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Point Location

Trapezoidal Map

- Properties & Complexity

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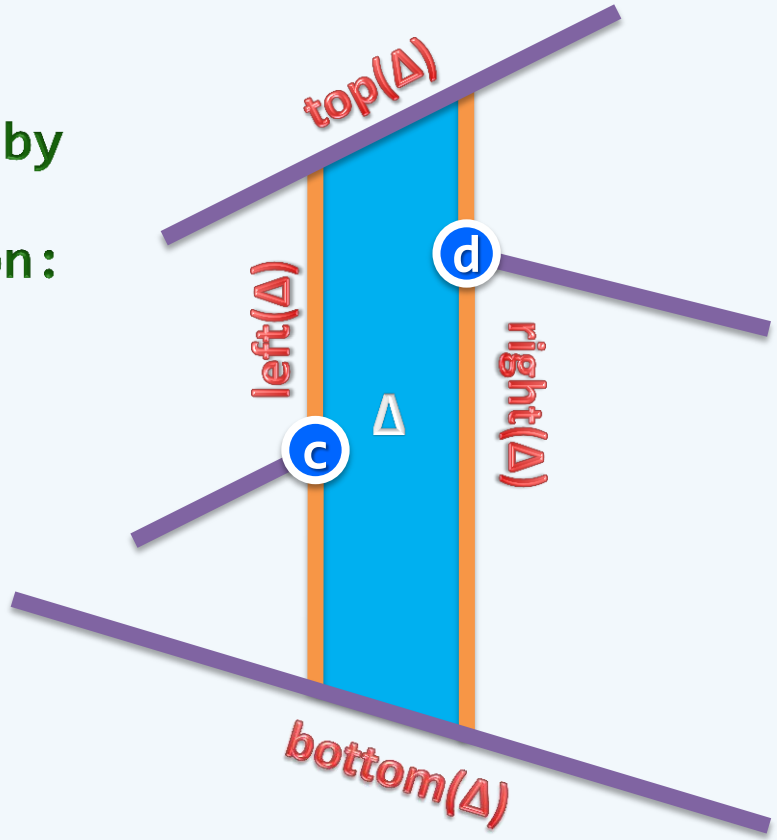
Properties

- Each face of TM(S) is a trapezoid with two **vertical** sides, one of which might degenerate to a point
- Each trapezoid Δ of TM(S) is **uniquely** defined by exactly 4 entities from the original subdivision:
  - 2 segments : **top(Δ)** & **bottom(Δ)**
  - 2 endpoints: **leftp(Δ)** & **rightp(Δ)**
- What if
  - S contains vertical segments, or
  - two vertices lie in the same vertical line?



Complexity

- TM(S) is a refinement of S, obtained by adding a number of vertical segments
- How many vertical segments should be inserted in total? and will the construction increase the complexity of S?
- Claim: given a polygonal subdivision S with n segments, TM(S) has
  - at most 6n + 4 vertices and
  - at most 3n + 1 trapezoids
- Hence, by converting S into TM(S), the size is increased by a constant factor