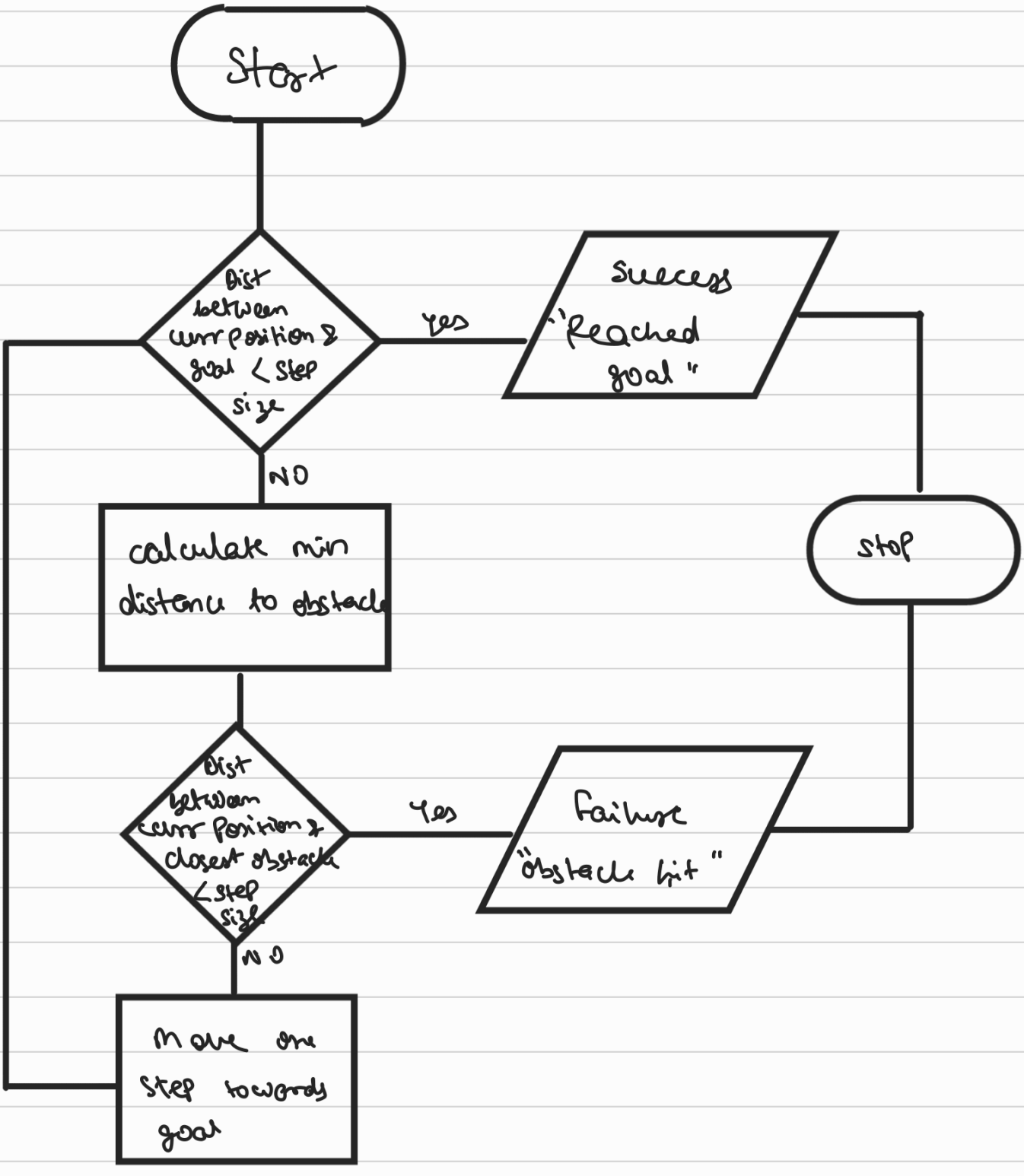
Q1) Sketch a flowchart for implementing bug1 bug2



Q2) Describe in a paragraph how to modify bug base to implement bug1

Bug1 algorithm

while not at goal :

move towards goal

if hit an obstacle

circumnavigate it moving left Right

while circumnavigating, store distance to goal in memory

move to the point on boundary closest to goal.

The bug base algorithm takes us to the obstacle/goal. If hit an obstacle, we need to use computeTangent to polygon to get path to be followed to circumnavigate

the obstacle, while circumnavigating the obstacle, store distance to goal. After reaching the hit point (P_{hit}), check for point in memory with minimum distance to goal. Move to that point while circumnavigating the obstacle. Repeat the process from bug base until reached goal.

Functions used from Fig. 6 & Fig. 7

i) compute Distance to Polygon:

Computes distance from current point to obstacle, used for detecting obstacle

ii) compute tangent vector to Polygon:

used to generate path for circumnavigating obstacle

iii) Compute distance point to segment:

used to get distance of a line segment from a given point

iv) compute distance to line: used to get distance of line from a given point

v) compute line through points: used to generate equation of line using two points.

3) Implement a fully functioning bug 1 algorithm

The Bug 1 algorithm was successfully implemented in Python. code is attached with this report

4) Test bug 1 in the following example

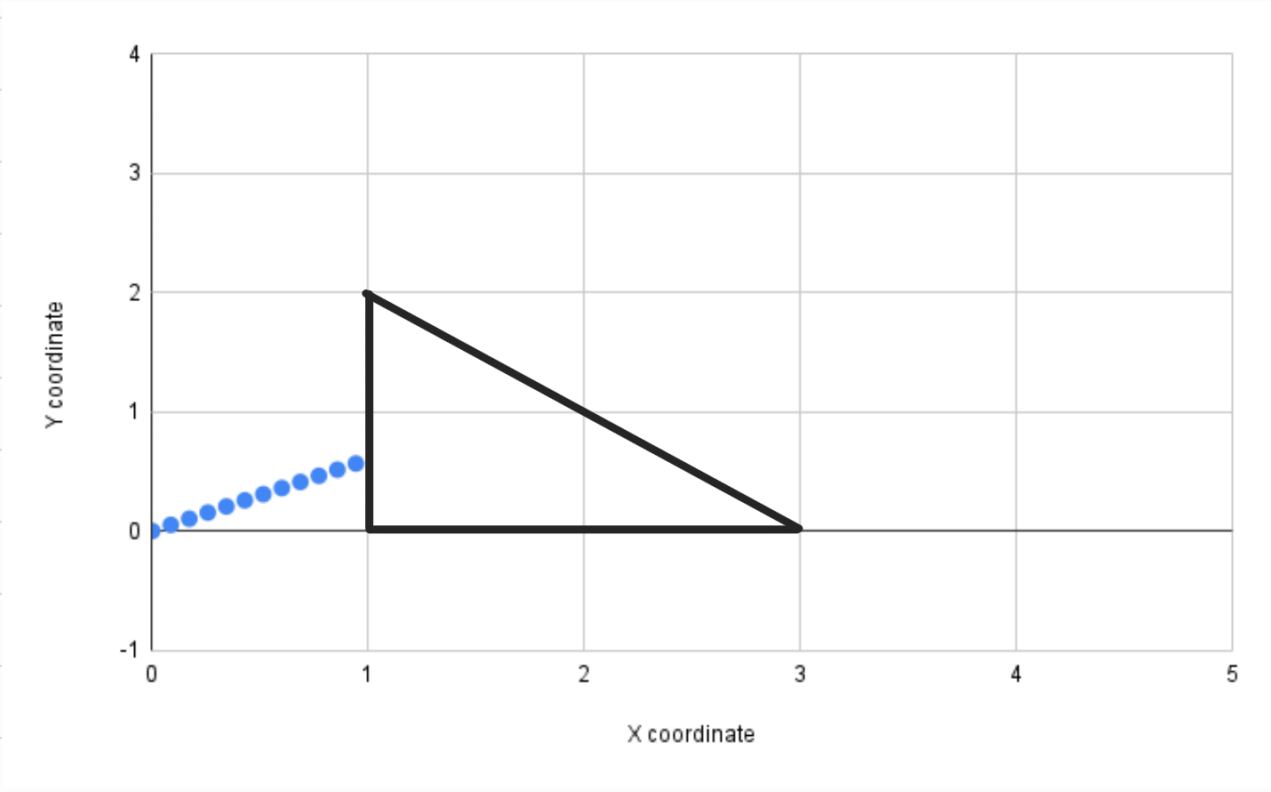
start : (0, 0) goal : (5, 3)

Step size : 0.1

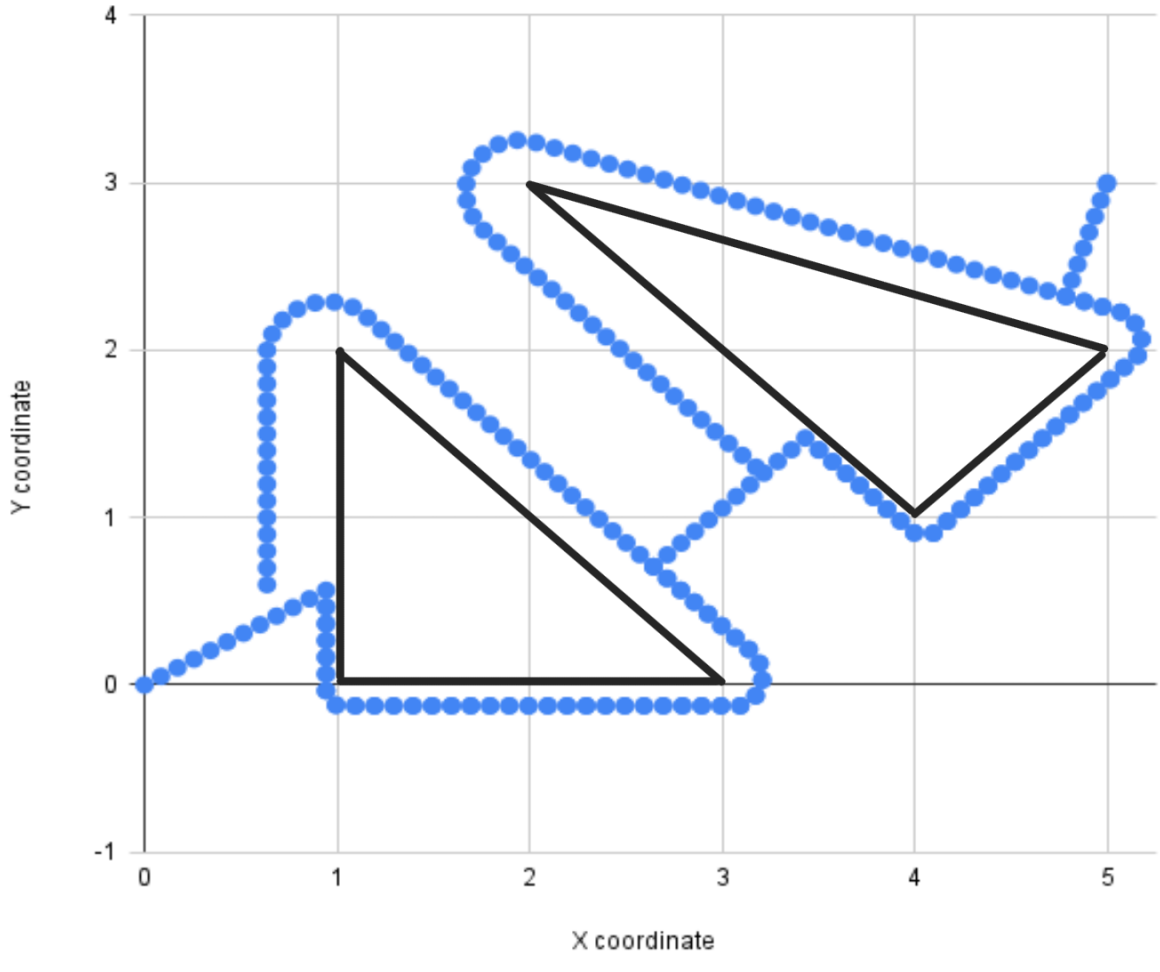
Obstacle list : {(1, 2), (1, 0), (3, 0)},

{(2, 3), (4, 1), (5, 4)}

a) path taken by bug base algorithm



b) Path taken by bug 1 algorithm



c) Distance to goal