

Triangulation

Triangulating Monotone Polygons

- Strategy

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Linear-Time Algorithm

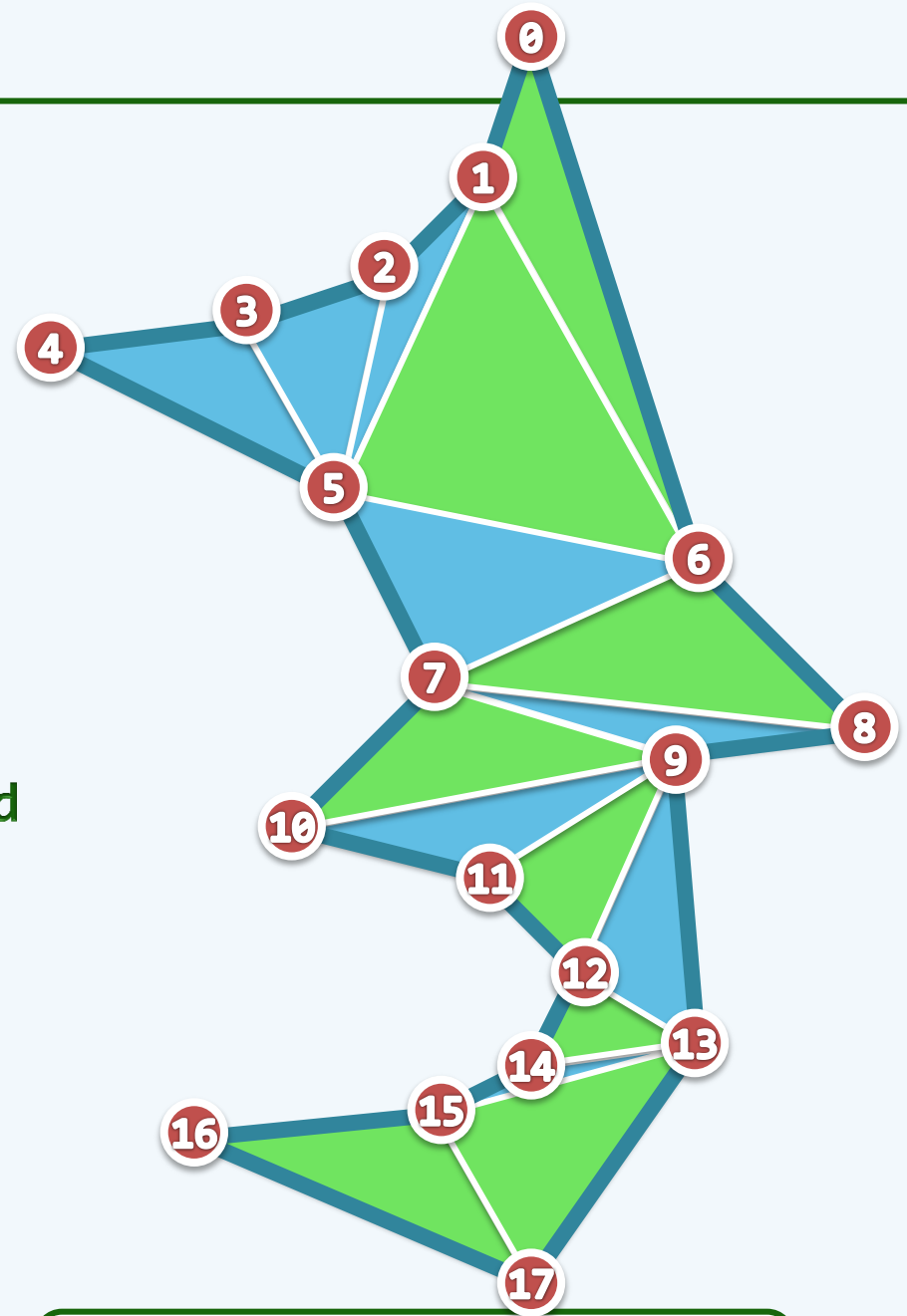
❖ Target:

to triangulate a monotone polygon
efficiently

❖ [Garey et al., 1978]

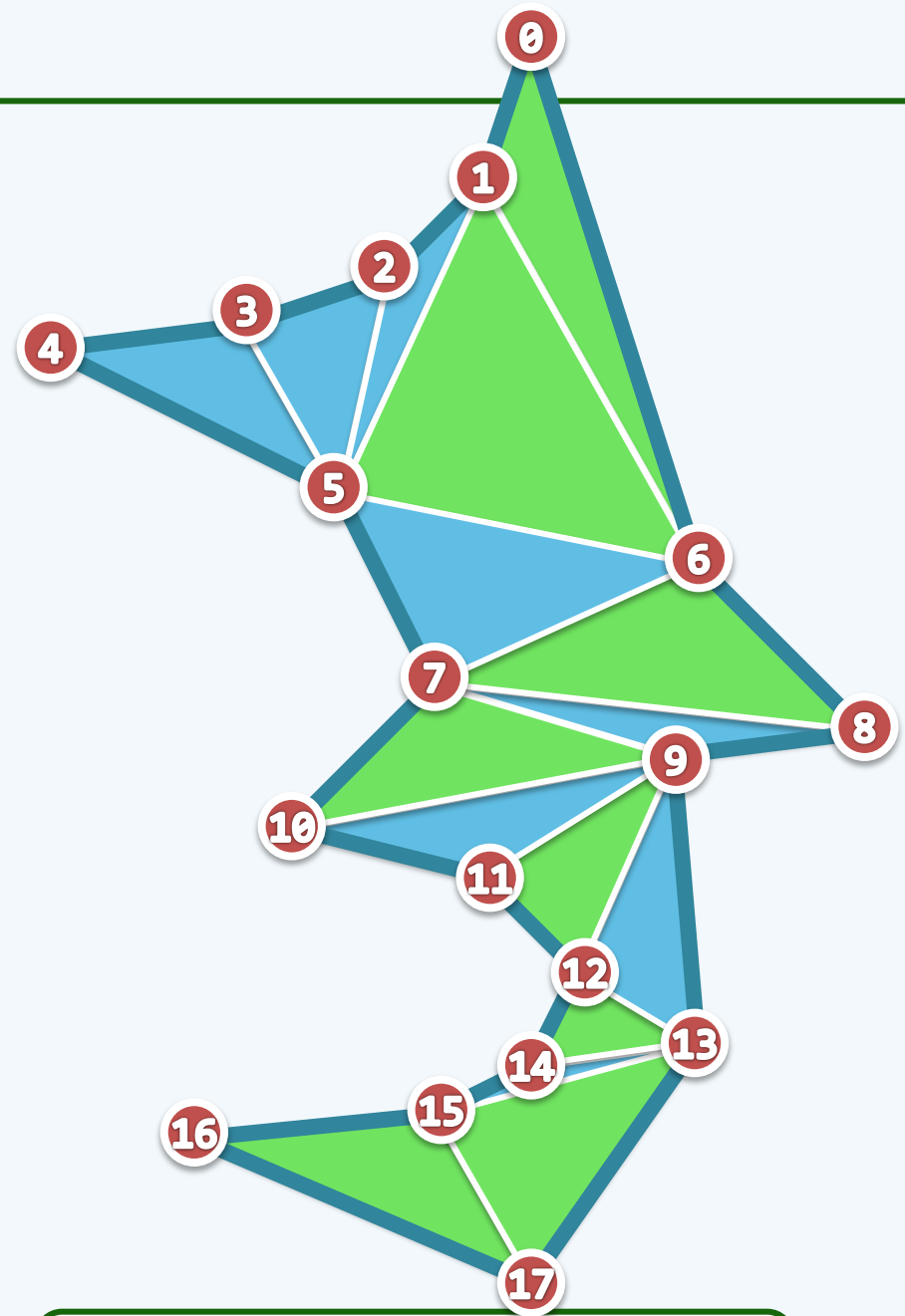
A **monotone** polygon can be triangulated
in **linear** time

❖ The idea behind this algorithm
is quite simple ...



Plane Sweep

- ❖ While a horizontal line L sweeps from top down
 - try to triangulate everything you can above the current sweep line, and
 - remove the triangles chopped off



Event Queue

❖ We begin with sorting all vertices

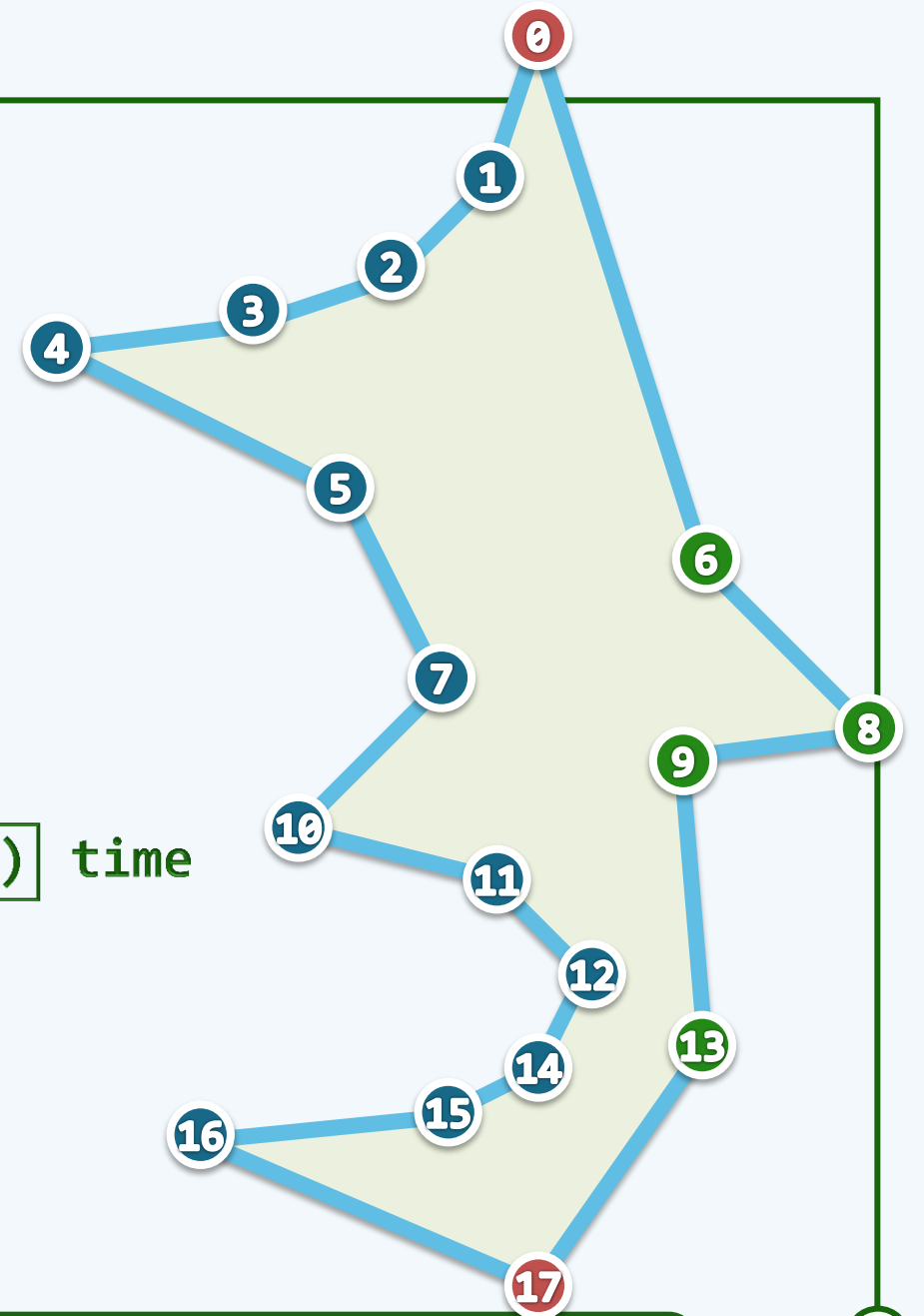
by y-coordinate into an event queue Q

❖ By monotonicity, the left & right chains

can be merged into a single queue in $O(n)$ time

❖ For simplicity, assume that

no 2 vertices share a same y-coordinate



Event Queue

❖ This is a simple example of

plane sweep algorithm that

- **all** events are known **in advance** and
- **no more** events will be generated **dynamically**

