The State of CS Circles (cscircles.ca)

Open Source & Outreach using an Introductory Python Website

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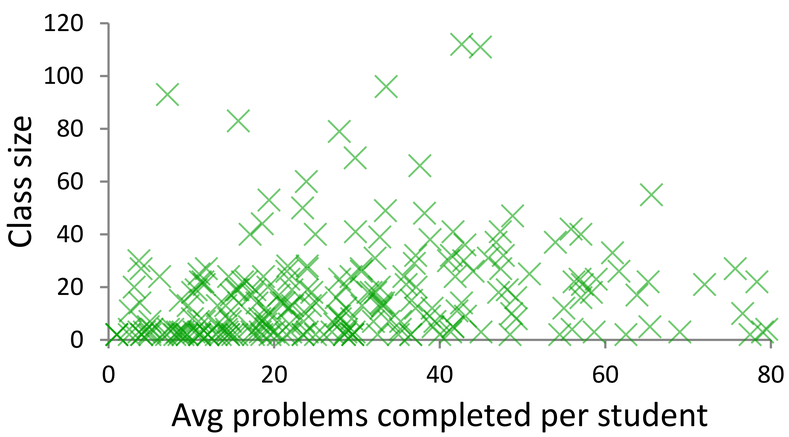
What is CS Circles?

- Free website to teach introductory Python
- 30 lessons & 110 exercises embedded within
- Mostly programming exercises
    - automatically graded by web server
- Visualizations and other problem formats
- Paper at SIGCSE 2013

Who uses CS Circles?

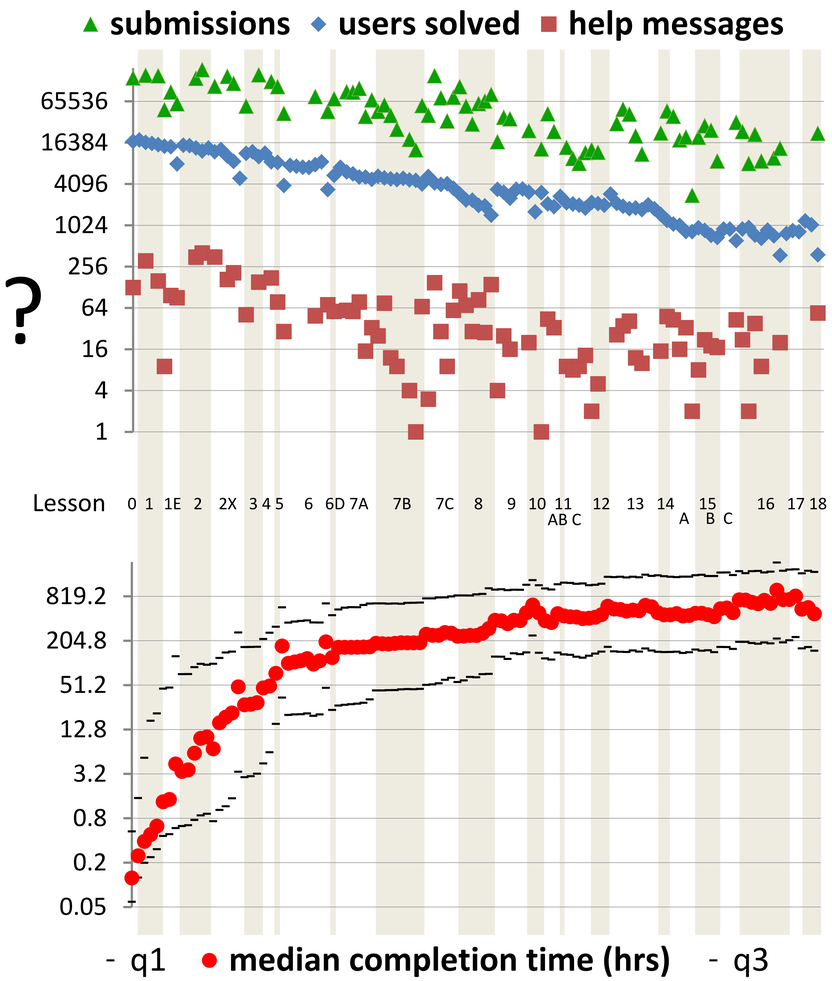
- 20000 users, together solved 550000 exercises
- Individual self-learners
    - can ask “CS Circles Assistant” questions
- High school, college and university classes
    - can ask your “guru” questions
    - gurus can see student attempts/success

Usage, by class



We gratefully acknowledge a SIGCSE Special Projects Grant from Summer 2013, which supported the open-sourcing and error analysis.

Problem Statistics



Translations

- French (thanks to Brice Canvel, André Roberge, Serge Bays, Nico Westbury, Ashlyn Osborne)
- German (thanks to Bundesweite Informatikwettbewerbe)
- Dutch (thanks to Ries Kock, Joost Rijnveld)
- Lithuanian (thanks to Jurgis Pralgauskis)
- Serbian (thanks to Marija Đokić)

Open Sourcing

- WordPress plugin on GitHub, GPL license
- Content shared under Creative Commons
- Installed mirror in a correctional facility

"Excellent way to teach programming in a classroom without Internet access"

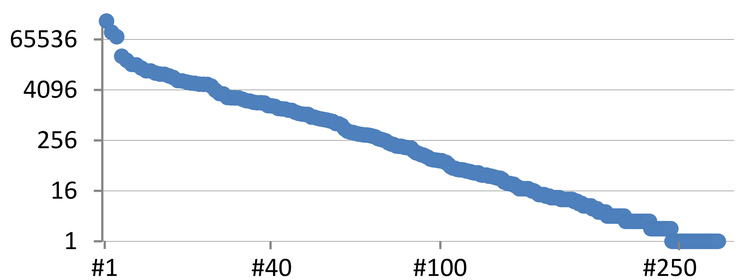
Top Errors

Commonest errors out of 600k events:

```
#1: SyntaxError: invalid syntax
#2: NameError: name ... is not defined
#3: EOFError: EOF when reading a line
⋮
```

Rank v. frequency

(shifted log-log)



- Site embeds explanations for top errors
    - thanks to Ayomikun Okeowo
- Zipf-Mandelbrot distribution? $\text{freq}_i = (t+i)^{-a}$
    - ongoing research in other languages