Welcome!
Prof. Albert R Meyer

Quick Summary
1. Fundamental Concepts of Discrete Mathematics (sets, relations, proof methods, ...)
2. Discrete Mathematical Structures (graphs, trees, counting...)
3. Discrete Probability Theory

Vocabulary
Quickie:
What does “discrete” mean? (≠ “discreet”)

Online Tutor Registration
• TP.1: Registration asap
• not later than Saturday, 9AM for table assignment

Reading Assignment
• Courseinfo on web page asap
• Notes Chapters 1 & 2 asap
• Ch. 3, 4.1—4.7 next week
• Reading Comments -- using online system NB

Course Web site
http://courses.csail.mit.edu/6.042
• announcements
• class schedule
• notes, slides,...
• course organization
• grading info
Lecture & Team Problems

Three 1.5 hour class sessions:
• 1/2 hour overview lecture,
• then team problem-solving.

Team participation counts 20% of final grade
Teams assigned by Monday

Active Lectures

Say “hello” to your neighbors—you’ll be working with them

Active Lectures

Quickie question:
Where was your neighbor born?

Getting started:
Pythagorean theorem

\[ a^2 + b^2 = c^2 \]
Familiar? Yes!
Obvious? No!

A Cool Proof

Rearrange into:
(i) \( a \times c \times c \) square, and then
(ii) an \( a \times a \) & \( b \times b \) square
A Cool Proof

\[ a \quad b-a \quad a \]

A False Proof: Getting Rich By Diagram

11 → 10 → 11 → 11 → Profit!

A False Proof: Getting Rich By Diagram

The bug:

are not right triangles!

So the top and bottom line of the "rectangle" is not straight!

Getting Rich

The bug:

are not right triangles!

So the top and bottom line of the "rectangle" is not straight!

1 = -1 ?

pictures are not the only source of false proofs

\[ 1 = \sqrt{1} = \sqrt{(-1)(-1)} = \sqrt{-1} \sqrt{-1} = (\sqrt{-1})^2 = -1 \]

Moral:
1. Calculation is a risky substitute for understanding.
2. Be sure you know the rules.

Consequences of 1 = -1

\[ \frac{1}{2} = -\frac{1}{2} \quad (\text{multiply by } \frac{1}{2}) \]
\[ 2 = 1 \quad (\text{add } \frac{3}{2}) \]

"Since I and the Pope are clearly 2, we conclude that I and the Pope are 1. That is, I am the Pope."

-- Bertrand Russell
Consequences of $1 = -1$

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Bertrand Russell (1872 - 1970)

Team Problems

Problems 1–3