

# Discrete Optimization

Mail Bag - Week 1

# Goals of the Lecture

- ▶ Weekly update on your progress  
(in aggregate)
  - something unique to this session

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- ▶ We have a lot of auditors
  - common in MOOCs

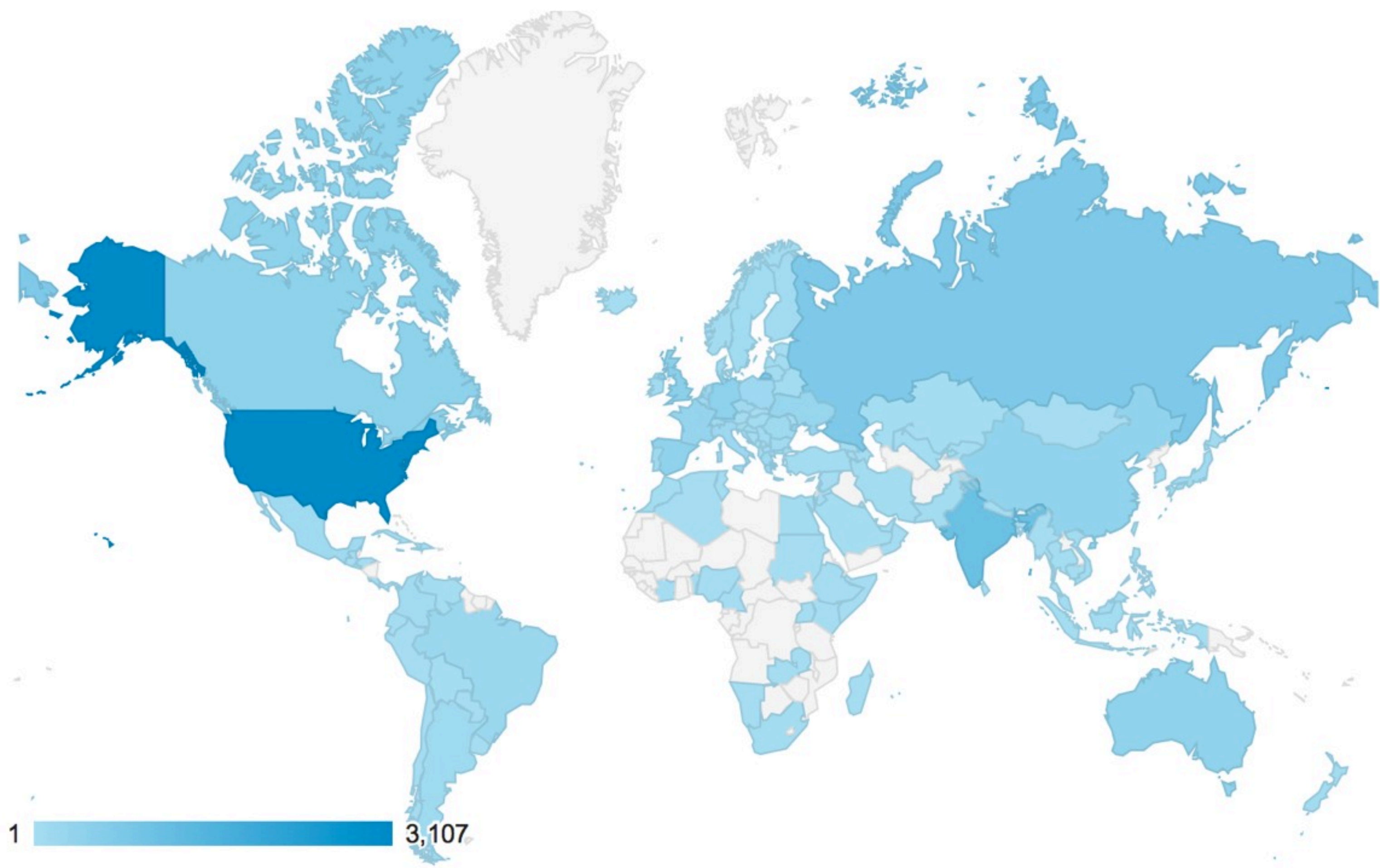
# Overview of the Student Body

	<b>12,253</b>
	% of Total: 100.00% (12,253)
1. United States	<b>3,107</b>
2. India	<b>1,065</b>
3. Russia	<b>742</b>
4. United Kingdom	<b>491</b>
5. Germany	<b>453</b>
6. Canada	<b>427</b>
7. Spain	<b>420</b>
8. Australia	<b>406</b>
9. China	<b>388</b>
10. France	<b>297</b>
11. Ukraine	<b>276</b>
12. Brazil	<b>226</b>
13. Netherlands	<b>179</b>
14. Poland	<b>172</b>
15. Italy	<b>161</b>
16. Israel	<b>146</b>

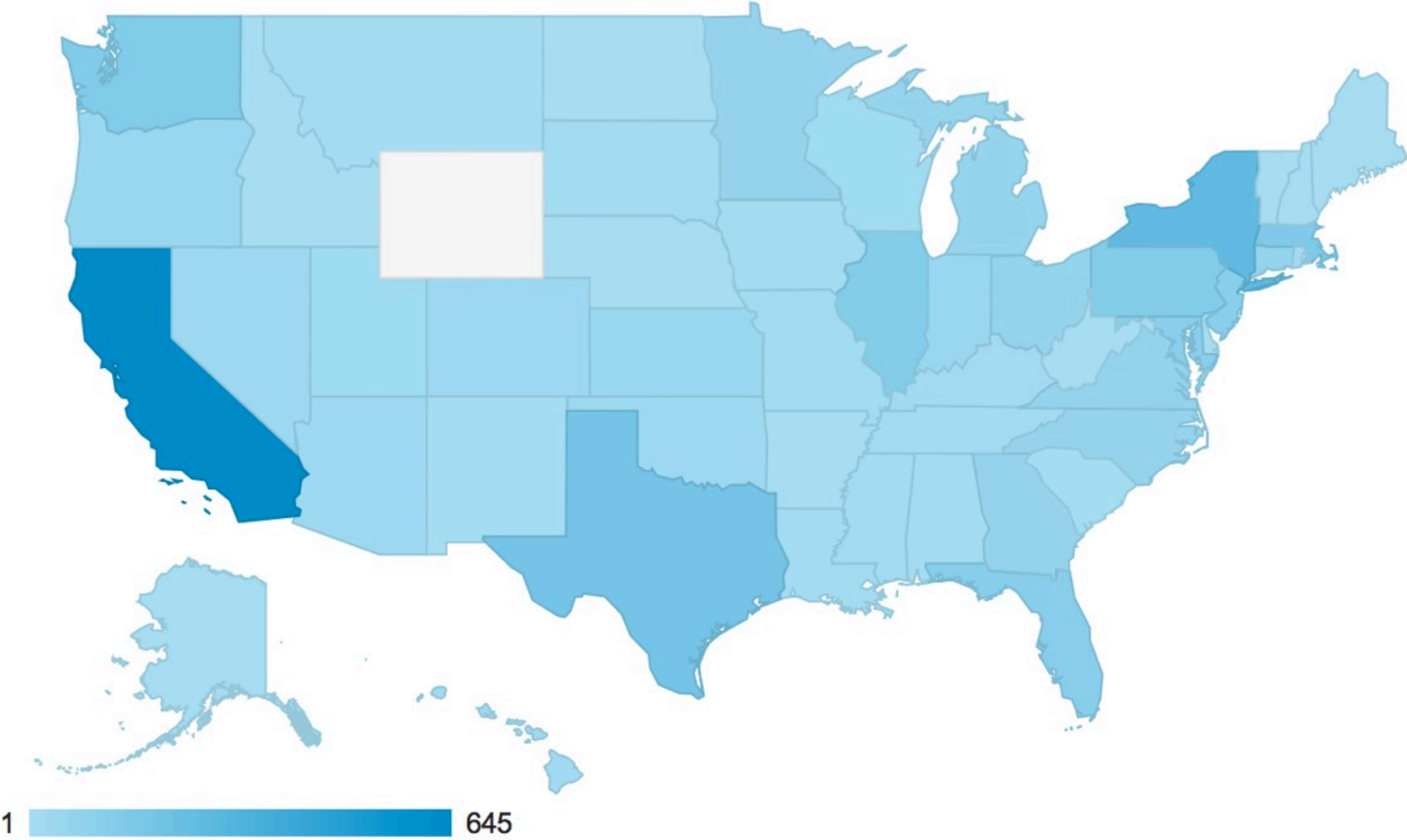
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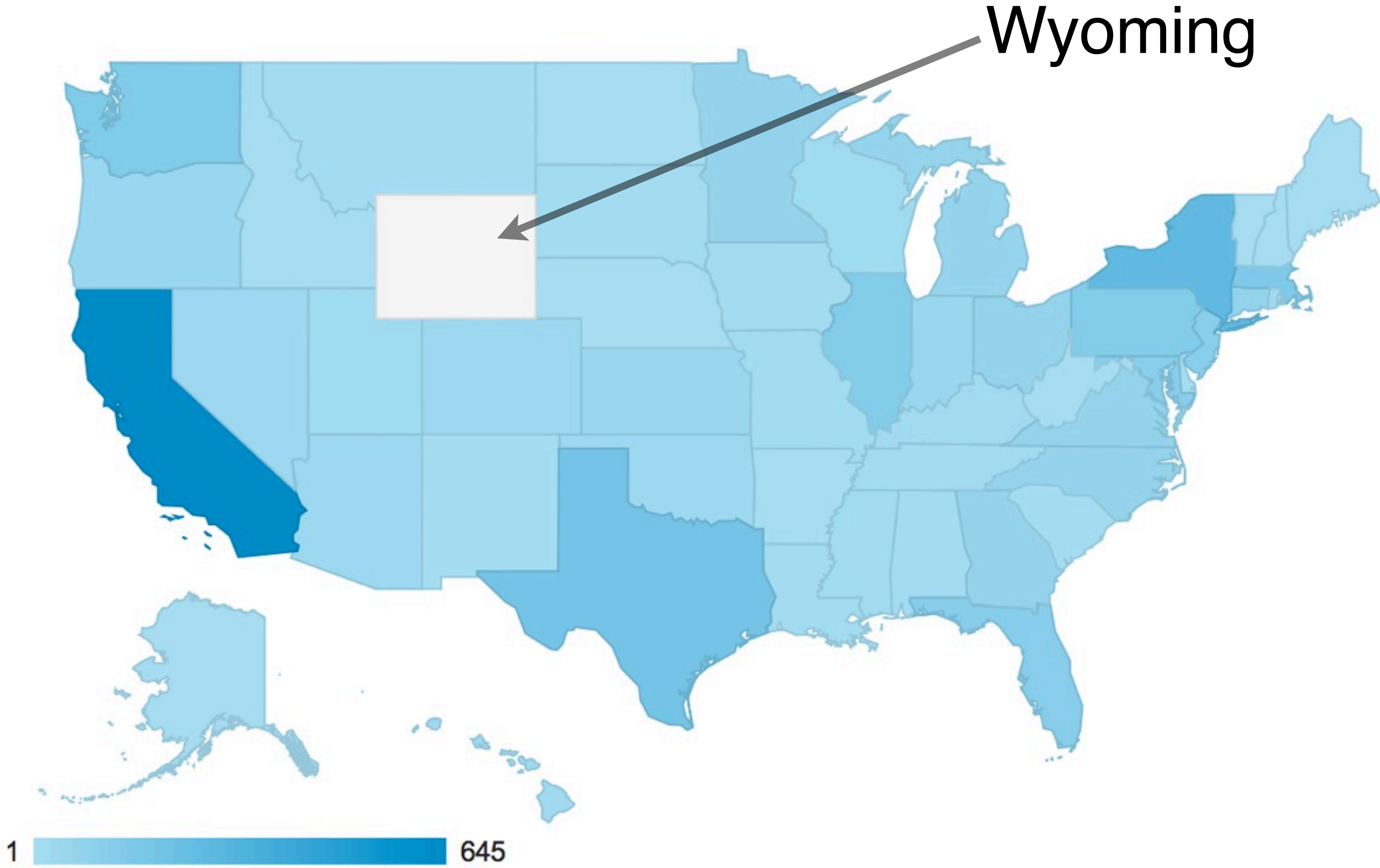
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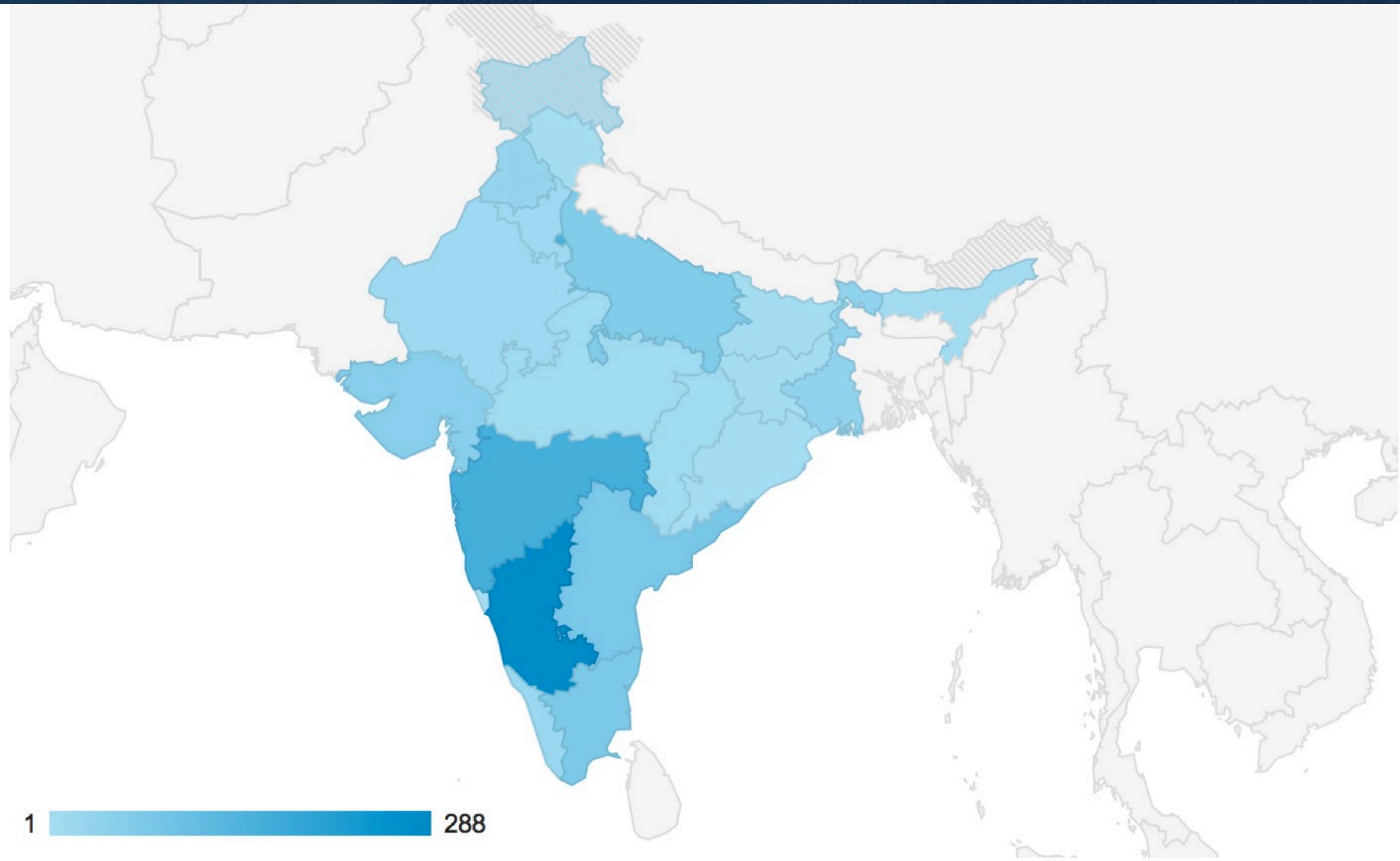
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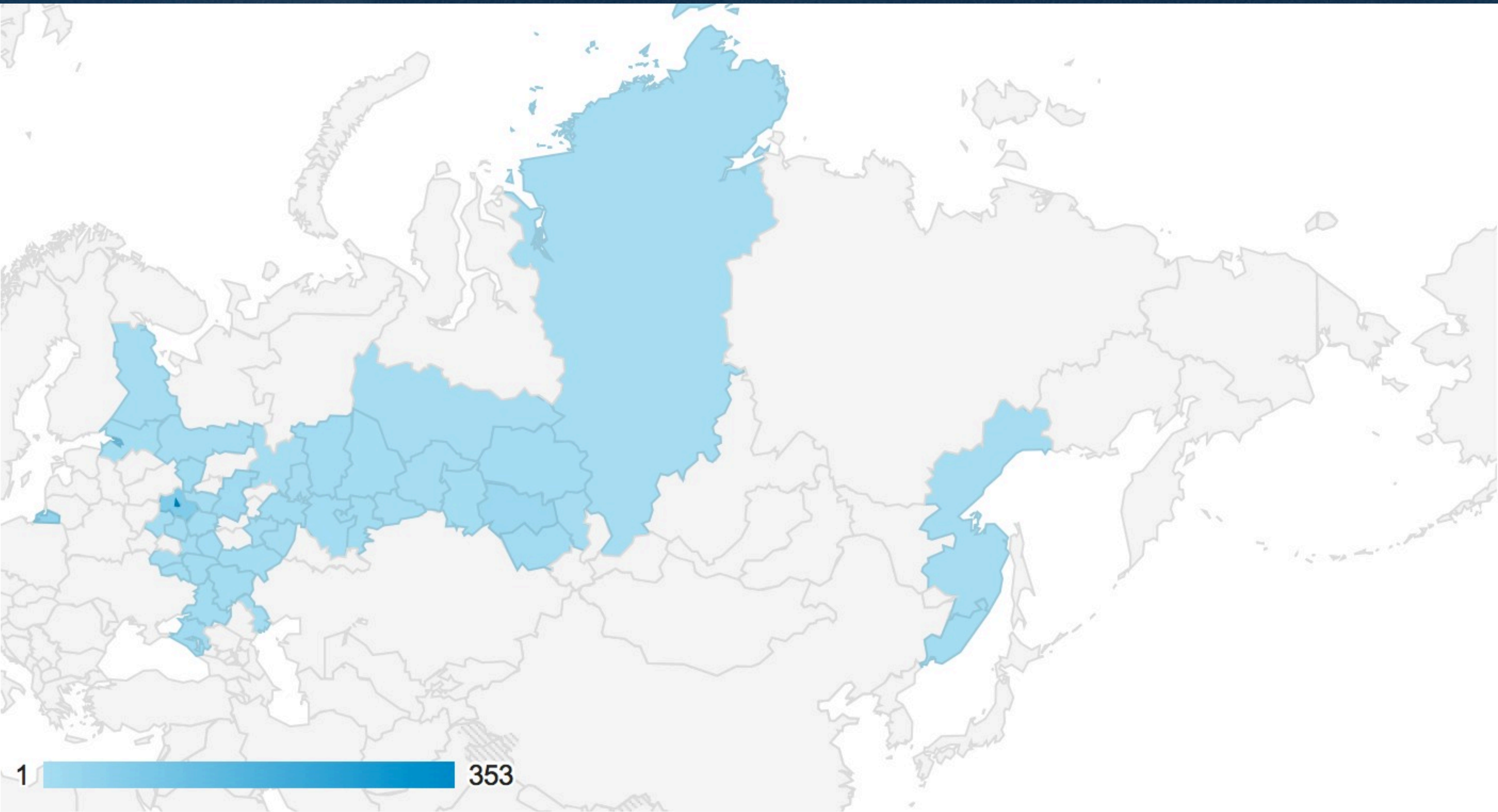
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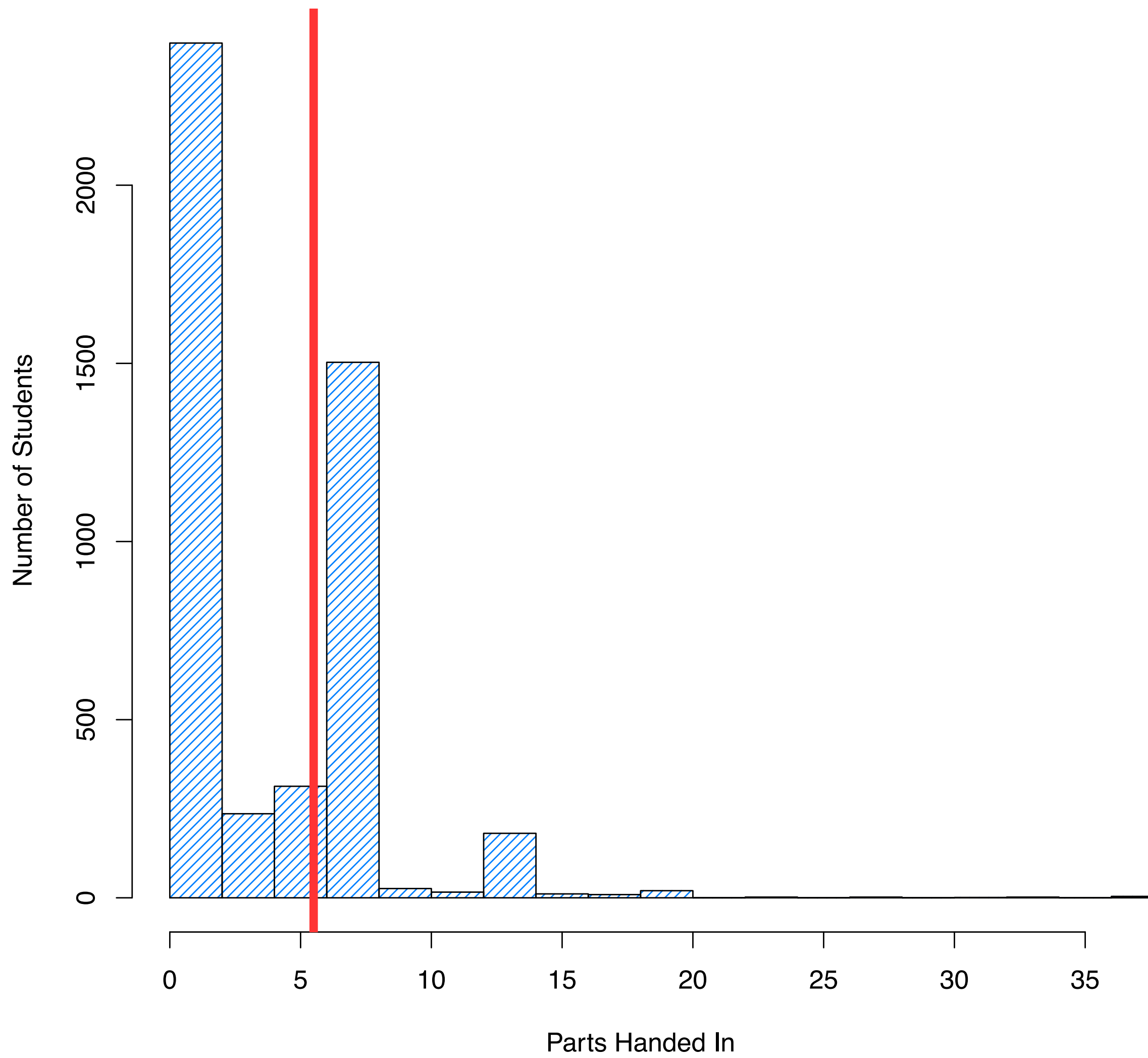
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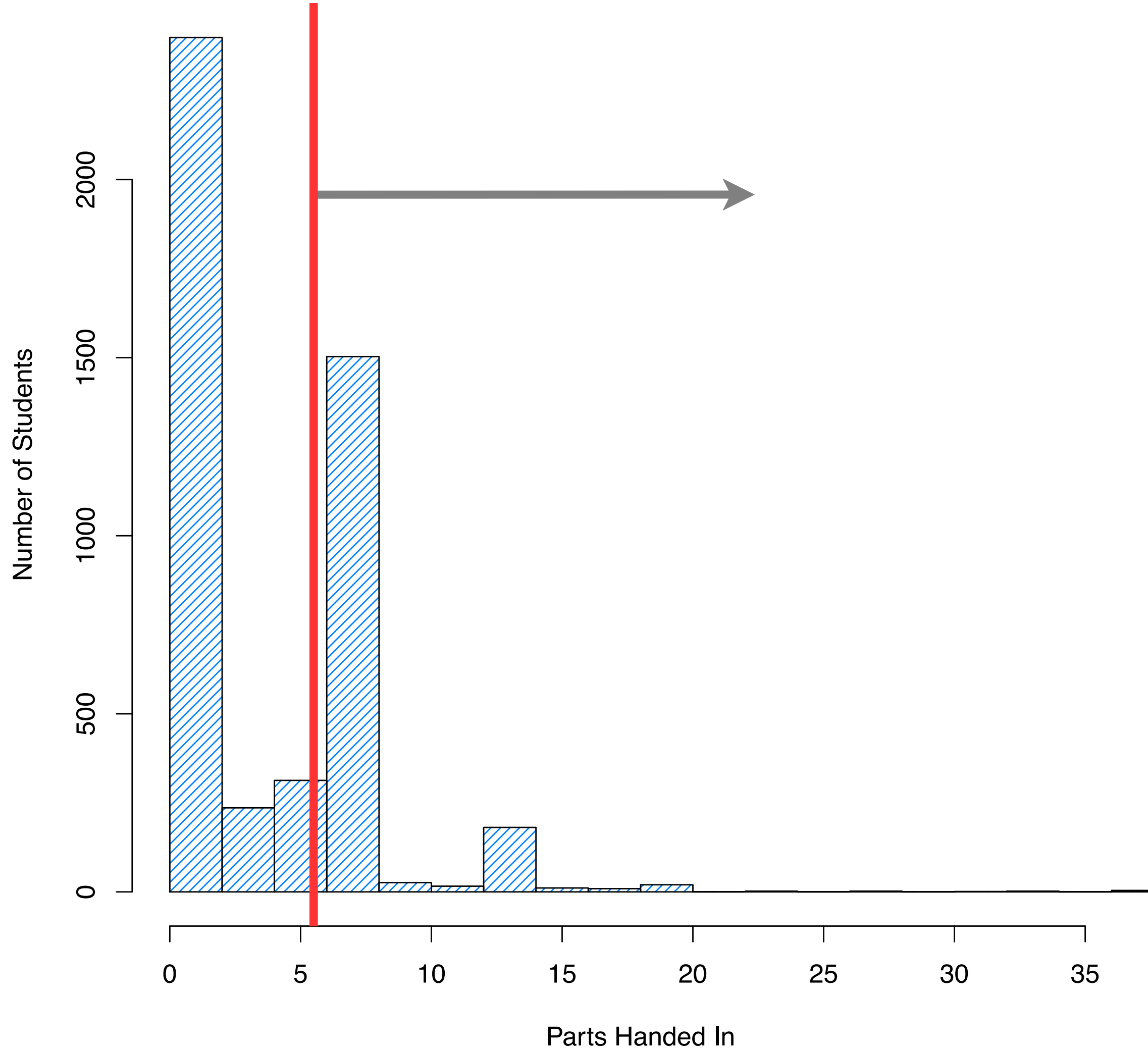
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- ▶ Progress by Parts
  - 6 parts
  - “on track” = a score between 7-10 per part

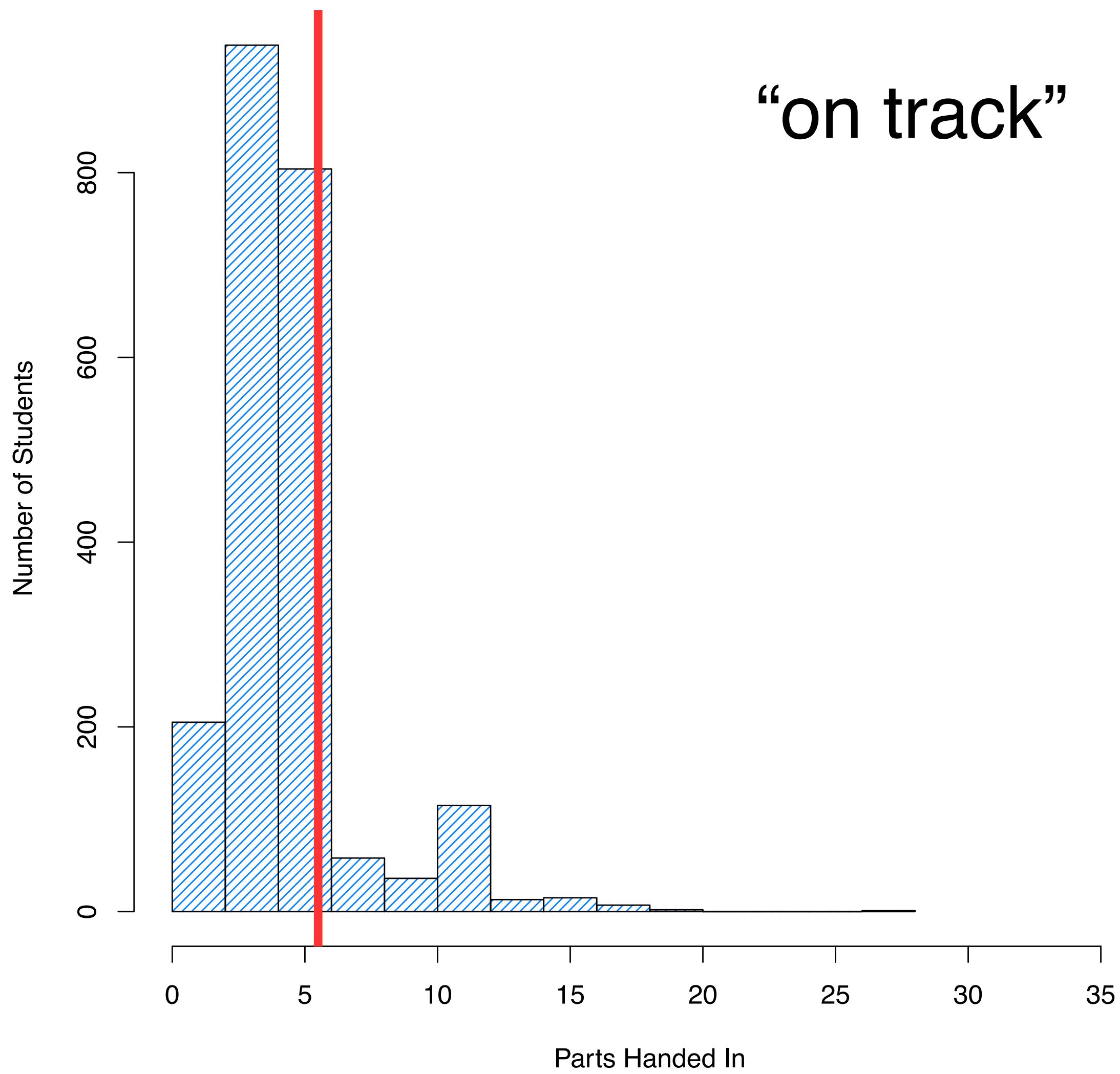
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- ▶ *Why is Branch and Bound still exponential?*

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## ► Consider

- capacity 701
- item weights: 2, 2, 2, 2, 2, 2, 2, ..., 2, 1
- item value: 2.00001, ..., 2.00001, 1

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## ► Consider

- capacity 701
- item weights: 2, 2, 2, 2, 2, 2, 2, ..., 2, 1
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## ► Of course, there are ways around it

- some are in the lecture slides (but later)

# Some Suggestions

- ▶ Check the forums before reporting a problem.

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- ▶ Check the course's twitter account  
[@DiscreteOptimiz](#) for micro-announcements



# Some Suggestions

- ▶ Use the course wiki

# Some Suggestions

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RESOURCES

Optimization Tools


Additional Materials


Community


About Us


Surveys


Social Media


Course Wiki 


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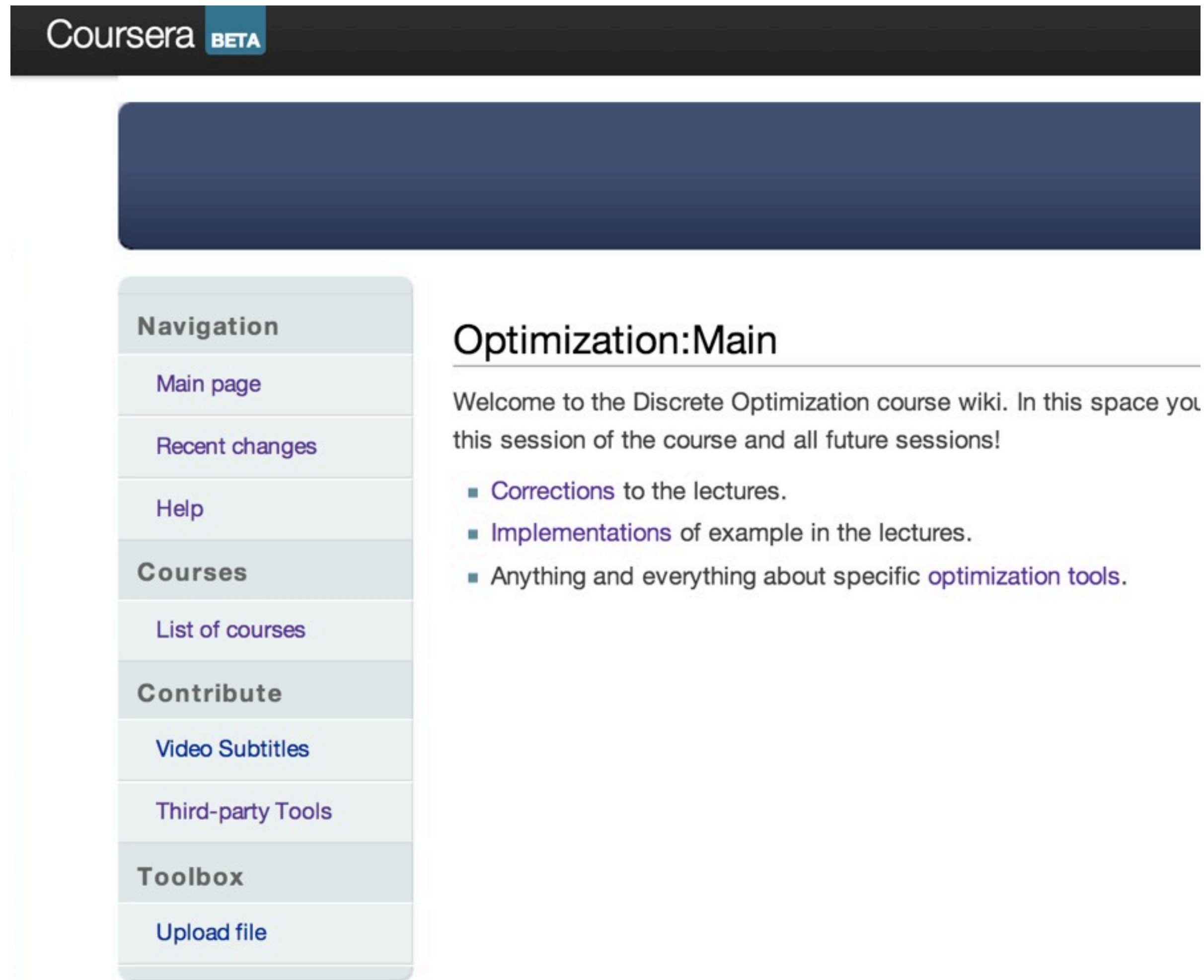
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## ► Use the course wiki



The screenshot shows the Coursera course wiki interface. At the top is a dark header with the Coursera logo and a 'BETA' badge. Below this is a large dark blue banner. On the left is a sidebar with a table of contents. The main content area is titled 'Optimization:Main' and contains a welcome message and a list of suggestions.

Navigation
<a href="#">Main page</a>
<a href="#">Recent changes</a>
<a href="#">Help</a>

Courses
<a href="#">List of courses</a>

Contribute
<a href="#">Video Subtitles</a>
<a href="#">Third-party Tools</a>

Toolbox
<a href="#">Upload file</a>

### Optimization:Main

Welcome to the Discrete Optimization course wiki. In this space you can contribute to this session of the course and all future sessions!

- [Corrections](#) to the lectures.
- [Implementations](#) of example in the lectures.
- Anything and everything about specific [optimization tools](#).

# What's Next?

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  - time for serious optimization






















































































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  - don't expect to find an optimal solution to every instance
  - remember 7-10 is sufficient for a certificate






















































































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- ▶ Graph coloring is hard
  - don't expect to find an optimal solution to every instance
  - remember 7-10 is sufficient for a certificate
- ▶ Good News!
  - graph coloring is discussed all over the lectures

# What's Next?

▼ Constraint Programming	
CP 1 - intuition, computational paradigm, map coloring, n-queens (27:16)	    
CP 2 - propagation, arithmetic constraints, send+more=money (26:20)	    
CP 3 - reification, element constraint, magic series, stable marriage (16:49)	    
CP 4 - global constraint intuition, table constraint, sudoku (19:23)	    
CP 5 - symmetry breaking, BIBD, scene allocation (18:30)	    
CP 6 - redundant constraints, magic series, market split (11:35)	    
CP 7 - car sequencing, dual modeling (18:20)	    
CP 8 - global constraints in detail, knapsack, alldifferent (33:44)	    
CP 9 - search, first-fail, euler knight, ESDD (24:49)	    
CP 10 - value/variable labeling, domain splitting, symmetry breaking in search (28:45)	    
▼ Local Search	
LS 1 - intuition, n-queens (13:57)	    
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LS 3 - optimization, warehouse location, traveling salesman, 2-opt, k-opt (23:09)	    
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# Have Fun!

- ▶ Thanks for all the positive feedback
  - we worked hard to prepare this
  - you show us, it was worth the extra effort
- ▶ Keep up the awesome optimization!