

# GeoGebra Builders' Meeting

or Make More Math Magic!

## Proposed audience

Above medium level users who want to learn techniques useful in building high quality apps with GeoGebra suitable for large scale work like book publishing, curriculum support or software integration. Also useful if you just simply want to level up.

## When

Tuesday 1 to Wednesday 2 November 2016 (during Week 44). It will be possible to participate both days, only Tuesday or only Wednesday. However, there will be different contents during these days. Exactly what will be covered on what day is still to be decided.

## Where

Stockholm – in Thorén Innovation School <http://innovationsgymnasiet.se/> at Löjtnantsgatan 25 A, 115 50 Stockholm <https://goo.gl/XO8CEu>. Participants are asked to handle their own lodging. This is a workshop meeting – not a conference.

## Minimum and maximum number of participants

From 6 to a maximum of 30 participants per day

## Course leaders

Jonas Hall, Svetlana Yushmanova and Anders Karlsson from the Swedish GeoGebra institute: <http://www.geogebrainstitut.se/kontakt/kontakt.asp>

## Cost

350 SEK per day. This covers the travel expenses for the course leaders and coffee. Lunch and Saturday dinner will have to be paid by the participants and are not arranged by the course.

## Registration

Register by sending an email to [jonas.hall@norrtaelje.se](mailto:jonas.hall@norrtaelje.se). You will then receive payment information in the confirmation email.

**Latest day for registering is Wednesday 19 October and latest time for payment is Friday 21 October.**

## Stuff to bring home

Participants will receive links to ready-made tools, script samples and GeoGebra sample files.

A GeoGebraBook with text, sample constructions and screencasts has been initiated and will be developed before, during and after this first meeting.

Link to book: <https://www.geogebra.org/m/t6v92Gdz>

## Contents

Approximately 5-6 different workshops over two days focusing on different techniques. Participants are invited to share their knowledge and help developing the GeoGebrabook. Proposed techniques include

### Overview

- Overview of action tools and their basic operations: Sliders, Checkboxes, Input fields and Buttons
- Using 2 graphic fields for for example:  
Graphic 1: `function[x^2+9,0,3] + A=Point[f] + poly1=rectangle created by the point`  
Graphic 2: `B=(x(A),poly) + trace on + move point A and plot A(x) as trace of B + locus`

### Sliders

- Controlling settings (i.e. for sliders etc) with variables. Fine tuning sliders. Sliders with uneven distribution of numbers, i.e. 1, 2, 3, 4, 5, 6, 8, 10, 12, 18, 24, 48, 96. Controlling rounding for texts and numbers.

### Boolean operators, checkboxes etc

- Boolean variables, conditional visibility and dynamic color.
- Different structures with checkboxes: Radio buttons, cascading check boxes
- $\in$  ("belongs to") to create games or "drag the label" exercises.  $C \in c$  works with both circles/conic sections and polygons.
- Time controls by using bipolar sliders and Boolean variables.

### Dynamic Text and positioning

- Caption magic: Using variables and LaTeX in captions and text. Using texts for captions and positioning them using point arithmetic. Different colors in caption:  
`$ (\fgcolor{3BA4D2}{%x},\fgcolor{4AAF57}{%y})$` (replace %x and %y with x(A) and y(A) for same effect in text.
- Dynamic texts and enhancements. How to make nice looking texts with negative numbers. Positioning texts dynamically. Dynamic texts within dynamic texts.

### Buttons and GG-scripting

- Basics:
  - Forward/Backward/Reset buttons with simple scripts
  - Conditional visibility for texts and other objects
  - onClick and onUpdate scripts.
  - Script to toggle visibility.
  - SetValue command.
- Random Exercises with RandomBetween and UpdateConstruction
- Scripting magic.
  - Make two points – drag one to move both and the other to change the distance between them.
  - Click a point to change the style of the point.
  - Create "solvers" for formulas.

### Spreadsheet

- Creating multiple objects.

- How to record data to the spreadsheet on the click of a button.
- How to create tables from spreadsheet with individually colored cells (LaTeX).
- Connect to construction protocol

## Tools

- Creating tools. Useful tools for builders. Tools as commands.
  - Text tools for minus sign handling
  - Marking points

## JavaScript

- A quick briefing on how to use JavaScript scripts, especially `ggbApplet.evalCommand("...")`.  
NOTE: This is not really to learn JavaScript as a programming language but only meant as a first introduction on how to use Javascript within GG and where to find more info. You'll come away with some sample scripts that you can later change and adapt for other purposes.
- A more in-depth look into how to use Listeners and program autocorrecting dynamic geometry exercises.

## If and list commands

- The If, Max, and Min commands. Creating input filters for variables
- List operations.
  - Spreadsheet regions as lists.
  - Sequence command to create multiple objects. Nested sequence commands.
  - Zip command
  - Texts in lists for variety of random answers.

## Making the Apps

- Locking things down. Unchecking selection allowed. Fixing objects.
- Creating default settings, creating default colours, producing templates

## Management

- Style templates - Creating default settings, creating default colours, producing templates
- Group management and setting editing rights for collaborative GeoGebraBooks.
- Working with GeoGebraBooks as a Publishing system for mathematical books. Brief mention of exercises and exam mode.

## Possible extras (depending on whether we learn them in time or not)

- XML hacks
- Could there be stuff in the command line parameters that builders would find useful?