BACHELOR OF COMPUTER SCIENCE AND ENGINEERING

Third Year | First Semester | Class Test II

Principles of Programming Language (Set II)

Time- Fifty Minutes **Full Marks-30**

1. Compare between Omega combinator and Y combinator. 2
2. (a) Write the lambda expression to calculate the sum of n natural numbers. Show the steps for any value of n>2. 6
   (b) Do the same summation in Prolog. Show the DFS tree that gets generated for any input >1. 5
3. Write the Prolog program for insertion sort. Show the steps using unification and/or resolution for the list [3,2,1]. 10
4. How do you represent list in Prolog? How to prepend elements? Explain the concept of pattern directed matching w.r.t your code. 7

BCSE 3rd Year, 1st Semester, Class Test Examination. Subject: Computer Graphics. Full Marks: 30. Time: 1 Hour

Question #1: Let your roll number be R, comprising of two digits, R1 and R2 (if R>99, then R=R%99; if R<10, then R1=0).

a) Draw a circle centred at (R1, R2) having a radius r=10+R%5, using Bresenham's midpoint circle drawing algorithm. Derive the algorithm, show all the intermediate steps to generate the points in the 2nd octant, and use 8-point symmetry to generate the remaining points on the circle. **(14 marks)**

b) Draw an analog clock with the hour and minute hands inside the circle. Then, time will be represented as H:M, such that, H=R1 and M=R%60. Let the length of the hour and minutes hands be (r-4) and (r-2), respectively. Then, generate the intermediate points on the lines representing the hour and minute hands using any known line drawing algorithm. **(16 marks)**

Hint: Let R be 27. So, the circle will be centred at (2,7) with r=12. Then, in the analog clock, time is to be represented as 2Hr:27Minutes using two straight lines of lengths 8 and 10 units, respectively.

BACHELOR OF COMPUTER SCIENCE & ENGG. EXAMINATION, 2022

(3rd YEAR , 1st SEMESTER)

COMPUTER GRAPHICS - CLASS TEST-2

Time: One Hour **Full Marks: 30**

Read the Following Instructions Carefully:

- Put your Name, Class Roll No, Primary Mobile phone no, Email at the first page
- Let R_1 and R_2 be the last two digits in your Class Roll No. For example, If your Roll No. is 23, then, $R_1 = 2$ and $R_2 = 3$; If your Roll No. is 105, then, $R_1 = 0$ and $R_2 = 5$.

Answer ALL questions

1.	a)	Briefly explain the principle of Liang Barsky line clipping algorithm. Let ABCD be the rectangular window with A(0,0), B(15,0), C(15,15), D(0,15). Use Liang Barsky Algorithm to clip the line XY, such that X(-5,R_1) and Y(20,(5+R_2)).	(5+15) = 20
2.	a)	Derive the formulation for diffuse and specular reflections from multiple light sources.	5
	b)	Briefly discuss the A-Buffer algorithm for hidden surface removal	5