All of you, students of MAT2VJ, have been coping with the problem of attitude representation. Attitude is difficult to understand because it is difficult to visualize. On this assignment you are going to fight against that.

The aim is to develop functions inside a graphical tool that allows to represent and therefore, more easily understand, attitude. To do that you will need to work with the different representations of the attitude, implement functions to transform between them and use this functions to virtually rotate an object. The graphical tool will be fed by the data coming from a mobile phone. Actual mobile phones provide attitude estimations by means of the use of integral rate gyroscopes, rate gyroscopes and/or magnetometers. The measure of the euler angles will be the input of the tool.

The graphical tool must include a front end with at least:

1. A plot area where the element under rotation (A cube by default, but you can experiment) is displayed.
2. A quaternion panel where the value of the actual quaternion is displayed.
3. An Euler angles panel where the values of the actual Euler angles are displayed.
4. An Euler angle/axis panel where the values for the euler axis direction and angle are shown.
5. A rotation matrix panel where the rotation matrix info is shown.

After reading the values of the euler angles coming from the phone, the tool must calculate in the background the equivalent rotation parametrizations and update them. With the rotation matrix you can update the position of the cube vertices and display on-line the cube moving.

To succeed you should follow the next guidelines:

1. Start thinking on what is the best way to organize the interface. **Make a conceptual draft.**
2. Identify, implement, test and report the functions that you will need. **Test the functions that you have implemented. Tests have to be present on the documentation.**
3. Make sure the tool works.
4. **Record a video** explaining its functionalities and demonstrating how your tool works.
5. Deliver the documentation of the tool, taking into account the points above and the link to the video **before** June 1st at 24.00h (CET).
6. Enjoy.