Exercises (2nd Day)
(Hough Transformation)

**Exercise 1:** Open the "data/geometry.png" image. After binarizing the edge image, write a method that implements the Hough-Transformation for straight line detection.

**Note:** Take care to use reasonable value boundaries for your Hough parameter space.

Visualize the parameter space. Try different quantizations of the parameter space and observe the effects. Now, apply the same steps as before to the image "data/geometryNoise.png". Does the parameter space representation change significantly? What conclusions can you draw for the properties of the Hough transformation?

**Exercise 2:** Implement the inverse Hough Transformation.

For simplicity choose the top $k$ values from the accumulator grid in your Hough parameter space. Usually you would have to decide on a meaningful threshold instead of choosing the top $k$ values. Here, we know that we are looking for approximately 12 edges.

Plot the resulting lines (in the original images). You can then visualize them using the opencv line drawing function.

**Optional:** Typically, in your inverse transform there is more than one line approximating a given edge. Implement a solution for this issue.

**Optional:** The resulting lines have no fixed start or end point, try to find a solution for this issue.