

GENERATIVE AND GEOMETRIC MODELLING - 2019/2020 – 1st sem.

Professor Luís Mateus.

EXERCISE 3 (MiARQ – 4F)

5th of december 2019

Title: *“Interlocking vault”*

A. OBJECTIVES:

- Generalize the study of the geometric transformations.
- To understand and develop an interlocking method based in a planar pattern.
- To develop a strategy to communicate for fabrication.
- To link architecture, geometry, and materials.
- To develop the fluency with Rhinoceros software and Grasshopper plugin.

B. METHODOLOGY:

1st STEP – Conception

- Sketch a base shape, or shapes, that can interlock and fill a planar region

2nd STEP – 3D modelling / Rhino

- Model that base shape, or shapes, and fill a planar region.
- Assay topologic transformations of your filled planar region onto curved surfaces.
- Develop a support shape for the interlocking vault.

3rd STEP – 3D modelling / Grasshopper

- Import the filled planar region.
- Generate a parametric curved surface.
- Assay topologic transformations of your filled planar region onto curved surfaces.
- Bake 3 solutions including the elements of next step.

4th STEP – Extracting data / Grasshopper

- Create tags for all the individual elements of the transformed geometry.
- Consider a fabrication material and its specific weight and calculate the weights of all individual elements of the transformed geometry.
- Map all the individual elements of the transformed geometry into a planar region, and assign the respective tag, including weight information.

5th STEP – PDF Report

- Prepare a PDF report with no more than 5 to 6 pages describing and illustrating the work developed including all steps from one to three.

C. ELEMENTS TO DELIVER:

- Report in PDF format.
- One *.3DM file resulting from step 2.
- One *.GH file and one *.3DM file corresponding to step 3 and 4 of the work.

D. DELIVERY:

All the files should be zipped into one *.ZIP file according to the following notation

XXXXXXXX_N.zip

where:

XXXXXXXX corresponds to the student's number

N equals **3**.

XXXXXXXX_N.zip corresponds to the zipped folder where it was placed the files of the exercise.

The delivery limit date is the 20th of December. Send the files through Wetransfer.

E. EVALUATION CRITERIA

- Schedule compliance.
- Report:
 - Quality of the report in terms of language.
 - Level and quality of description including steps 1 to 4.
 - The maximum classification for the report is 4 points out of 20.
- Models and definitions:
 - Organization of the *.3DM files and *.GH resulting from steps 2, 3 and 4.
 - Level of development of the exercise.
 - Correctness of all the modelling process.
 - The maximum classification for the models and definitions is 16 points out of 20.

The exercise can be developed individually or in groups of two students.