CMSC425 Lecture notes CollidersFirstDay

These notes parallel the PowerPoint on Colliders

Pages:

1) Definition of convex hull for a point set, and inefficient algorithm with all pairs of points.

2) Faster algorithm based on centroid smarter line algorithm, also sorting all points by angle made by ray from centroid to point.

See other sources on how to compute convex hull.

3) Determining if a polygon is convex or concave based on cross product; and determining the winding direction (clockwise or counterclockwise).

4) Collider as bounding circle.

5) Collider as bounding box (axis aligned or not).

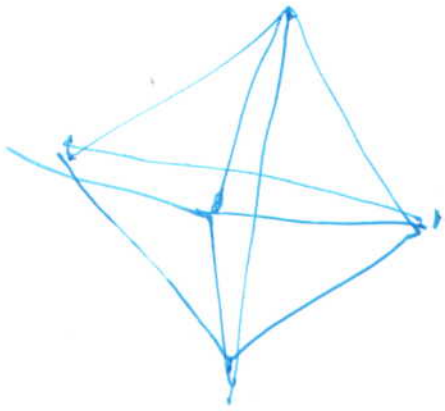
6) Colliders as bounding boxes, one axis aligned, others not.

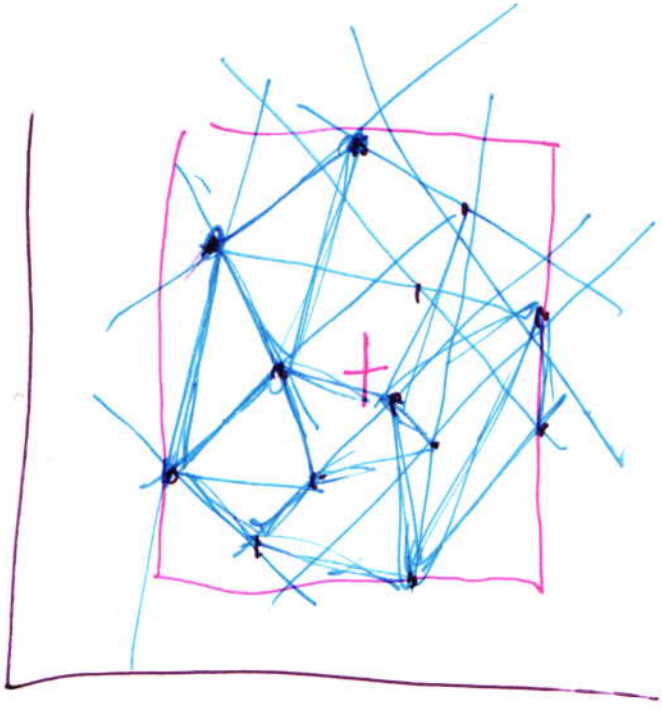
7) Colliders as cylinder (or 2D rectangle), as capsule (2 and 3d).

8) Colliders with central axis aligned with y axis.

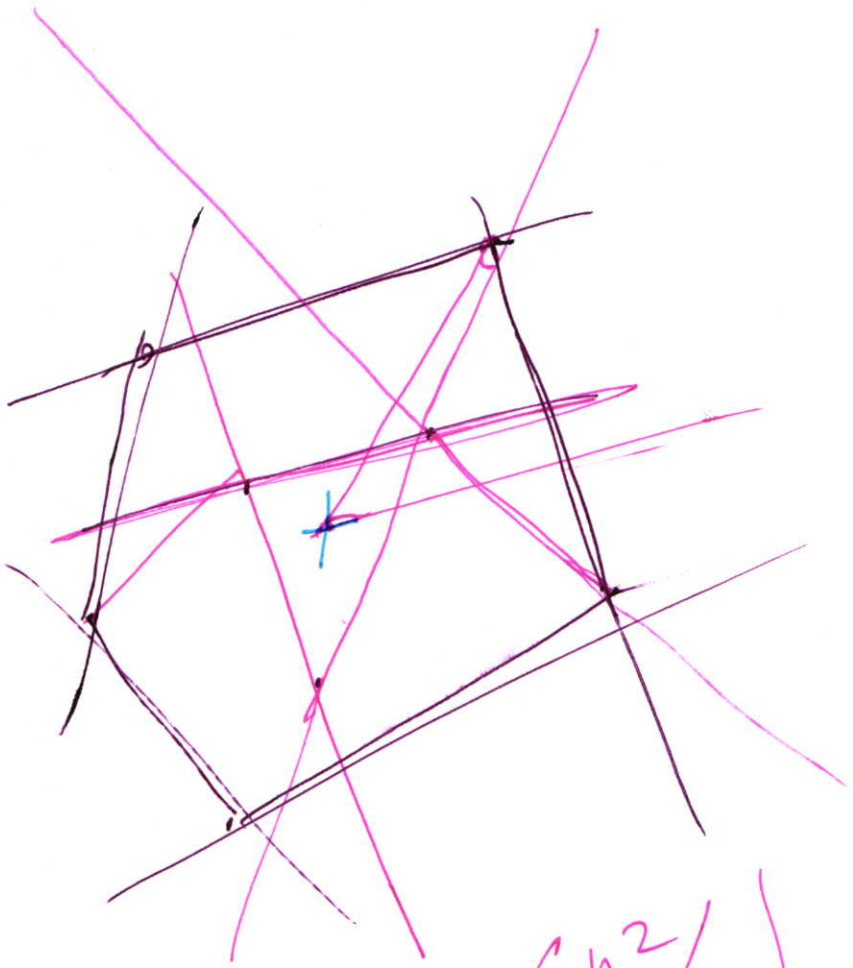
9) More capsules.

Slide 1

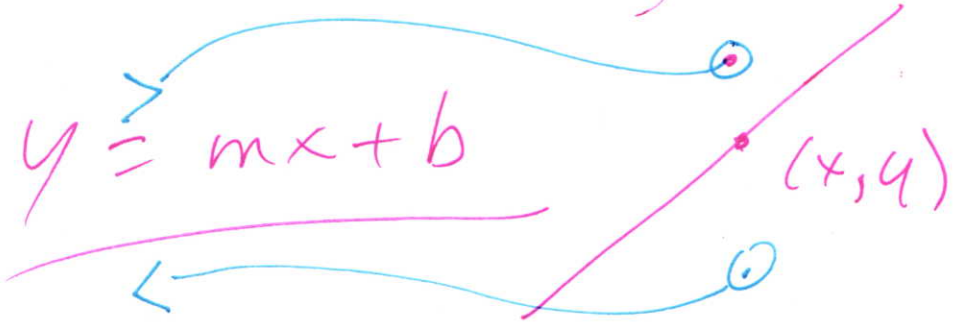


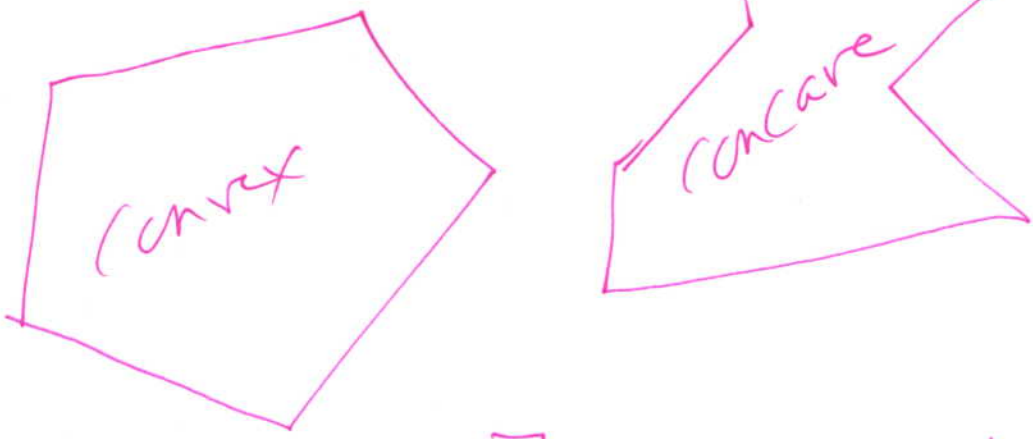


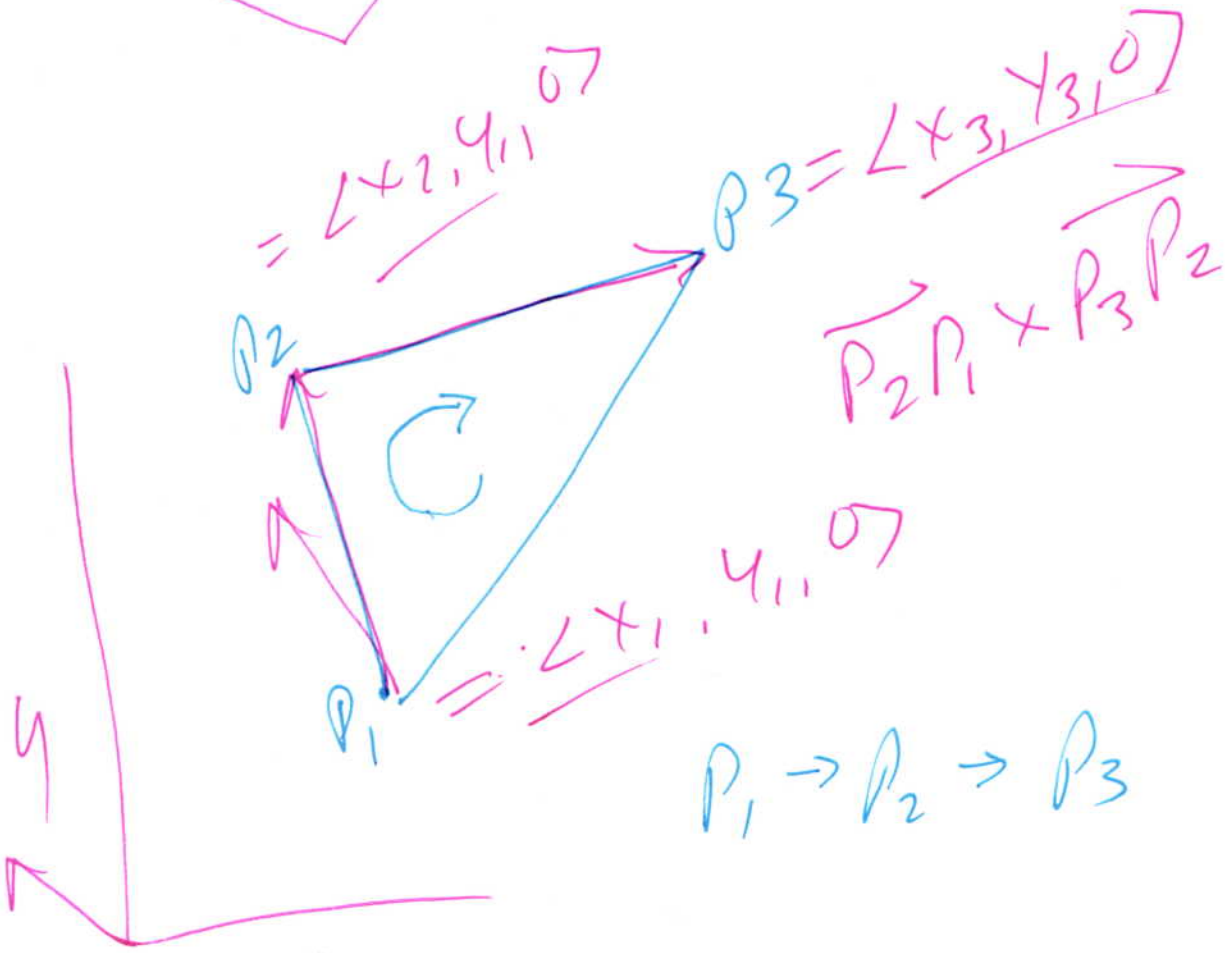
Slide 2



$\left(n^2/2\right) n \rightarrow n^3$





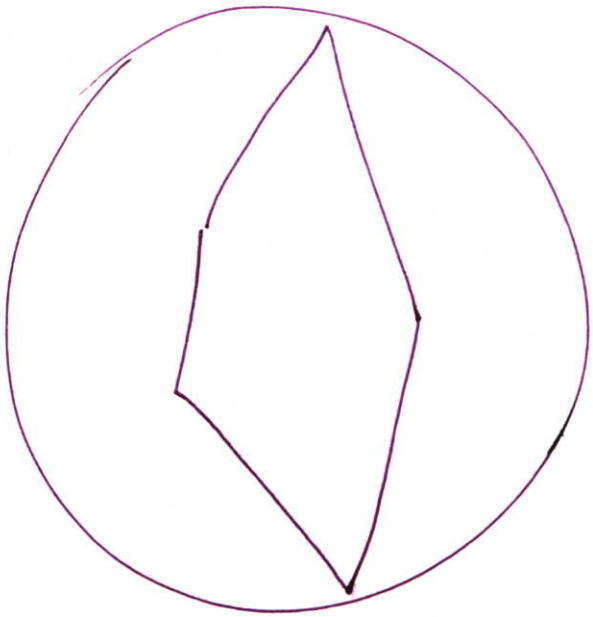


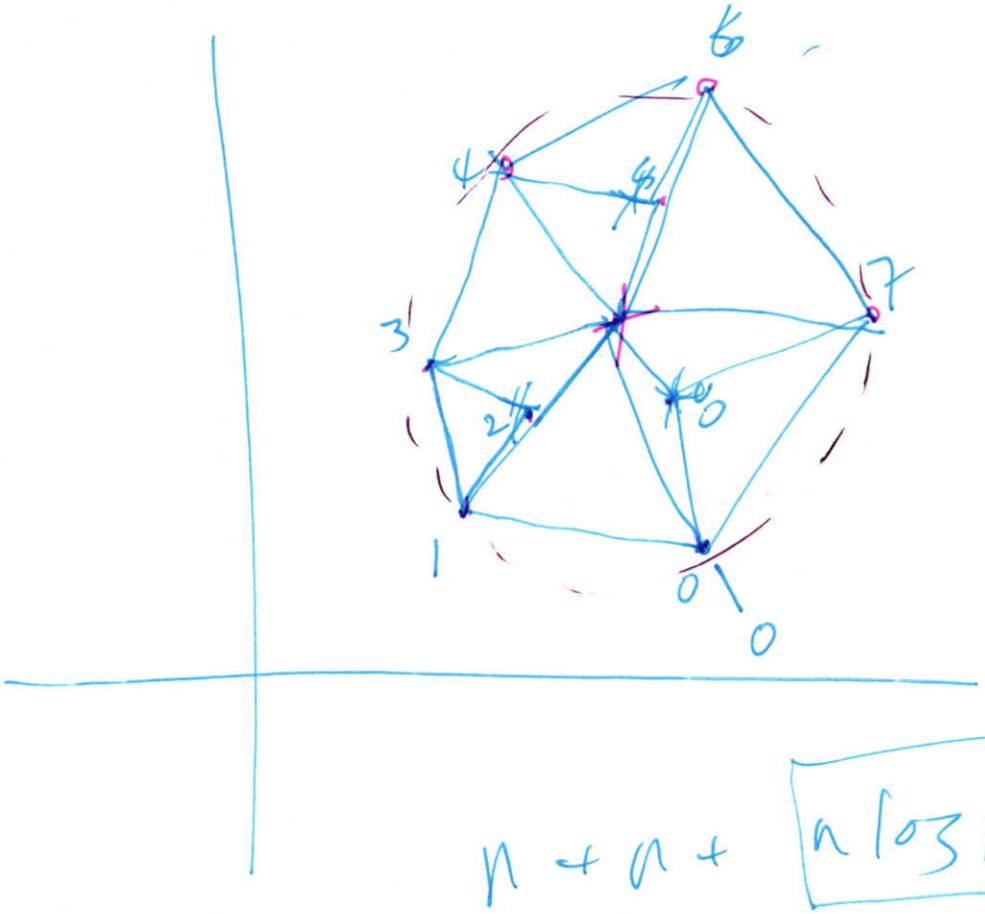
$\overrightarrow{P_2P_1} \times \overrightarrow{P_3P_2}$

$P_1 \to P_2 \to P_3$

$P_3 \to P_2 \to P_1$

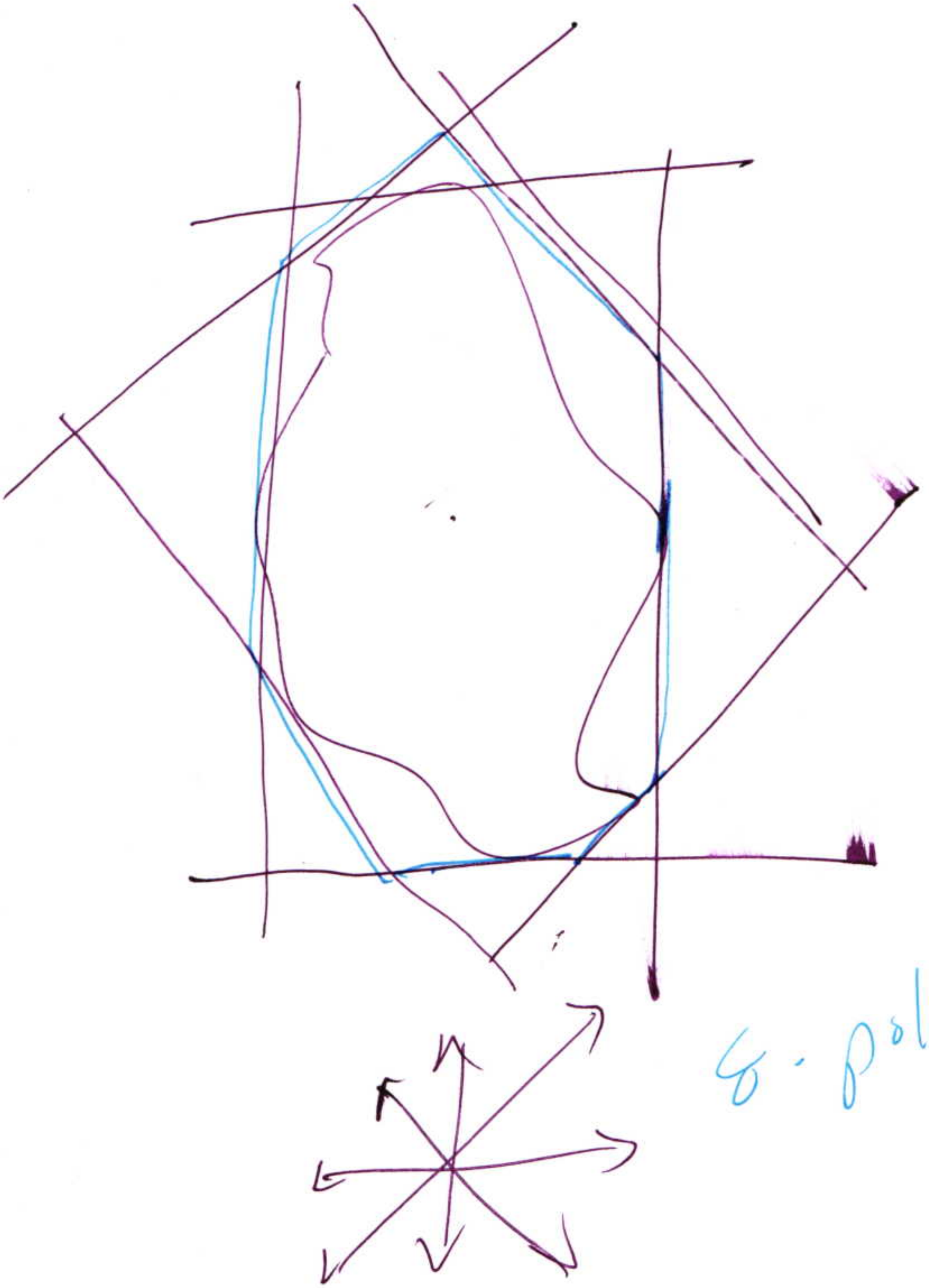
Slide 4





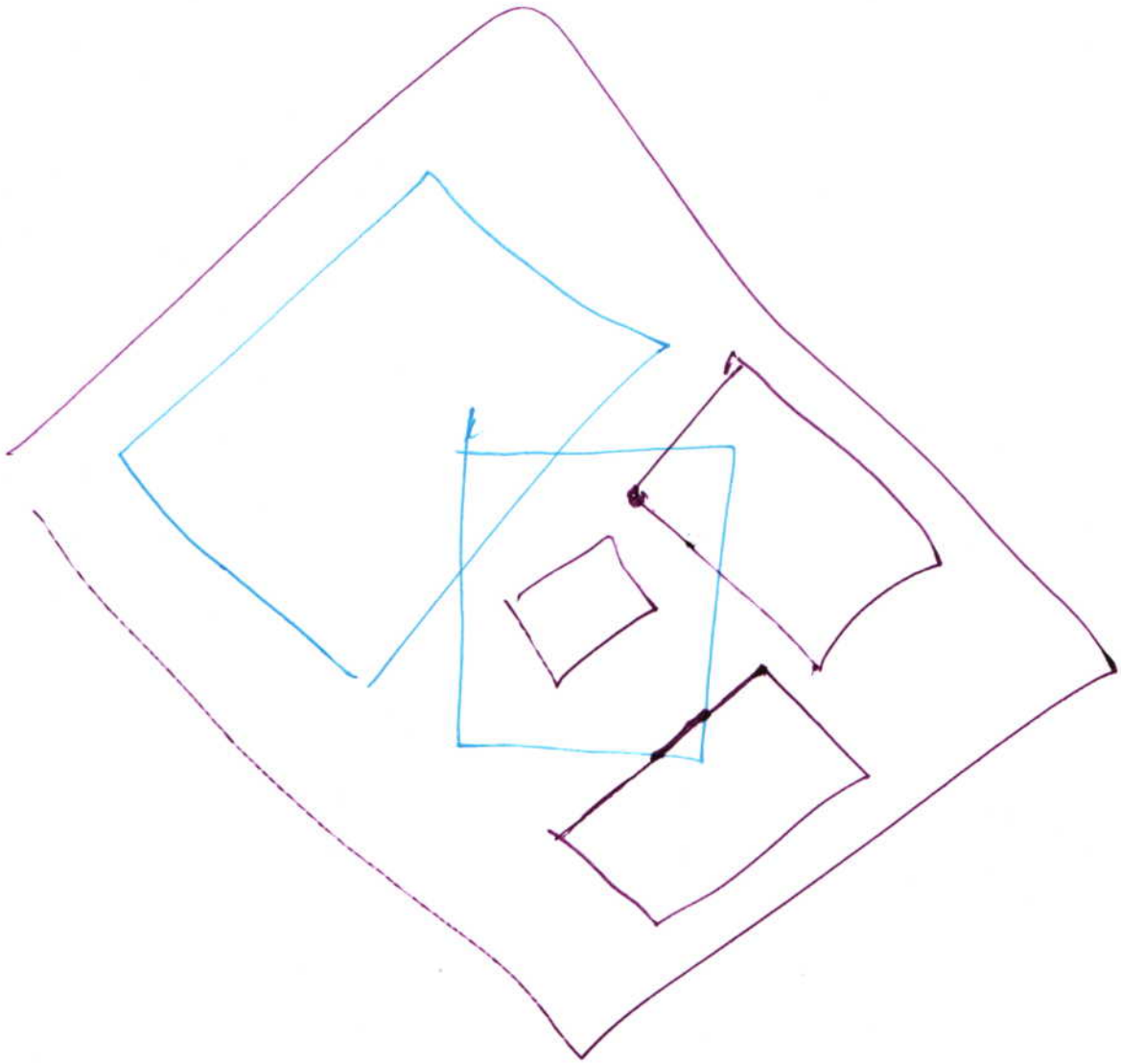
$n + n +$ $n \log n$

Slides

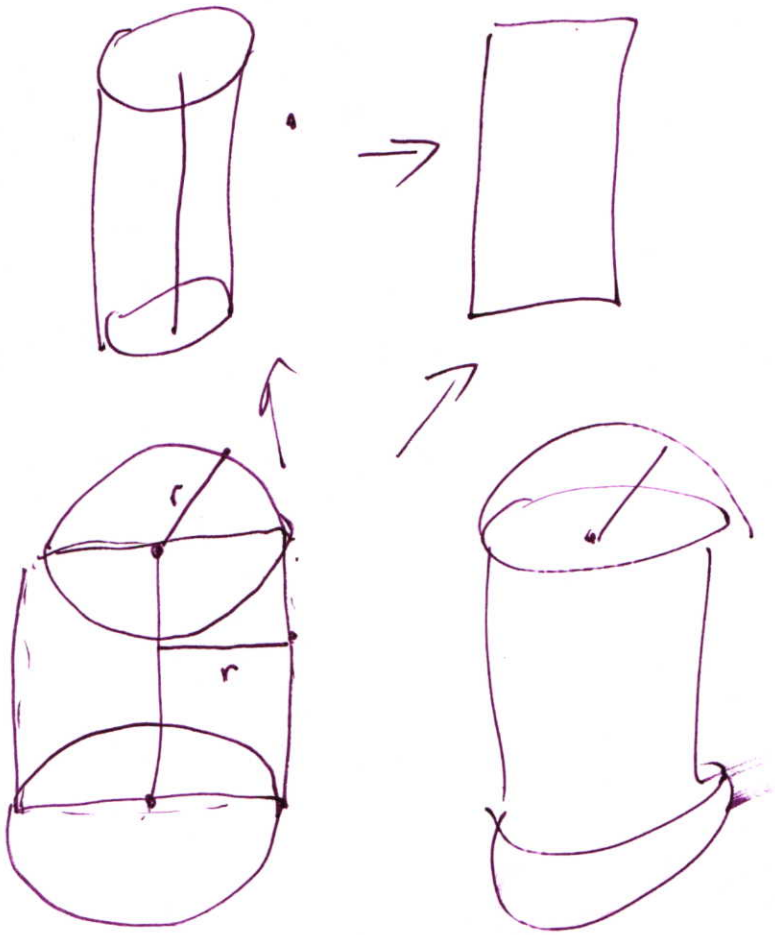


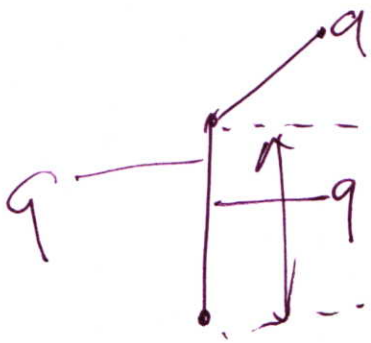
8 - polytope

Slide 6

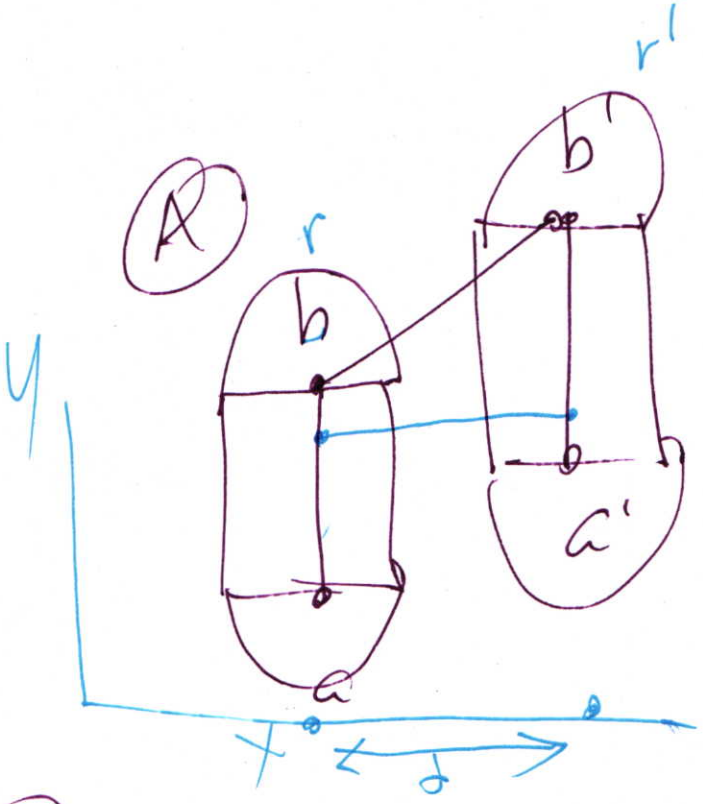


Slide 7





$d < r' + r$

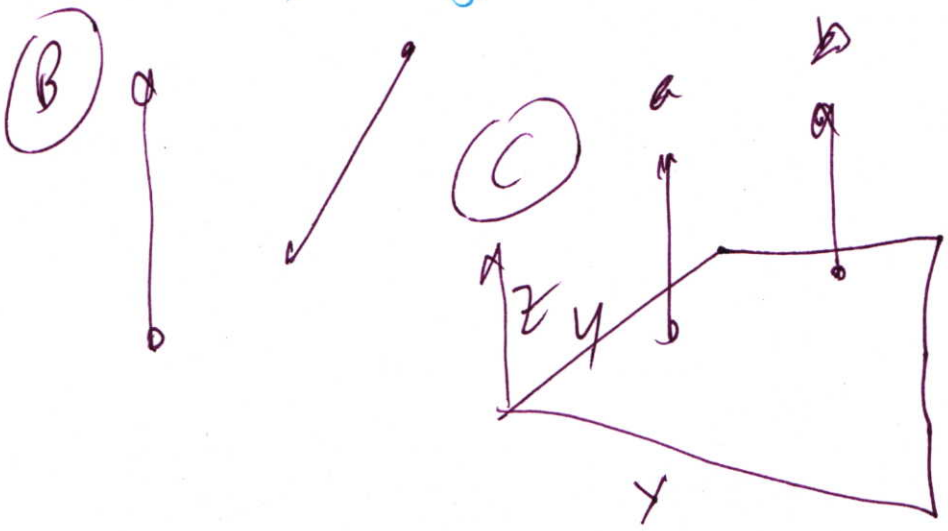


(A) two aligned 2D segments

(B) two general 2D segments

(C) aligned in 3D

(D) general in 3D



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