HEGL Proseminar / Seminar: Illustrating Mathematics (Groups and Symmetries)

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Concept

The goal of this seminar is that you are able to prepare and give a mathematical talk as well as that you are able to actively attend mathematical talks. Furthermore, that you are able to transfer some mathematical knowledge into visualizing geometric objects.

Logistic

The seminar slot is on Wednesday from 2.15pm–3.45pm. However, we will not meet every Wednesday but follow this schedule:

- October 18: First meeting, talks by Anja and Florent.
- October 27: Math talks by participants in the seminar.
- November – January: Work in groups on projects, possibility to attend HEGL open hours.
- November 29: Status meeting.
- January 10: Status meeting.
- January 24: Final presentations of the projects.

After October 8, you cannot cancel your talk any more without receiving a "fail" for the seminar. If you should be sick, please let us know as soon as possible so that we can find a solution.
Please meet with either Florent or Anja to discuss your talk at the latest on October 20.
The language of the seminar is English, so also talks should be given in English. A written report or a handout is not necessary.

Schedule of math talks

- October 18:
  1. *Introduction to Group Theory*, Anja.
  2. *Group actions*, Florent.
- October 27:
  1. *Symmetric groups and Platonic solids*, Johannes.
  2. *Isometries of the Euclidean plane*, Sebastian.
  3. *Wallpaper groups*, Caroline.

Most important rule for preparing a talk

A talk has to address the audience! Although this is obvious, it is not easy to follow this rule and it sometimes also gets forgotten during preparation. So it is a good practice to regularly remind yourself: You are giving this talk for the other participants of the seminar (not for Florent and Anja) and for them, it has to be interesting and understandable.

From text to talk

Different media work in a different way. So you should not just take the written text and read it aloud as a talk. You can (and sometimes should) definitely change the order of the content, add some explanations or examples, or shorten remarks that are less relevant for us. Keep in mind what your audience would already know and what the text perhaps assumes but would not be general knowledge in your audience.

Hints for preparing a talk

Do not underestimate the preparation time and start early to work with the text. This could be like:

- Read through the text leisurely, skipping details and proofs for now. Look for the big picture.
- Read the text carefully and note what is particularly important.
- Work out the connections between the topics in the text.
- Collect connections to topics outside of the text (for example to lectures, other talks, or similar).
- Make a rough structure for the talk.
- Read through the text again, now with all details.

- At the latest at this points, ask all your questions to Florent and Anja that you couldn't resolve up to now.
- Fill the rough structure of your talks with details. Don't be afraid to restructure at this point.
- Try out your talk in front of audience. Ask your test audience what they learned and use it to adjust your talk.
- Meet with Florent or Anja to discuss your plans for the talk. (Please come to us also with any question before that.)
- Adjust your talk. Remember at this point that you have learned a lot in the previous steps and now many things will be "obvious" to you that you have to explain to your audience carefully.

Once again: Always keep in mind that you are preparing the talk for your fellow students!

Time management

Don't go over time! Plan some time for short questions during the talk, so that you prepare more for 40 minutes than for 45. (If there is a long, productive discussion already during your talk, we can of course add this time afterwards and shorten the discussion phase instead.)
If you realize during preparation that your planned talk is longer than 45 minutes, don't solve this by speaking faster (think of the audience!) but by cutting out a part. It is an advanced trick to decide already during the preparation on a part towards the end which you can skip if you do not have enough time left.

Blackboard management

We strongly suggest to give the talk as a blackboard talk, of course with digital support whenever this is useful (for example to show pictures with the projector).
If you have not written much on a blackboard before, try out the writing (and erasing) in an empty seminar room. In particular, try out the best font size for your hand writing. Plan ahead which part of the talk you want to write where on the blackboard and when you want to erase the blackboard.

Active listening

Attendance in all talks is mandatory.
Moreover, you should not only attend the talk but also be active: Listen to the talk carefully and try to learn something. If there is something that you don't understand, ask about it. Recall that this talk is given for you. Please also don't hold back questions out of misplaced solidarity with the speaker.

In particular, you are encouraged to ask questions that are going beyond the presented topic. Of course we do not expect the speakers to be able to answer such questions in all details. Instead, we will discuss such questions together.

Feedback and grades

After the talk, we will have a mathematical discussion and a short feedback round.
The grades for the seminar, you will receive at the end of the semester.

Projects

After having given your talks, you will decide on a visualization project and work on this project for the rest of the semester.
There will be status update meetings in December and January and a presentation of projects on January 24.
(More information will follow.)