CS7.302: Computer Graphics Assignment #3

Weightage: 20%

Due: April 24th, 2025

Learning objectives

- Learn Rasterization.
- Learn Advanced geometry processing.
- Learn Ray tracing

Tasks

The broad aim of this assignment is three-fold, to learn geometry processing methods like slicing, to learn basic algorithms in Rasterization, to build a basic ray tracer. **[N]** denotes the weight for each task out of **20**.

1. **[6] Slicing a mesh**
   - **[5]** Slice a mesh using arbitrary planes, the number of planes should range from $1 - 4$.
   - **[1]** User interface to provide the plane equation.
2. **[3] Rasterization**
   - **[2]** Rasterize a line given it's end points.
   - **[1]** handle all possible combinations of slope, intercepts and quadrants.
3. **[4] Scan conversion**
   - **[4]** Scan-line fill polygons using the algorithm (that will be) discussed in the class.
4. **[7] Ray tracing**
   - **[4]** Design a basic ray tracer, handle shadows, simple objects such as cubes/cuboids and spheres.
   - **[3]** Handle polygonal meshes.
5. **[3] Bonus**
   - **[3]** Add reflections to the ray tracer.

Submission

1. Submissions should be made through *github*, link will be provided by the TAs.
2. A valid submission would comprise of all the code (with makefile, readme, etc..) with adequate instructions to compile and run the code, the code **should** compile without errors.
3. Please do not upload executables.
4. Deadline: **23:59 hrs, April 24th**.
5. Any submission beyond the deadline will be considered as **late submission**. Late submissions will be evaluated out of **13** instead of **20** if submitted by **23:59 hrs, April 25th**.
6. Submissions past April 25th will not be evaluated.

Notes

1. The off files provided as part of assignment 2 can be used to showcase slicing and also for ray tracing.