CIT 5920

Recitation 0
August 30, 2024

Agenda

- TA introductions [10 mins]
- Speed networking [35 mins]
  - Meet 3-min with 10 students
  - Series of questions to guide conversation
  - Get to know many people
- Hand-Raised Study Habits Survey [5 mins]
  - Learn who works in compatible way to you
  - This will help you form study groups
- Demo of LaTeX Overleaf [15 mins]
  - Creation of template, compilation
  - Tool for all homeworks
- Math puzzlers [25 mins]

TA INTRODUCTIONS

Staff list

Professor Jérémie Lumbroso

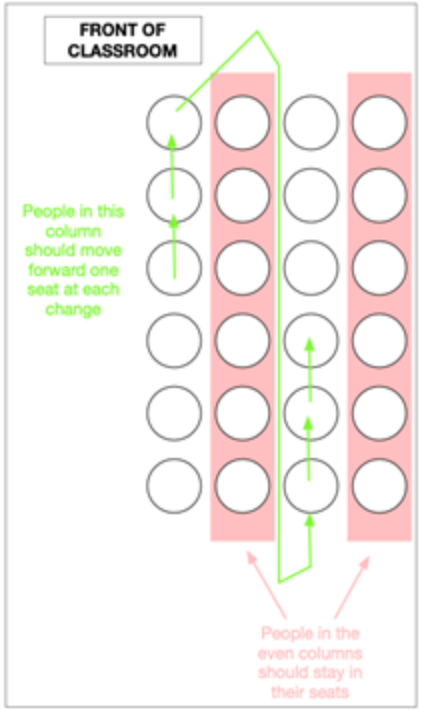
TAs:

Qianyue Ding
Tiffany Gao
Shutong Jiang
Samuel Pollock
Shenao Zhang

SPEED NETWORKING

Speed networking: **Get To Know Your Peers!** [35 mins]

- **Pair Up:** Find a partner and prepare to share.
  - People in even column, stay in same seat
  - People in odd column, move one in front, and circle back
- **3-Minute Intros:** Discuss academic backgrounds, interests, and more.
- **Switch & Repeat:** After 3 minutes, find a new partner and start again.
  - **Repeat 10 times**
- **Benefits:**
  - Meet multiple peers quickly.
  - Discover shared interests and backgrounds.
  - Foster a collaborative classroom environment.
  - Lay the foundation for future study groups and partnerships.



Speed Networking Script (suggested, pick questions you like)

"What drew you to the MCIT program?"

"Do you have any prior experience with math or computer science?"

"What's one non-academic thing you're passionate about?"

"If you could collaborate on a project, what topic or problem would you want to tackle?"

"What's a unique skill or perspective you bring to this course?"

"How do you handle challenging problems or concepts?"

"What's your favorite way to decompress after a tough study session?"

"Do you have any study habits or routines that work well for you?"

HAND-RAISED STUDY SESSION SURVEY

Study Habits Survey [10 mins]

- **Finding people with MATCHING STUDY HABITS helps find compatible collaboration partners**
- TA will slowly ask each question, like “Preferred Study Time”
- For each possible answer
  - TA will ask all people with this preference to raise **and hold** their hand **up**
  - TA pauses (10-20 secs) and asks everybody to look around
- Continue to next possible answer
- Once everyone has answered, pause and then continue to the next question

Students: Take note of people with your similar preferences

Preferred Study Time:
- Morning
- Afternoon
- Evening
- Late Night

Study Environment:
- Quiet Library
- Coffee Shop
- Group Study Room
- Outdoors

Study Methods:
- Flashcards
- Summarizing Notes
- Teaching the Material to Someone Else
- Practice Problems

Group Study Preference:
- Prefer studying alone
- Prefer studying in small groups (2-3 people)
- Prefer larger study groups

Focus Duration: How long can you study before needing a break?
- Less than 30 minutes
- 30 minutes to 1 hour
- 1-2 hours
- More than 2 hours

LaTeX DEMO

LaTeX and Overleaf [15 mins]

- LaTeX is a system to write documents with mathematical notations
- We will use it for all homework assignments
- We use **Overleaf**, runs in the cloud (like Google Docs but for math)
- We will provide **a template for each homework assignment**, to ensure your submissions proper format

Today, we are just showing you how to use Overleaf.
We will provide more help.

Some LaTeX basics

Special Characters:

- The backslash '\' denotes commands or escape special characters
- The dollar sign '$' is used to enter or leave inline math-mode
- The percent '%' sign is used to comment the remainder of the line
- Curly braces '{}' are used to tell LaTeX that "these things belong together"

- Import packages using the \usepackage{packagename} command

- Structure of ".tex" document:
  - Preamble: packages, macros, general info about document (i.e. title, author, etc.)
  - Document body: enclosed in \begin{document} … \end{document} tags

DEMO

DEMO of how to

- login to Overleaf
- use a template,
- compile,
- download PDF,
- modify the document.

Questions?

MATH PUZZLERS

Math Puzzlers

- Take a moment to form groups [1-2 mins]
  - 2 people to 5 people
  - TAs will walk around to confirm groups
- TAs will introduce problem ~1 min
- Individual thinking for 2-3 mins
- Then group discussion

Once time has run up, we move to next math puzzler, at end, solution will be given

GOAL: *Meet people and have fun while doing something math-related!*

The Four 4's Problem [15 mins]

Use exactly four 4's to form every integer from 0 to 20, using only the operators +, −, ×, /, () (brackets), . (decimal point) and ! (factorial, recall that $5! = 5\times4\times3\times2\times1$).

Example:

0 can be written as 4 - 4 + 4 - 4. Why?
1 can be written as 44/44. Why?

(This can be extended up to 100.)

The Farmer’s Dilemma [10 min]

A farmer has a wolf, a goat, and a cabbage.

He needs to cross a river, but his boat can only carry **him** and **one** of the three items at **a time**.

He can't:

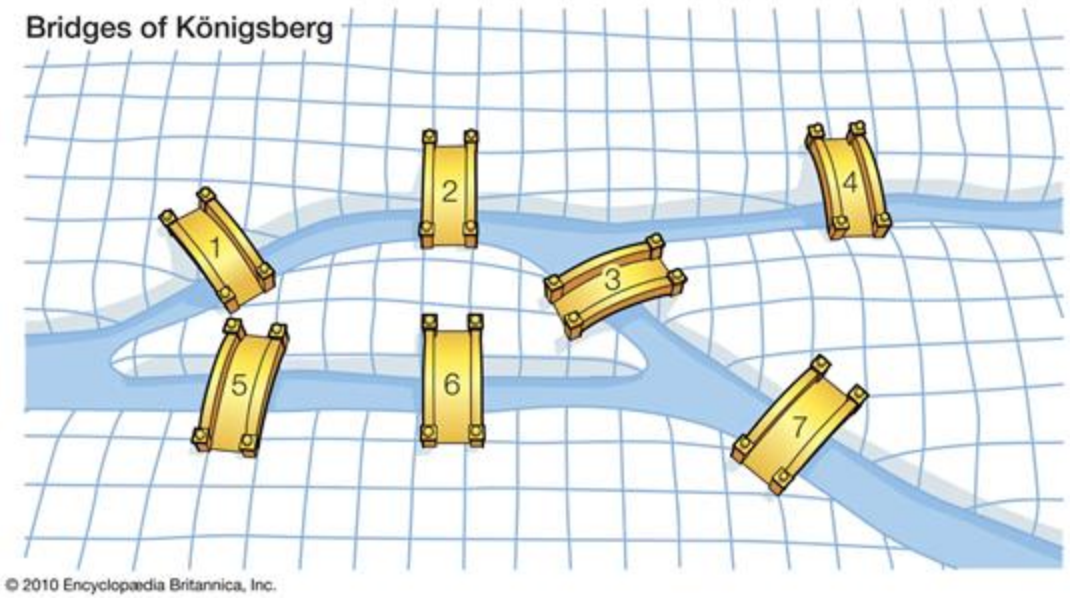
- leave the wolf alone with the goat (because the wolf will eat the goat),
- and he can't leave the goat alone with the cabbage (because the goat will eat the cabbage).

How can the farmer get all three items across the river safely?

Puzzle: Bridges of Königsberg [10 mins, skip if short]

Are you able to find a way to:

- Start somewhere
- Walk over each bridge exactly once
- Return to the initial place



Solutions

0 = 44 − 44
1 = 44 / 44 or (4 + 4)/(4 + 4) or (4/4) / (4/4) or ((4! − 4) / 4) − 4
2 = 4/4 + 4/4
3 = (4 + 4 + 4) / 4
4 = 4 × (4 − 4) + 4
5 = (4 × 4 + 4) / 4
6 = 4 × .4 + 4.4
7 = 44 / 4 − 4
8 = 4 + 4.4 − .4
9 = 4/4 + 4 + 4
10 = 44 / 4.4
11 = 4/.4 + 4/4
12 = (44 + 4) / 4
13 = 4! − 44/4
14 = 4 × (4 − .4) − .4
15 = 44 / 4 + 4
16 = .4 × (44 − 4)
17 = 4/4 + 4 × 4
18 = 44 × .4 + .4
19 = 4! − 4 − 4/4
20 = 4 × (4/4 + 4)

Take the Goat Across First:

- The farmer takes the goat across the river first and leaves it on the other side.
- This ensures that the wolf won't eat the goat when the farmer is away, and the goat won't eat the cabbage.

Return Alone and Take the Wolf:

- The farmer returns to the original side and takes the wolf across the river.
- He leaves the wolf on the other side, but he takes the goat back with him to the starting side.
- This ensures that the wolf doesn't eat the goat while the farmer is away.

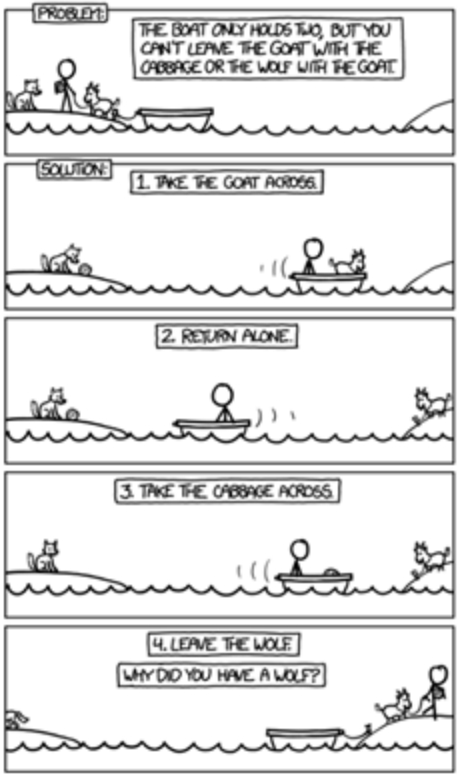
Leave the Goat and Take the Cabbage:

- The farmer leaves the goat on the starting side and takes the cabbage across the river.
- He leaves the cabbage with the wolf on the other side. Since the wolf won't eat the cabbage, it's safe to leave them together.

Return Alone and Bring the Goat:

- The farmer returns to the starting side one last time, leaving the wolf and the cabbage on the other side.
- He then takes the goat across, and now all three items — the wolf, the goat, and the cabbage — are safely on the other side of the river.

(This joke-solution by XKCD shows that sometimes **it is useful to revisit/change assumptions**)



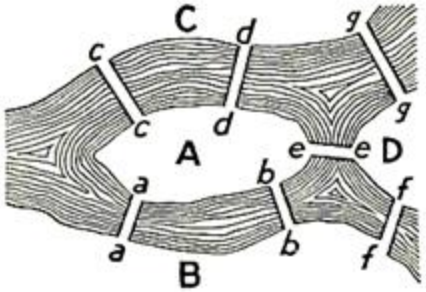
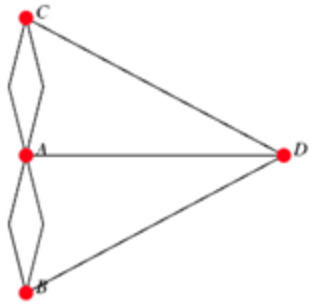


FIGURE 98. *Geographic Map: The Königsberg Bridges.*



Solving the Königsberg problem would require finding an "Eulerian circuit" in this graph: Which is NOT possible.

Welcome, lovely meeting you, and thank you!