

CSE 423 Spring 2022  
Quiz #1, 22-2-2022  
Marks: 20, Time: 40 minutes (writing + pdf submission)

Instructions:

1. Answer all of the following questions with pen and paper.
2. Write your student ID and page number on top of every page.
3. Merge your answers into a single pdf file and submit via this form:

<https://forms.gle/Bk6Mthzk8PJW4H3m6>

1.	Explain in short, how does the DDA algorithm avoid floating point multiplication.	03
2.	Note down the advantages of using the Midpoint line drawing algorithm over the DDA algorithm.	03
3.	<p>Suppose a line segment starts at <math>(x_0, y_0)</math> and ends at <math>(x_1, y_1)</math> where, <math>x_0, y_0, x_1</math> and <math>y_1</math> are sequentially the first, second, third and fourth pair of digits from the left in your student ID.</p> <p>For example, if your ID is 15101298, then <math>x_0 = 15, y_0 = 10, x_1 = 12, y_1 = 98</math>.</p> <ol style="list-style-type: none"> <li>a. Find the zone of this line.</li> <li>b. Simulate the midpoint line drawing algorithm to find the first four intermediary pixels of this line after <math>(x_0, y_0)</math>; or, all of them if the line reaches <math>(x_1, y_1)</math> in less than four pixels.</li> </ol>	03 04
4.	<p>Given below is a flowchart of the midpoint circle drawing algorithm for zone-1.</p> <pre> graph TD     Init["d = d_init = 1.25 - r"] --&gt; D1["is d ≥ 0?"]     D1 -- yes --&gt; SE["Choose SE as next pixel d ← d + 2x - 2y + 5"]     D1 -- no --&gt; E["Choose E as next pixel d ← d + 2x + 3"]     SE --&gt; D2["Check if x &gt; y"]     E --&gt; D2     D2 -- yes --&gt; End["end"]     D2 -- no --&gt; D1     </pre> <ol style="list-style-type: none"> <li>a. If zone-1 starts from the pixel <math>(0, R)</math>, what is the coordinate of the next pixel if we go towards the southeast (SE) direction?</li> <li>b. If zone-1 starts from the pixel <math>(0, R)</math>, what is the coordinate of the end pixel if we go towards the east direction for five times and towards southeast for seven times?</li> <li>c. Explain how we avoid floating point operations here with proper justification on correctness of the approach.</li> </ol>	01 02 04