

# Knuth and Gingerbread Appreciation Club: making advanced mathematics fun

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# Knuth and Gingerbread Appreciation Club

- Pun on a Russian idiom "*k-nut i pryanik*" (transl. "whip and gingerbread", similar to English idiom "stick and carrot").
- Reading club dedicated to Donald Knuth's "Art of programming".

# Goals

- Keep highly-motivated or/and able students in.
- Draw highly-motivated or/and able students in.
- Promote appreciation of mathematics and mathematics-specific values.
- Let students experience a **genuine mathematical process**.

# Constraints

- *Nomen est omen*: tea party should be part of a format.
- Therefore: department's room used for club meetings.
- Therefore: limited in-person capacity.
- No lectures! Meetings should be as interactive and inclusive as possible.

# Design

- **Focus on solving problems:** theory as a problem-solving tool.
- **No lectures:** Speaker for each session is nominated from student members.
- **Student agency:** speaker makes the choice of chapter to study for next session.
- **Resilience:** vice-speaker in case speaker can't make it.
- **Continuity:** vice-speaker automatically becomes speaker for next session.
- **No lectures:** Speaker presides over discussion, tells his own solution only if student members are stuck.

## Design (cont.)

- Mixed format: in-person & Zoom.
- Only 10 permanent members, who have in-person presence priority.
- Tea and biscuits. Student members in charge of bringing fresh biscuits (reimbursed from dept's funds).
- Biweekly meetings.

## Design: supervisor team

- Currently: 3 supervisors.
- Moderate the discussion.
- Provide general mathematical context.
- Intervene if and only if student members and both speakers are stuck (**No lectures!**).
- Foster a safe and respectful space and at the same time.
- Foster a vibrant, challenging discussion, by personal example as needed.

## Main result

- Club survived for four semesters.
- Club has a core of dedicated student members and a rather coherent community.

## Reasons for success

- **Administrative & material support:** room, storage space, workload for supervisors, credit for students.
- **Supervisor team:** academically and pedagogically diverse.
- **Adherence to core values:** genuine mathematical process, mutual respect.
- **Student pool of well-trained and/or motivated students:** not necessary, but makes things much easier.

## Challenges (incl. for replication)

- **Student turnover.**
- **Dependence on supervisor team.**
- **Growth problems.**
- **Scheduling.**

# Scheduling

- Schedule negotiation is hard.
- Schedule mismatch is a cause of student attrition.
- Recently KGAC got a fixed time slot.

# Supervisor team

- Supports core values.
- Pedagogically mature.
- Can provide broader mathematical context.
- Can work as a team.
- Charisma is not required, but helps tremendously.

This kind of task cannot be shoved off to a random teacher.

And this kind of activity is very intensive in terms of supervisor team's time.

# Student turnover / Growth problems

- Students can drop out because: lost interest, schedule conflict, need to prioritize etc. Some return, some don't.
- "Art of programming" is HUGE. New students have to catch up.
- Two choices:
  1. Older students are expected to bring the newbies up (common student-owned space YAY!), or
  2. We start a new iteration of the club.
- KGAC needs a better recruitment strategy: word of mouth doesn't work well enough.

Growth problems (cont.) Opportunity: odd weeks can be used to:

- Move to weekly schedule. Probably not enough time to prepare for next session, catch-up problem persists.
- Launch a parallel draft of KGAC. Avoids catch-up, but breaks the common space.
- Use it to read another source, maybe entirely unrelated, with the same design and probably the same people.

**THANK YOU  
FOR YOUR ATTENTION**