BRAC UNIVERSITY

A

Department of Computer Science and Engineering

Examination: Midterm Exam | Semester: Fall 2022
Duration: 1 hour 15 minutes | Full Marks: 30

CSE 423: Computer Graphics

Name:	ID:	Section:

Answer the following questions.
Figures in the right margin indicate marks.

1. Consider a straight line having the end points **(-2, 12)** and **(5, -3)**. For this given line segment, answer the following questions:

a. CO1 **Show** the equation of the straight line for the given line segment and **identify** its slope and intercept. **2**

b. CO1 **Determine** the original zone of the given straight line and **convert** the end points to zone 3. **3**

c. CO1 Using the midpoint line drawing algorithm, **compute** the first 4 pixels (including starting pixel) to be colored for the given line segment in their original zone. **5**

2. a. CO1 In the Midpoint Circle Drawing Algorithm, we use the concept of 8 way Symmetry. **Explain** the significance of using 8 way Symmetry in Midpoint Circle Algorithm. **3**

b. CO1 **Illustrate** the output of the Midpoint Circle Algorithm without using 8 way Symmetry starting from Zone 1 **(0 , r)**, using a small figure. All the zones/quadrants should be mentioned.
[Assume that the origin of the circle is at (0, 0)] **2**

c. CO1 **Calculate** the first 4 pixels of a Circle starting from zone 1 (0, r) where, r = 8 and origin/center of the circle is at (2, -3) and **convert** the pixels for the segment of the circle in zone 2. **5**

3. a. CO3 In between Cohen-Sutherland and Cyrus-Beck Line Clipping Algorithm, **determine** which one would work on a polygonal clipping region with n number of sides where n = 6. **1**

b. CO1 In every step of the Cohen-Sutherland algorithm, we find the intersection of the given line with a boundary and (partially) clip the line. **Identify** the maximum number of steps for clipping in the Cohen-Sutherland algorithm. **Demonstrate** an example with a figure.
[Assume that we deal with the leftmost bit (MSB) 1 in the outcode first.] **3**

c. CO3 Suppose, a viewing window from (-400, -200) to (400, 200) is given. **Compute** the clipped part of the line from (40, -480) to (520, 320). You can use any algorithm of your choice. **6**

BRAC UNIVERSITY

B

Department of Computer Science and Engineering

Examination: Midterm Exam | Semester: Fall 2022
Duration: 1 hour 15 minutes | Full Marks: 30

CSE 423: Computer Graphics

Name:	ID:	Section:

Answer the following questions.
Figures in the right margin indicate marks.

1. Consider a straight line having the end points **(12, -2)** and **(-3, 5)**. For this given line segment, answer the following questions:

a. CO1 **Show** the equation of the straight line for the given line segment and **identify** its slope and intercept. **2**

b. CO1 **Determine** the original zone of the given straight line and **convert** the end points to zone 5. **3**

c. CO1 Using the midpoint line drawing algorithm, **compute** the first 4 pixels (including starting pixel) to be colored for the given line segment in their original zone. **5**

2. a. CO1 In the Midpoint Circle Drawing Algorithm, we use the concept of 8 way Symmetry. **Explain** the significance of using 8 way Symmetry in Midpoint Circle Algorithm. **3**

b. CO1 **Illustrate** the output of the Midpoint Circle Algorithm without using 8 way Symmetry starting from Zone 0 **(r , 0)**, using a small figure. All the zones/quadrants should be mentioned. **2**
[Assume that the origin of the circle is at (0,0)]

c. CO1 **Calculate** the first 4 pixels of a Circle starting from zone 1 (0, r) where, r = 11 and origin/center of the circle is at (-3, -3) and **convert** the pixels for the segment of the circle in zone 3. **5**

3. a. CO3 In between Cohen-Sutherland and Cyrus-Beck Line Clipping Algorithm, **determine** which one would work on a polygonal clipping region with n number of sides where n = 3. **1**

b. CO1 In every step of the Cohen-Sutherland algorithm, we find the intersection of the given line with a boundary and (partially) clip the line. **Identify** the maximum number of steps for clipping in the Cohen-Sutherland algorithm. **Demonstrate** an example with a figure. **3**
[Assume that we deal with the leftmost bit (MSB) 1 in the outcode first.]

c. CO3 Suppose, a viewing window from (-400, -200) to (400, 200) is given. **Compute** the clipped part of the line from (40, 320) to (520, -480). You can use any algorithm of your choice. **6**