



Aalto University, 12.04.2019/0

## ZERO GRAVITY – Assignment 01

### ARTS-ENG-PROJECT COURSE 2019

### Find a stable solution with the minimum amount of sticks

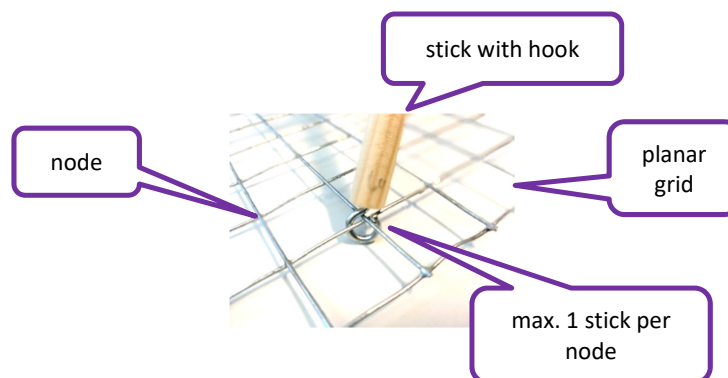
#### 1. Challenge.

- The task is to build a stable, physical model following the rules as described below. Can you connect the 2 grids with a **MINIMUM NUMBER** of sticks in a stable configuration?

Stable means that even when turning and rotating the model in all possible positions, the 2 grids are not changing their relation, the sticks don't move or turn, etc. Of course, the models will be a bit "shaky" because of the play in the nodes.

#### 2. Used material.

- It is allowed to use the provided steel grids, stick and hooks only.
- Do NOT deform the grids, keep them planar.
- NO glue, NO additional materials, NO cutting of grid, etc.



#### 3. Assemble.

- **Cut the stick** into pieces. There is no restriction in length or number of pieces.
- Screw the provided **hooks** into both ends of the sticks.
- Connect the 2 planar grids by the sticks only, and use the nodes of the grids to attach the

hooks (open and close the hooks with pliers) – see image

- ONLY **1 HOOK PER NODE** is allowed – see image
- The hooks represent a **spherical hinge**, which means that the hooks must not block the motion.
- the **GRIDS ARE NOT ALLOWED TO TOUCH** each other, or to be directly connected
- the **STICKS ARE NOT ALLOWED TO TOUCH** each other, or to be directly connected

#### 4. Make a strategy.

- Discuss possible strategies for solving the challenge.
- Write down what you think, why and what is the expected result
- Start simple and controlled.

e.g. Don't cut all sticks immediately. How to stabilize a mast? What are the geometrical constraints and related questions? Compare or search for similar problems, structures, ...

- Analyze fails and try to adjust your strategy accordingly

#### 5. Investigate, document and upload your results as a group to MyCourses.

- What are the results of your investigation?
- Take notes, write down your thoughts, take videos from the process, ...
- Document your approach. What is your strategy?
- Document also the failed experiments with photos, sketches, notes. Figure out why it failed.
- Think of
  - what input is missing,
  - what knowledge is needed for successful progress
  - how and where to receive the necessary input  
(consulting, workshops, lectures, ...)
- online submission by groups due Mon 22.04.2019, pay attention to cut-off date and time
- upload the **result of your investigation** as a
  - **NUMBER** in the online form
  - **VIDEO** (preferable avi/mp4, maximum 15 seconds, use good light and monochrom white background), when moving and rotating the model to demonstrate stability in all directions