IS F311 - Computer Graphics
BITS Pilani, Hyderabad Campus
Assignment -1
Due Date : 12th March 2020 (by Midnight)
Total Marks: 20 (weightage : 10%)

Exercise 1: Implement Midpoint Line Drawing algorithm for line with any slope in openGL. [2]

Exercise 2: Implement Midpoint Circle Drawing algorithm using openGL. [2]

Exercise 3: The objective of this task is to make a crude visualization of 2D vector fields.

- A vector field on two dimensional space is a function that assigns to each point (x,y) a two dimensional vector given by $\vec{F}(x, y)$.
- Refer to **https://mathinsight.org/vector_field_overview**

  Task 3a: We would like to draw each vector using line segments (using Bresenham's code) to make a crude visualization of the vector field. How this visualization will look. [3]
  Task 3b: What if we replace each vector with a circle of diameter of the length of the vector (using Bresenham's code)? How this visualization will look? [3]
  Task 3c: Let's say at point (x1,y) you have drawn the vector with its tail at (x1,y1) and head at (x2,y2), and then compute the next vector at (x2,y2) and draw it with its tail at (x2,y2) and head at (x3,y3) and so on. We will get a polyline. How these polylines will look? [4]

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Exercise 4: Experiment with many examples and try out different samplings of the 2D space. Record your experimental results along with the documentation of algorithm. Develop HTML pages to document the results produced by your code, issues in coding, general discussion on the algorithm, timing analysis, references, and any other remarks. Work towards producing aesthetically pleasing outputs. Credits will be given for creative outputs. [4]

Exercise 5: Use software Doxygen to produce the code documentation. [2]

General Instructions:

1. This assignment can be done in groups of no more than three students.
2. Design the classes and headers properly. The code should be well indented, well commented and easily readable. Points will be deducted for an unorganized and uncommented code.
3. The assignment has to be coded completely in C/C++ using openGL.
4. You need to upload and submit your working code, and HTML documentation in zip file on CMS by the deadline.

5. The name of the file should be id1_CG_A1.zip, where id1 refers to the ID of only one member of the group.
6. There should be only one submission from a group.
7. You can discuss with your friends but refrain from copying the code and submitting. Copied codes will receive no credits for the entire assignment.
8. You have to demo the code to the instructor/TA on a scheduled date and timing after submission.
9. **During Demo all members must be present. Anybody not present will be awarded zero credit.**