

# System Administration



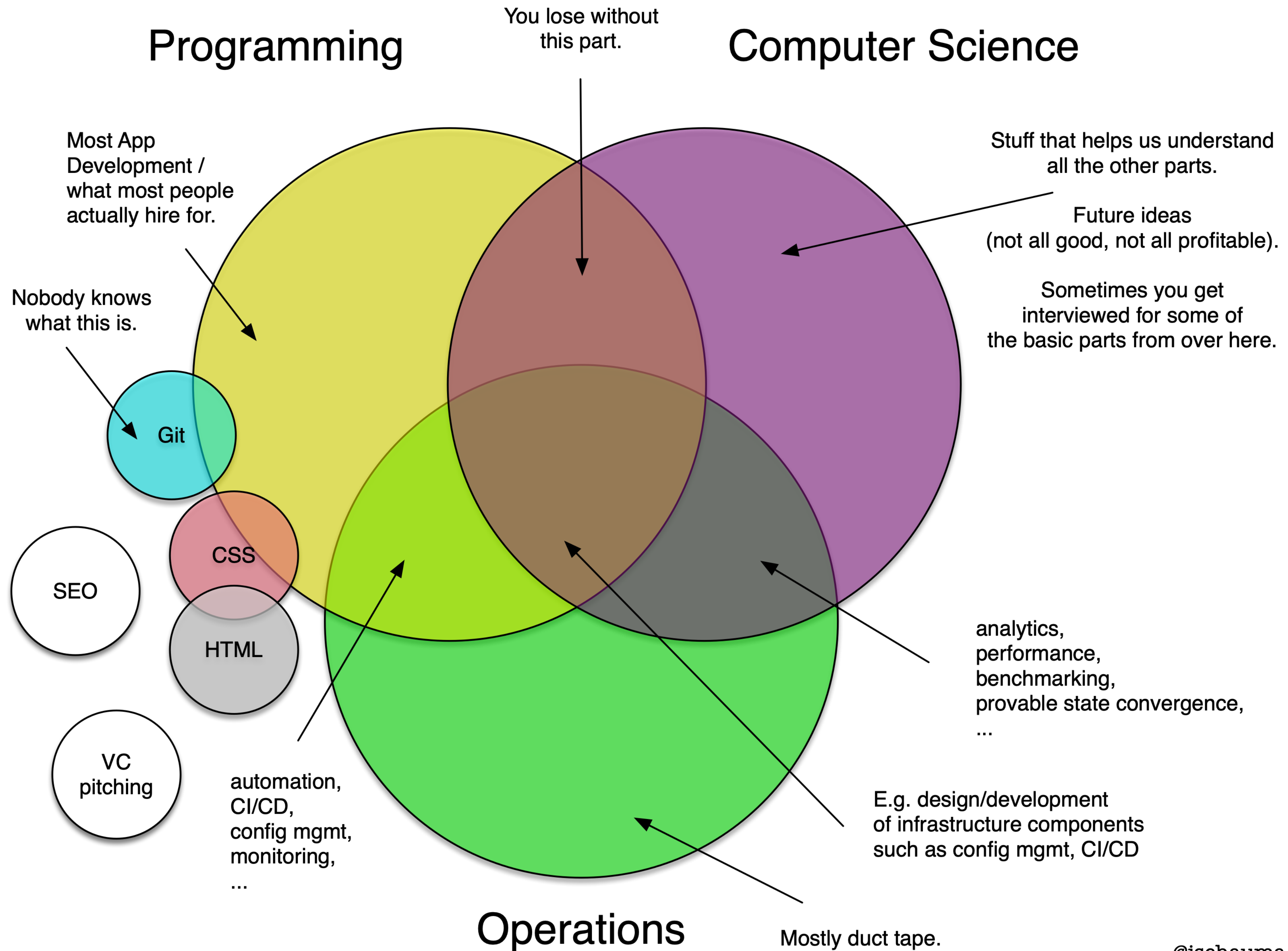
<https://xkcd.com/705/>

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<https://stevens.netmeister.org/615/>



## Learning System Administration

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System Administration is a profession with no fixed career path.

- few degree granting programs
- heavy reliance on practical experience
- specializations in many different areas possible
- breadth of expertise as necessary as depth in some areas
- background knowledge and requirements vary

# Learning System Administration

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## Breadth of knowledge:

- operating system concepts
- TCP/IP networking
- programming
- cloud computing
- ...

## Depth of knowledge:

- certain OS flavor
- specific service (DNS, E-Mail, Databases, Content-Delivery, ...)
- specific implementation/vendor (Oracle, Hadoop, Apache, Cisco, ...)
- specific area of expertise (security, storage, network, datacenter, ...)
- ...

# Syllabus

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Week 01: Introduction, UNIX history and basics

Week 02: Storage Models and Disks

Week 03: Filesystem Basics and Software Types

Week 04: Software Installation Concepts and Multi-user basics

Week 05: Networking I

Week 06: Networking II

Week 07: DNS, HTTP

Week 08: HTTPS, SMTP

Week 09: Writing System Tools

Week 10: Monitoring, Backup, Disaster Recovery

Week 11: Configuration Management

Week 12: System Security

Week 13: Ethics and Social Responsibility

Week 14: Review and CtF

## Learning is critical

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Know how to find answers:

- know how to ask questions
- know where to ask questions
- read critically
- know what you don't know (Dunning-Kruger effect)

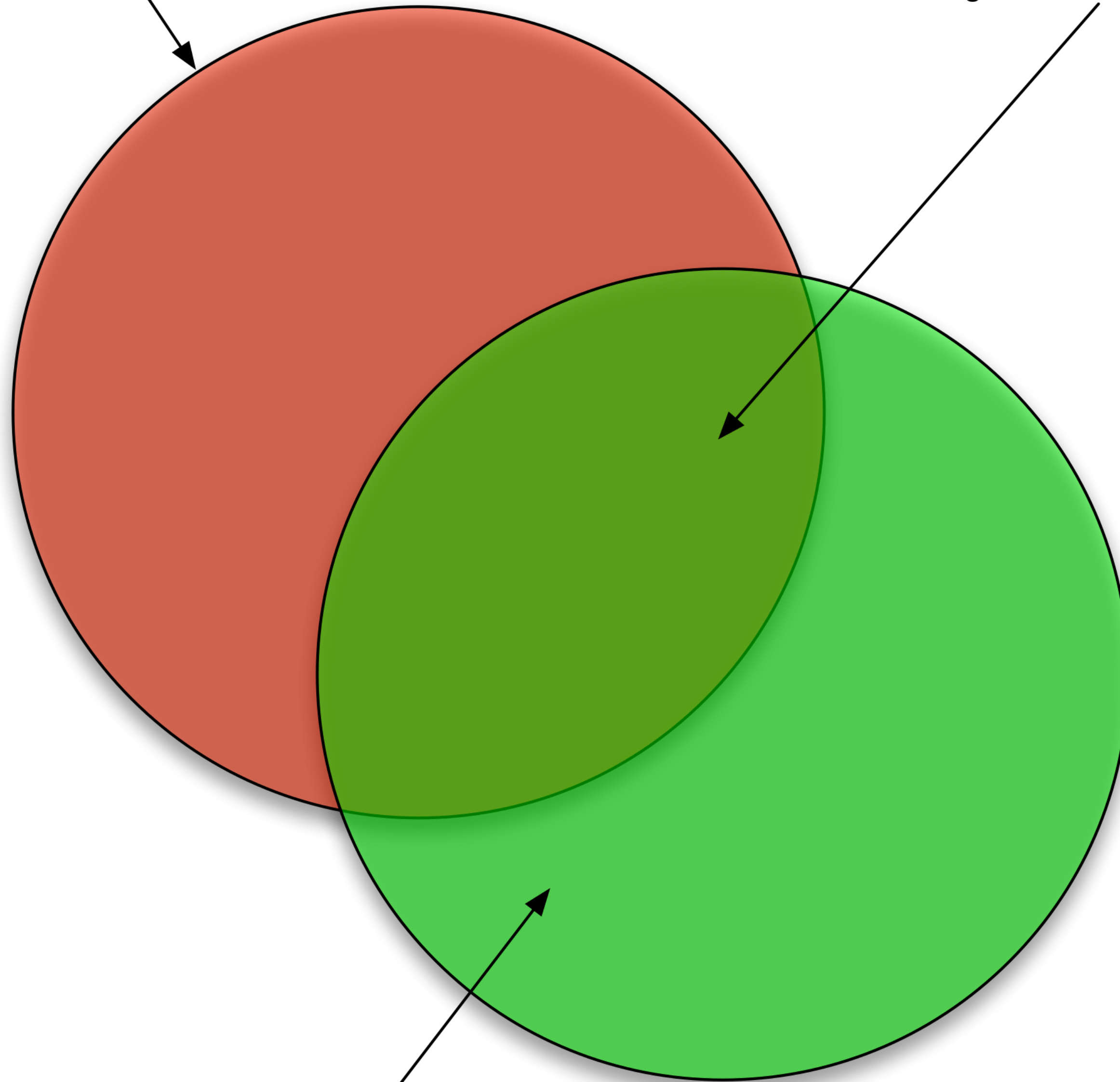


A: Things we don't know.

B: Things we know we don't know.

C: Things we know.

D: Things we know we know.



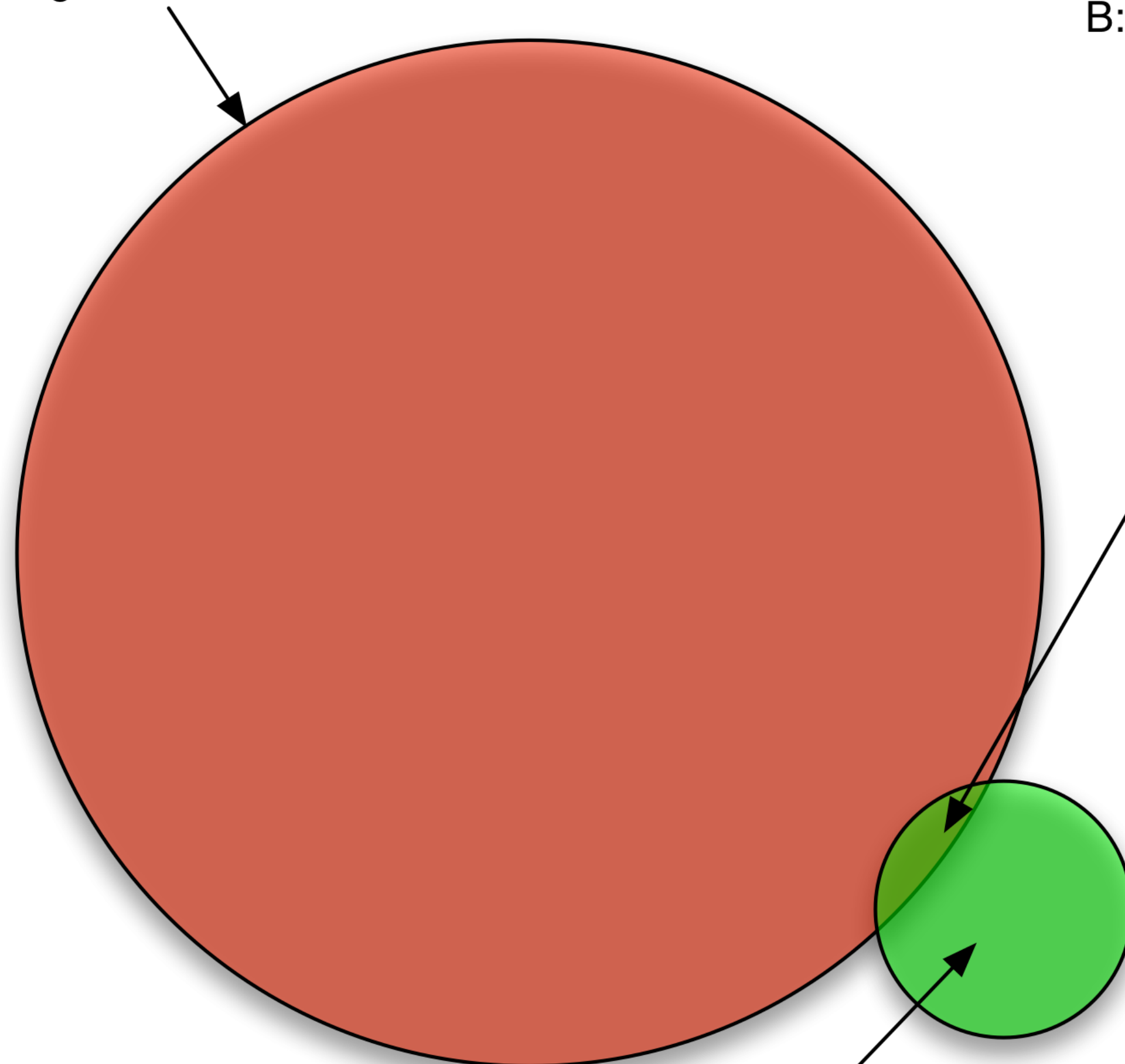
A: Things we don't know.

B: Things we know we don't know.

C: Things we know.

D: Things we know we know.

Ratio  $D:C \gg B:C \Rightarrow$  "I'm an expert!"





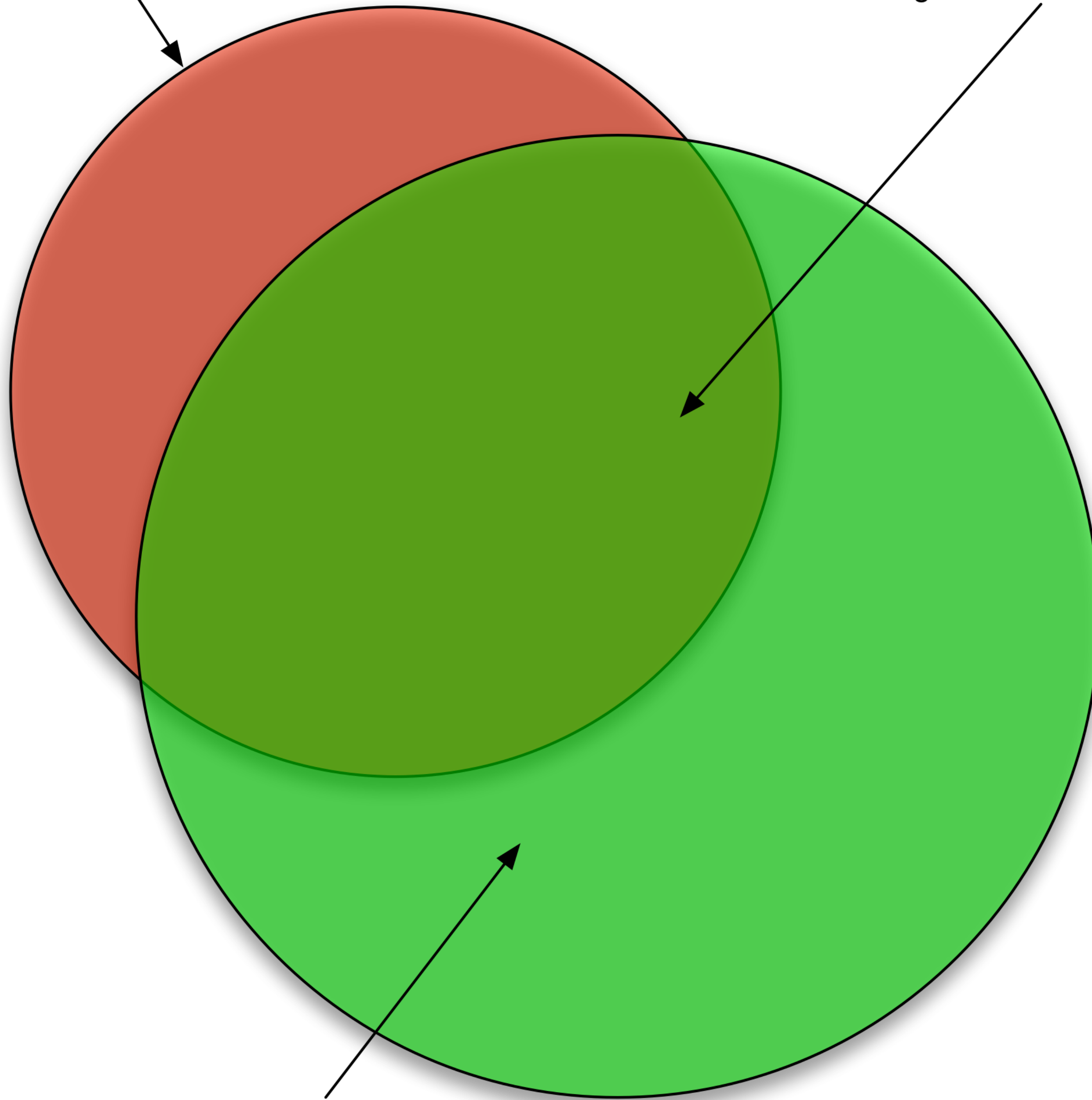
A: Things we don't know.

B: Things we know we don't know.

C: Things we know.

D: Things we know we know.

Ratio  $B/C$  now closer to  $D/C \Rightarrow$   
"I really don't know all that much."



## Learning is critical

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Know how to find answers:

- know how to ask questions
- know where to ask questions
- read critically
- know what you don't know (Dunning-Kruger effect)
- understand what you're doing
- understand why you're doing it
- seek information exchange

## Grading

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- course participation, questionnaires, course notes (12% of the grade)
- a meetup requirement (8% of the grade)
- three individual homework assignments (40% of the grade)
- one class project (25% of the grade)
- a group project (CtF) towards the end of the semester (15% of the grade)

## Systems Used

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- AWS EC2 — different OS on various instances
- linux-lab.cs.stevens.edu — Ubuntu Linux; see  
<https://stevens.netmeister.org/615/linux-lab.html>
- NetBSD 9.0 VirtualBox VM; see:  
<https://stevens.netmeister.org/631/virtualbox/>



## Course Notes and Participation

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- create a git repository with a single text file for each lecture
- before each lecture:
  - answer that week's questionnaire (linked from the course website in the syllabus)
  - note what you read, what exercises you completed, and what questions you have
- after each lecture:
  - review the questionnaire and your answers
  - note anything of interest you learned
  - write down what questions remain and what new questions arose
- follow up on unanswered questions in class or on the mailing list
- at the end of the semester, review and then submit all your notes

<https://stevens.netmeister.org/615/course-notes.html>

## Course Notes and Participation

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In each class, two students will each present one article, paper, project, ... relating to that week's topic.

- share link no later than Friday before class
- in class, summarize the information, show examples, and answer questions
- other students prepare by reading up and asking questions



## About this class

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You are responsible for your work as well as your time management. If you run into challenges, contact me as soon as possible and we will work something out.

There will be no extra-credit assignments, but for individual homework assignments you may resubmit your work to address any problems identified to improve your grade.

You are responsible for your own work. You may not present as your own the ideas, code, or code samples of another, even if those are available on the internet. Any incidents of plagiarism and copyright infringement will be reported to the Dean of Graduate Academics.

<https://stevens.netmeister.org/615/#plagiarism>

## About this class

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Everything: <https://stevens.netmeister.org/615/>

Course Mailinglist: <https://lists.stevens.edu/mailman/listinfo/cs615asa>

Video Lectures: <https://v.gd/cs615asa>

Slack: <https://cs615asa.slack.com/>

Twitter: <https://twitter.com/cs615asa>

Synchronous Discussions: Mondays, 18:15 Eastern on Zoom

Recommended Textbook:

“Principles of System Administration”, by Jan Schaumann

<https://www.netmeister.org/book/principles-of-system-administration.pdf>

# Homework

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Before *every* lecture:

- review the previous week's slides and notes
- submit class questionnaire
- watch the video lectures and slides for that class
- follow up with questions on the course mailing list
- prepare for class by reading the recommended materials
- do the recommended exercises

After *every* lecture:

- run all examples from the video / slides
- update your class notes

# Homework

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## Week 01:

- make sure your class notes git repository is set up
- bookmark the course resources
- double-check that you are subscribed to the class mailing list
- ensure you have access to `linux-lab.cs.stevens.edu`
- set up your AWS EC2 access
- join the course Slack channel and participate

## In our next segment...

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Keep your eyes open for the next video lectures. We'll cover:

- homework assignments
- setting up git on linux-lab
- some UNIX history
- just what exactly a System Administrator does...





## Links and Reading

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“Principles of System Administration”, by Jan Schaumann

<https://www.netmeister.org/book/principles-of-system-administration.pdf>

USENIX Short Topics in System Administration: Job Descriptions for System Administrators: <https://is.gd/x0BZG9>

“Principles of Network and System Administration”, by Mark Burgess

<https://is.gd/K3jnW9>

“The Practice of System and Network Administration”, by Thomas A. Limoncelli, Christina J. Hogan, Strata R. Chalup

<https://is.gd/VWQPr1>