04-L-09

Voronoi Diagram

Divide-And-Conquer

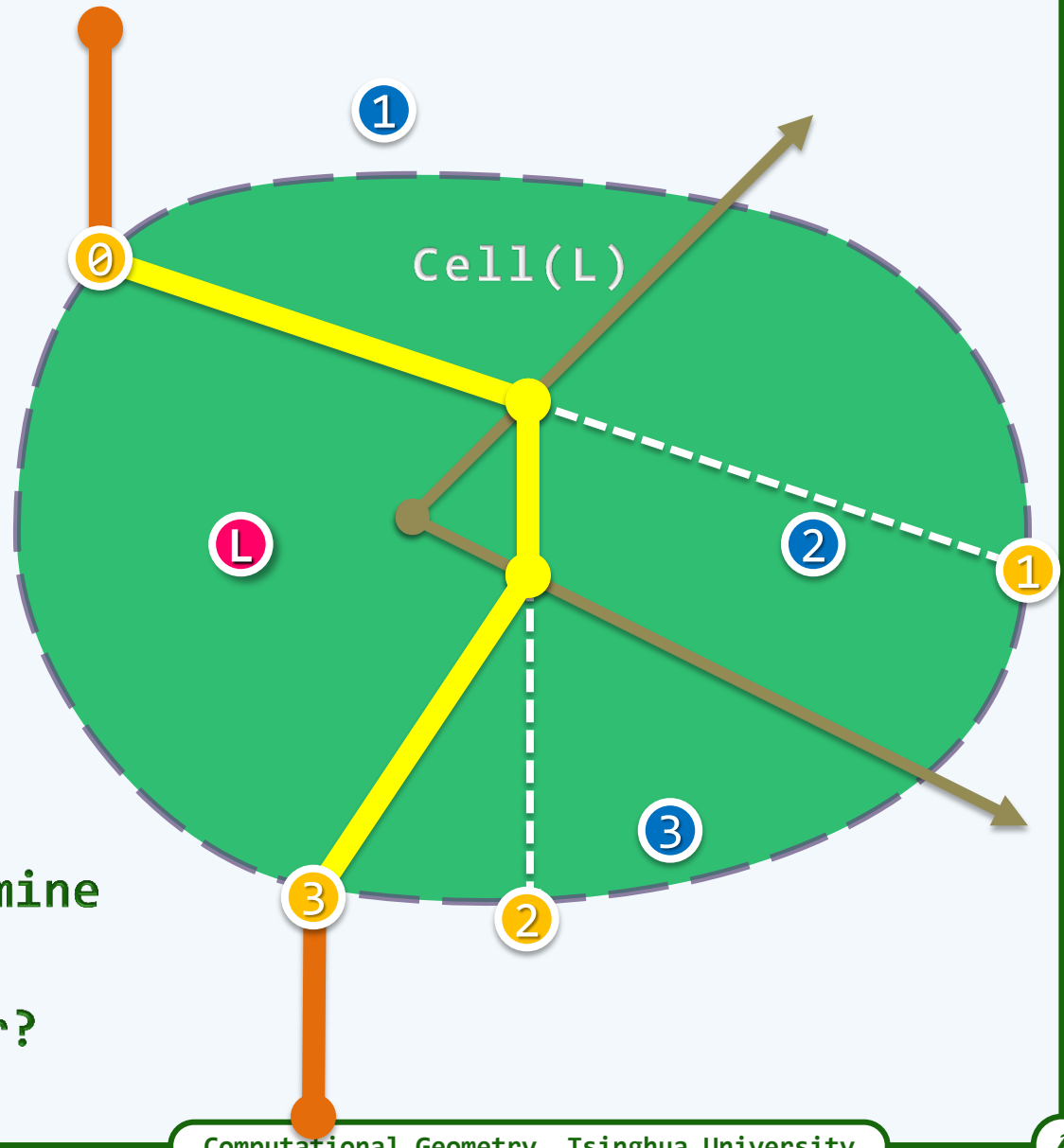
- Intersecting With Cells

Junhui DENG

deng@tsinghua.edu.cn

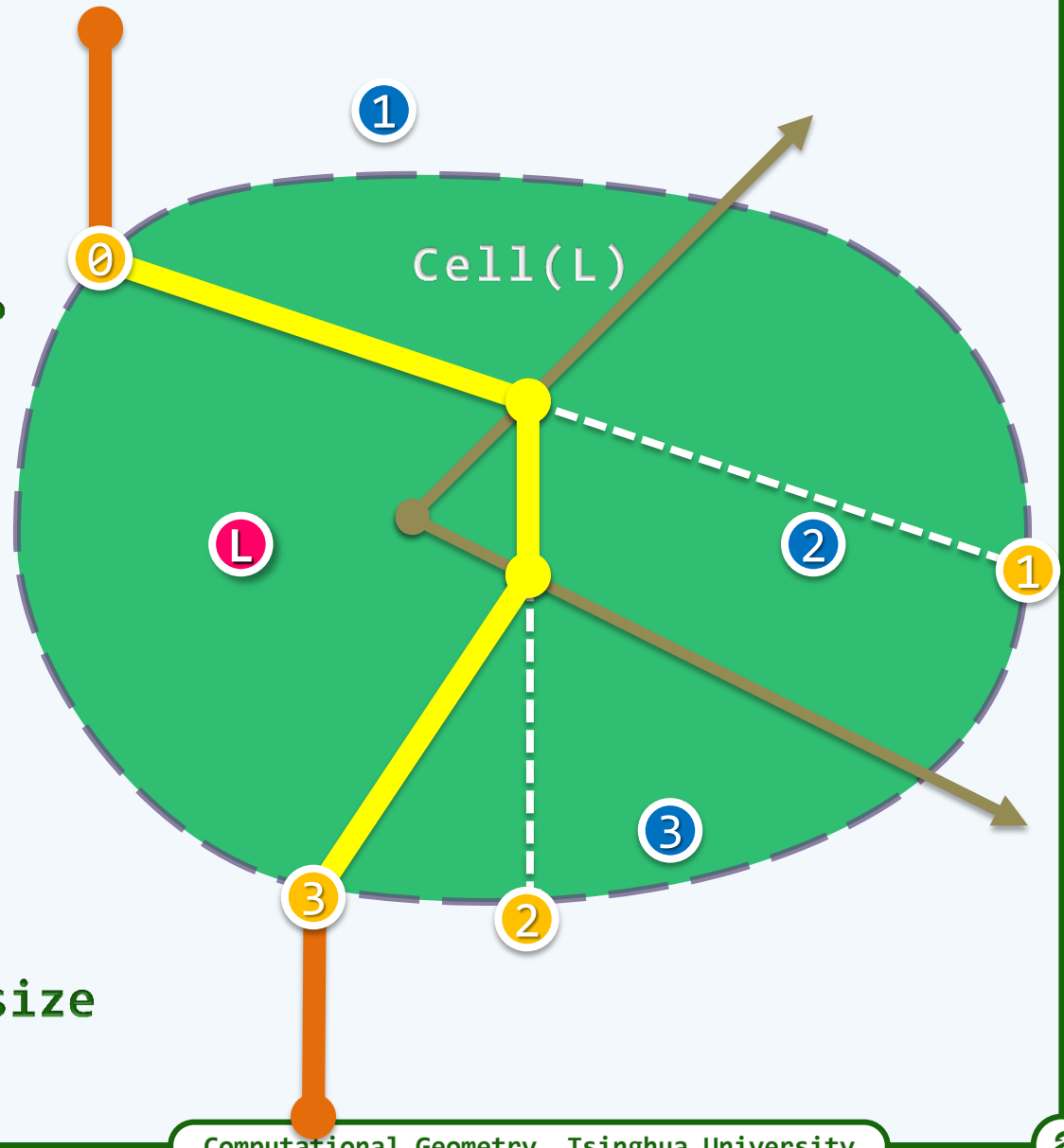
DCEL

- With the DCEL structure
  - the upper tangent can be computed
    in $O(n + m)$ time
  - to switch to a neighbor cell
    w.r.t. a given boundary edge
    needs $O(1)$ time
- But how much time is needed to determine
  each turning point of the contour?



Brute-Force

- But how much time does it need to intersect a cell with a bisector?
- A brute-force algorithm
  - tests all the cell edges with the bisector, and hence
  - runs in time linear to the cell size



Worst Cases

- As we will see later,

  in the worst cases, however,

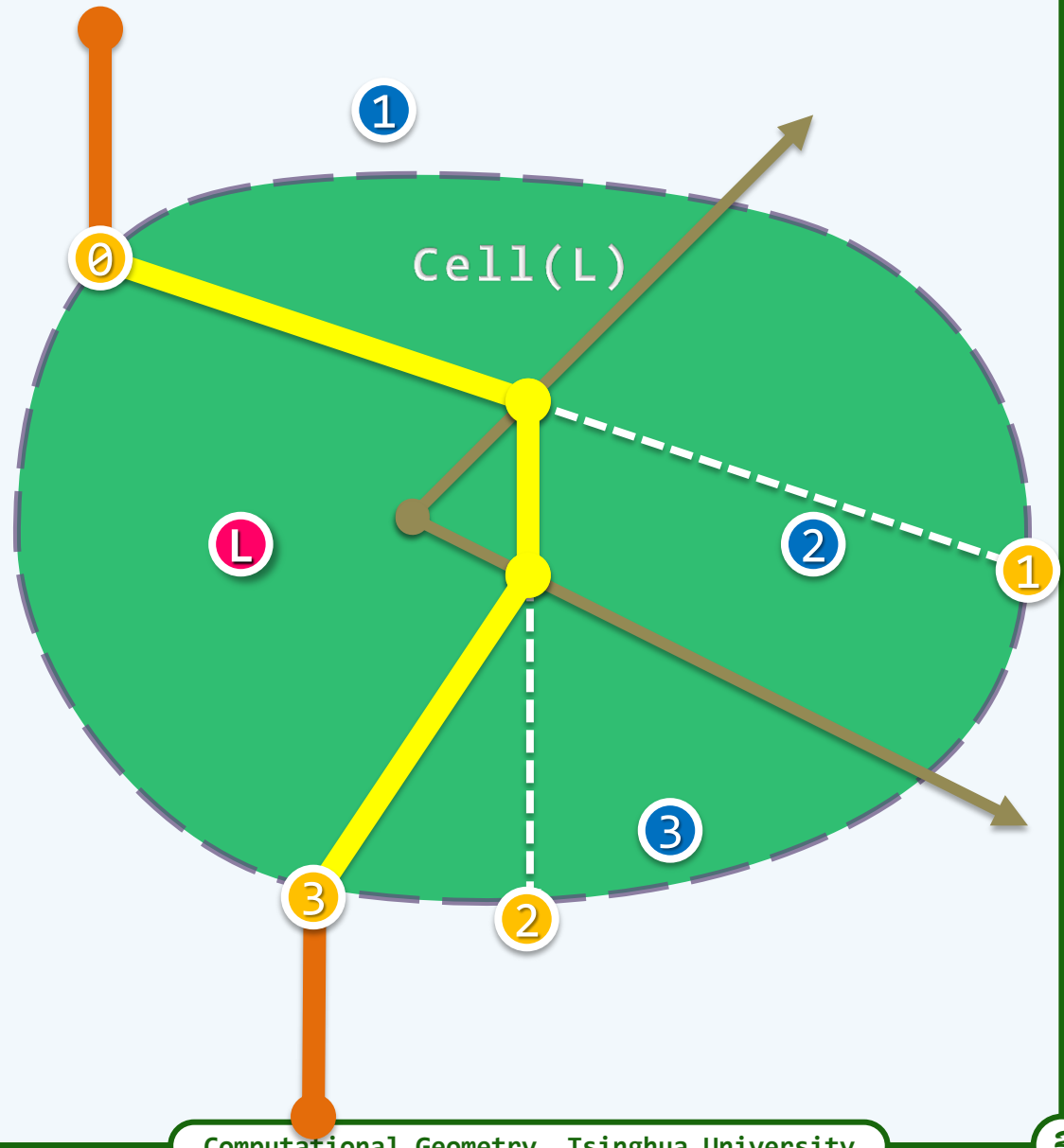
  every cell edge is **rescanned**

  for each bisector

- It means that

  the entire process might require

  $\Omega(n * m)$ time!



Avoiding Rescan

- A good news is that

  rescanning edges of a same cell

  can be **avoided**!

- Specifically, we need to

  scan each cell boundary **only once**

- The trick here is based on

  the following observations ...