Photogrammetric Computer Vision (PCV)
Assignment 3
Camera Calibration using Direct Linear Transformation (DLT)

Gruppe 18
Members:
Balkis Saidi (124785)
Ahsan Qadeer (123892)

Task1:

a) Three white sheets were taken and joined to provide the effect of a 3D plane, this forms our acquired calibration object. The lines joining the sheets reflect the x, y, and z axes.
b) The technical information of the used camera :
   type: Phone camera
   resolution: 13 megapixels
   The ratio of the lens opening to the focal length: f/2.2

Task2:

a) The image below shows how we defined the axes of the object coordinate system.
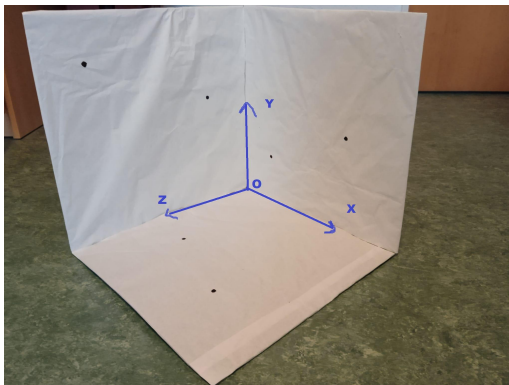
The point O (0,0,0) is the origin of the coordinate system, the orientation of our coordinate axes is the right-handed coordinate system, and the angles between the x,y, and z axes are respectively 90°.
b) We measured the object coordinates with a ruler with +/- 1 mm precision.

Task4:

a) Exterior orientation:
- Location of the projection center C (x, y, and z): (569.23, 351.33, 471.54)T [mm]
- Spatial rotation angles in Omega= 32.65° , Phi= 41.25°, and Kappa=25.78°.

Interior orientation:
- Principal distance: the perpendicular distance of the projection center to the image plane :1558.7 [pix]

- Principle point (x and y):(1074.4; 657.35) the section of imaging axis with respect to the image plane.
- Aspect ratio: of the image axes = 0.98
- Skew factor: 31.365
- Shearing angle: of the image axes. (skew factor/principle distance) = 88.84°

b) The camera orientation is determined almost precisely and the quality depends on the different parameters.