Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Final Examination, Summer 2021 @ DIU Blended Learning Center

Course Code: CSE421 (Day), Course Title: Computer Graphics

Level: 4 Term: 2 Section: M, N

Instructor: NH Modality: Open Book Exam

Date: Thursday 26 August, 2021 Time: 09:00am-12:30am

Three and half hours (3:30), Marks: 40

Answer all the questions

1. **a.** Consider a 3D shape. The coordinates of the shape are A (-2, -1,-3), B(1,-1,-3), C(1,3,2). After applying rotation of θ degree towards the X axis, the new coordinate points are A'(-2,3,-1), B'(1,3-1), C'(1,-2,3). Now find out the rotation angle θ. Show all calculations. **5**

   b. Consider the point A'(-2,3,-1), B'(1,3-1), C'(1,-2,3) and apply shear parameter i on X axis, j on Y axis and k on Z axis and find out the new coordinates of the object where i= last digit of your id, j= 2nd last digit of your id k = 3rd last digit of your id. **5**

2. Consider a rectangular window whose lower left-hand corner is at L (25-last digit of your id, 45-2nd last digit of your id) and upper right-hand corner is at R (75+ Last digit of your id, 90+2nd last digit of your id). **10**

Example, consider an ID is 161-15-11459, then L= ((25-9), (45 -5)) and R=((75+9), (90+5))

After finding out Xmin, Ymin, Xmax, Ymax values, you have to draw

i) line segment AB where A(20,48) and B(50,100),
ii) line segment CD where C(40,40) and D(40,70),
iii) line segment EF where E(82,40) and F(60,95) ,
iv) line segment GH where G(15,30) and H(15,60)

Now, find the line categories of the lines and clip the lines using Cohen-Sutherland line clipping algorithms and find out clipped points.

3. **a.** What kind of projection is shown in figure 1 and figure 2? Describe each of its kinds **6**

with examples.

i)

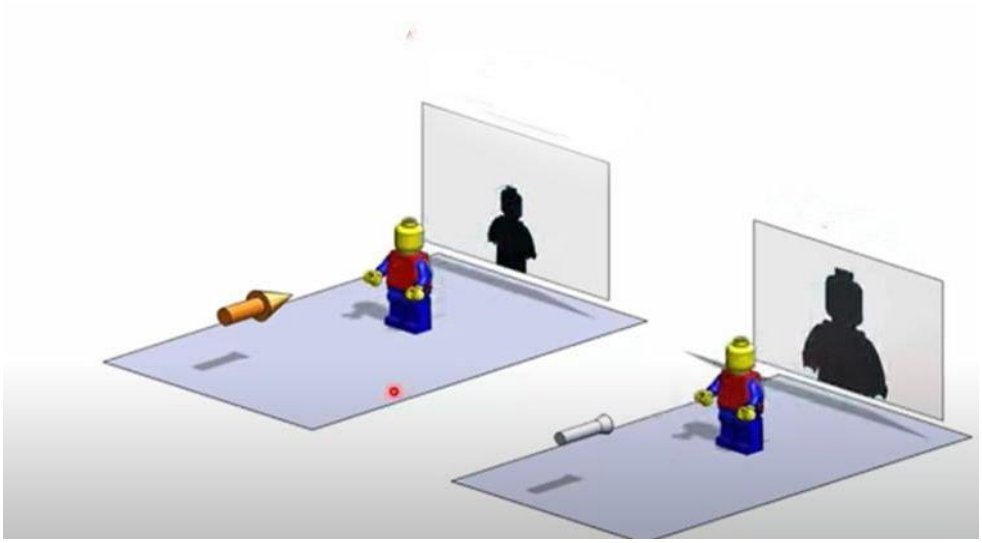

Figure 1

ii)

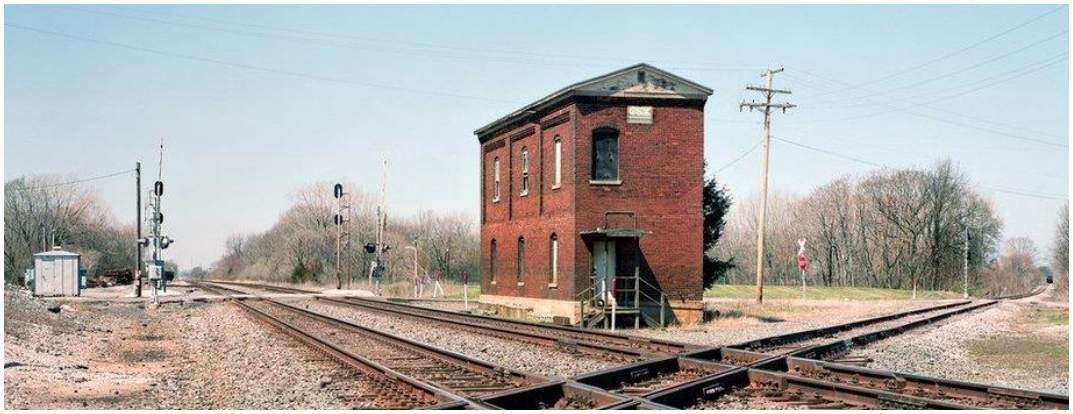

Figure 2

b. Assume for a rag day party you have designed a common t-shirt for everyone using RGB color format. But when the t-shirts were being printed you did not get the expected color. Explain the reason behind that. **4**

4. In figure 3, ABCD is the clipping window where the blue polygon is the clipping object. Now,

i) Which algorithm should you use to clip this polygon? Compare this algorithm with other polygon clipping algorithm. **3**

ii) Clip the given polygon in figure 3 using the best fit algorithm according to your opinion. **7**

Instructions:

** Perform an anticlockwise direction whose ID is ODD and clockwise

direction whose ID is EVEN.
** Here, Vertices of BLUE polygon will be your name of Capital Letter. Do not use the same character, take only the first character.

[Example: If your name is ABDUL AZIZ then BLUE polygon will be ABDULZI. Please add Digits (1,2,3, …..) or delete if the number of vertices of polygon did not match with your name's character.]

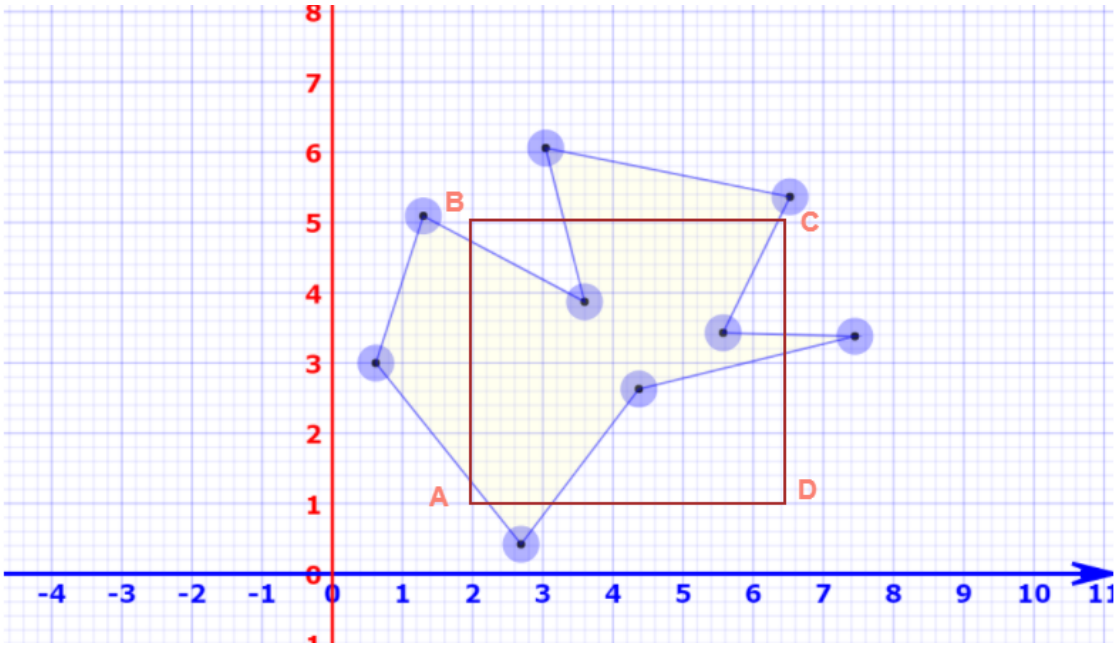

Figure 3