

EXCEL 15-151 Session Notes
Fall 2019 – Session 7
Sam Yong
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Session Ideas

- Exam reflection form
- Discussion on exam and EXCEL sessions
- Overview of the course so far
- Chapters coming up
- Review number theory with RSA
- Review bijection for counting sets
- Review PHP for counting sets
- Build intuition for the sizes of sets
- Build intuition for countable infinity
- Think about the size of naturals, rationals, and integers
- Build intuition for binomial coefficients

Exam Reflection and EXCEL Feedback [~15 to 20 minutes]

- Give students ~10 minutes to complete the form
- Take ~5 to 10 minutes to discuss exam and study strategy
- Take ~5 to 10 minutes to address feedback and discuss

The Course Overview [<5 minutes]

- Logic and proof techniques
- Sets
- Functions and relations
- Induction – a proof technique
- Number theory

Take <10 minutes to discuss RSA

Take ~5 minutes to discuss bijection

Take ~5 minutes to introduce set cardinality

Discuss Hierarchy of Cardinalities

- Finite sets
- Infinite sets
- Countable infinity
- Uncountable infinity

Discuss Countably Infinite sets

- Natural numbers
- Integers – comparing to natural numbers
- Rationals – comparing to integers
- Reals – NOT countable

Intuitions

- What does countable mean? (list-able)
- Hilbert's Hotel
- Discuss infinities, infinite cardinals, ordinals
- Discuss mathematical axioms and the framework of mathematics

Other Interesting Stuff

- Bijection between real intervals
- Infinite sequences
- Infinite fractions
- Crypto