Criteria-A

# Defining the problem

My client is a geography teacher at Aula EE, he wants to teach in an easy way to children the contour lines. Normally this topic is very hard for those children that don’t know how to visualise thing in 3d in their imagination. It was hard for him to come up with an easy way to show them those lines in 3d space without having to work a lot.

In December 2018, he came to our Computer Science teacher with an idea: Build a table where kids could play with sand and the contour lines would be displayed over it. I offered myself to do this project and they gave it to me.

In order to discuss more the project, we made an interview. There we discussed what were his requirements.

# Success criteria

1. Sistem
   1. The system has to be easy to transport
   2. The projection has to be visible with an ambient light of 450lx (usual lighting in a well lighten)
   3. Sensor’s resolution has to be equal or greater than the projector
   4. The system must be plugable
   5. The system has to have internet connection
   6. The system has to work at ambient conditions
   7. Software
      1. At the product
         1. Capableof generating the image in real time
         2. Capable of sending the images to the computer via an app or a web
         3. Think about the option of autocalibration if it is deconstructable
      2. Associated PC
         1. Capable of showing the images in real time
         2. Capable of storing the images if required
         3. It has to be able to customize:
            1. colour pallet(B&W or colour)
            2. The distance between the contour lines:

Initial target 10cm( 5 levels of colours)

Advance target: until 1 cm(50 levels of colours)

* 1. Hardware
     1. Only has to plug one cable (Inside of the housing there can be the associated transformers)
     2. The driver associated with the connection to the internet through wifi or ethernet
     3. The driver associated with the scanner 3d
     4. The driver associated with the projector
     5. The driver associated with the camera
     6. Electronics that receive the data from the 3d scanner and transforms it into data interpretable to the computer and projector
     7. (Optional) The inclusion of the sub-systems HMI (Human-Machine Interface) that let the user know the state of the product (On-Off, state de transmission, etc) without having to use the PC associated.
  2. Mecanics
     1. Approximate dimensions of the base: 0,5x0,5 m
     2. Usage of materials that let visualize the images with ceratin quality
     3. Usage of lightweight materials

# The rationale for Proposed Solution

From my point of view, the best solution to this problem is to have a computer in the table where we process the data and generate the image for the projector. In this computer, we should also have an apache server for the website. The PC associated would access the table through that webstite. The 3d scanner that I will use will be the xbox kinnect because we already had

The language for code for the image generation will be python because there are already libraries that support the xbox kinnect and 3d rendering. It is also a very adaptable language, this makes it easyer because I can use it also for OOP and it has a very simple syntax.