Computación Gráfica

Class 10. Computational Geometry. Fundamental ideas.

Professor: Eric Biagioli

Today

- Segment-Segment intersection
- Scalar and vector product
- line-line intersection
- line-plane intersection
- distance from a point to a line
- …

References for the class of today: (part of the first partial exam)

- Hughes, J. F., van Dam, A., McGuire, M., Sklar, D. F., Foley, J. D., Feiner, S., and Akeley, K. Computer Graphics: Principles and Practice, 3 ed. Addison-Wesley, Upper Saddle River, NJ, 2013. → **Chapter 07**

- [Will be available soon, in Canvas] Biagioli, E. Introduction to algorithms. → **Chapter "Computational Geometry".**

Segment-segment existence of intersection
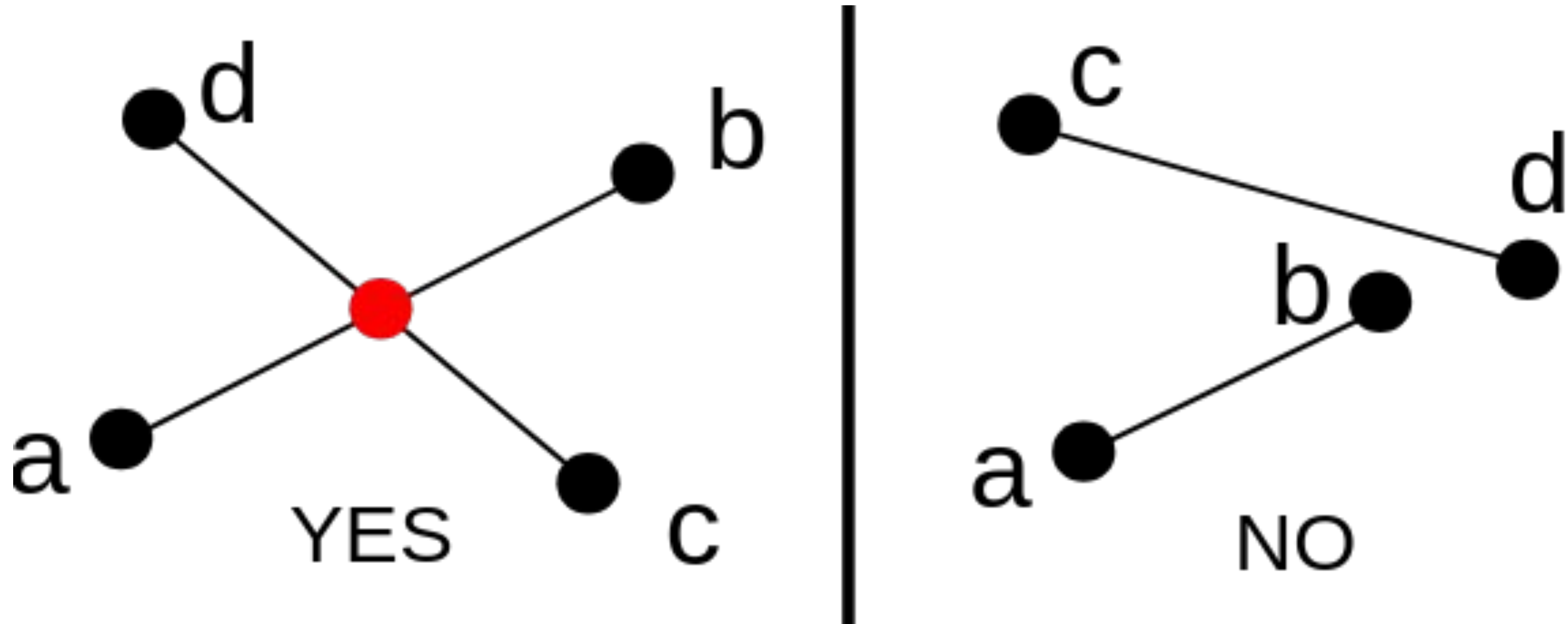
Vector and Scalar products

Line-Line intersection

Line-plane intersection
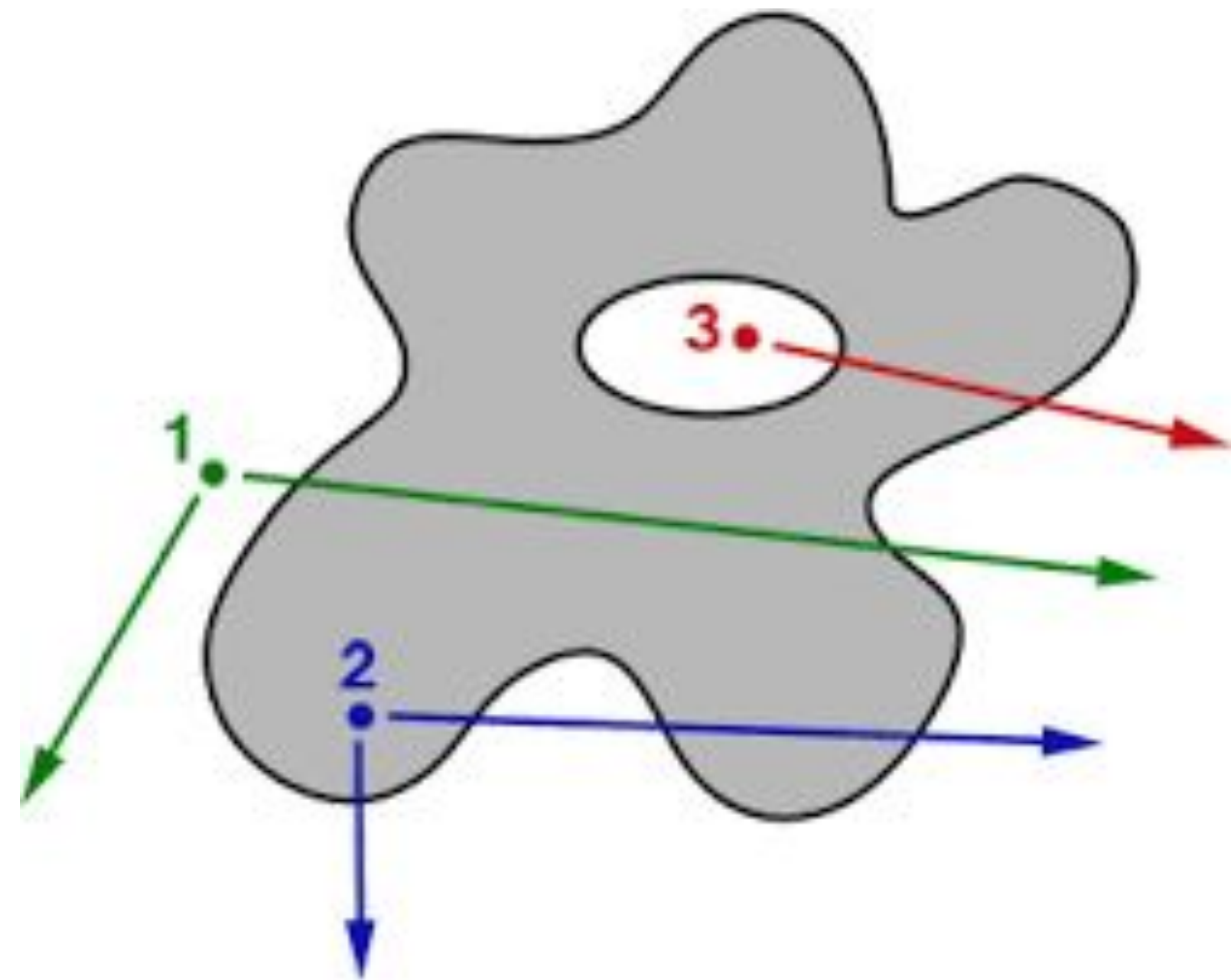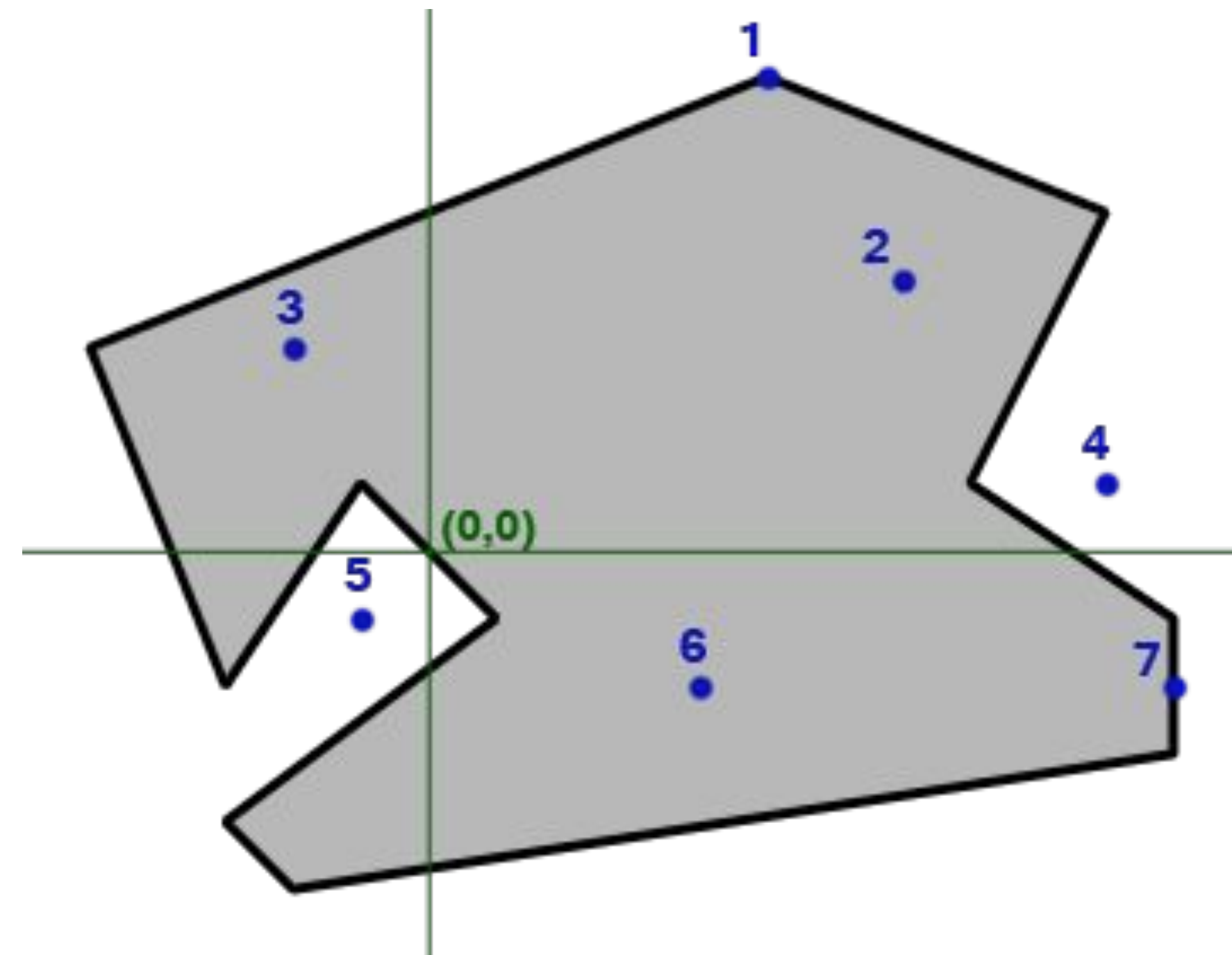
Distance from a point to a line

Exercise 1

- Propose a function that computes the distance from a point to a line segment.

Point inside triangle

Point inside any region

Area of a triangle

Exercise 2

- Given a set S of segments given by the coordinates of their endpoints, and given two point A and B, decide if it is possible to go from A to B without crossing any of the segments in the set S

Cosine, Gourand, Phong shading

Flat   Gouraud   Phong

Exercise 3

- Decide if a polygon, given by the coordinates of its vertices, is convex.

Exercise 4

- Given a set of line segments, compute the maximum number of them that can be intersected by a single line