

# CS 420: Advanced Algorithm Design and Analysis

## Spring 2015 – Lecture 23

Department of Computer Science  
University of British Columbia



March 31, 2015

# Announcements

Assignments...

- ▶ Asst8/9 (due April 9)

Exams...

# Announcements

## Assignments...

- ▶ Asst8/9 (due April 9)

## Exams...

- ▶ NO MORE EXAMS

# Announcements (cont.)

## Readings...

- ▶ matchings and network flows [Kleinberg&Tardos, Chapt. 7], [Cormen et al., Chapt. 26], [Dasgupta et al., Chapter 7]
- ▶ reductions and NP-hardness [Kleinberg&Tardos, Chapt. 8, 11], [Cormen et al., Chapt. 34,35]
- ▶ computational geometry... light treatment in texts, EricksonNotes has more; notes of David Mount are highly recommended

## Last class...

Finding extrema revisited... convex hulls (in 2 and higher dimensions)

- ▶ “equivalence” 2-d convex hull and sorting problems
  - ▶  $O(n \lg n)$  time algorithms following various sorting paradigms
  - ▶  $\Omega(n \lg n)$  lower bound by reduction from sorting

## Last class...

Finding extrema revisited... convex hulls (in 2 and higher dimensions)

- ▶ “equivalence” 2-d convex hull and sorting problems
  - ▶  $O(n \lg n)$  time algorithms following various sorting paradigms
  - ▶  $\Omega(n \lg n)$  lower bound by reduction from sorting
- ▶ breaking the “equivalence” ...output-size sensitive algorithms
- ▶ another equivalence...with half-space intersections
  - ▶ polarity transform

# Today...

- ▶ low-dimensional linear programming
  - ▶ deterministic and randomized algorithms
  - ▶ applications

## Coming up...

- ▶ two-dimensional searching...planar point location
- ▶ applications to geometric intersection problems
- ▶ motion planning problems