

Interactive and GPU Computing

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LAB. 2

RASTERIZATION ALGORITHMS

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Lab. 2

RASTERIZATION / SCAN CONVERSION

1. Objectives

In general terms, the idea of this labwork is to learn the fundamental rasterization techniques and algorithms, in particular those related to:

- straight line segments (e.g., DDA, Bresenham, etc);
- triangles;
- polygons.

2. References

James D. Foley, Andries van Dam, Steven K. Feiner, and John F. Hughes. Computer Graphics: Principles and Practice in C (2nd Edition). Addison-Wesley Professional, 1995.

<http://www.netgraphics.sk/rasterization-a-line>

<http://www.angelfire.com/linux/myp/LineRas/LineRas.html>

<http://gamedevelopment.tutsplus.com/tutorials/lets-build-a-3d-graphics-engine-rasterizing-line-segments-and-circles--gamedev-8414>

<http://www.sunshine2k.de/coding/java/Bresenham/RasterisingLinesCircles.pdf>

3. Exercises

- 1) Implement the direct scan conversion (DSC) algorithm for straight line segments.
- 2) Implement the direct digital analyzer (DDA) algorithm for straight line segments.
- 3) Implement the Bresenham algorithm for straight line segments.
- 4) Implement the midpoint circle algorithm.
- 5) Implement the midpoint ellipsis algorithm.
- 6) Implement a scan conversion algorithm for triangles.

- 7) Implement a scan conversion algorithm for convex polygons.
- 8) Implement a scan conversion algorithm for non-convex polygons.