ITS8030 2021 HW3

The task is divided into 3 parts:

1) **Use the asymmetric chessboard and asymmetric circles patterns to compute the intrinsic camera parameters matrix, i.e. camera calibration parameters.**

Camera calibration parameters include the camera matrix and distortion coefficients. Distortion formulae are described in the material referenced below. In the lectures we have considered rectified images, i.e. images from which the distortions have been removed. Store the code and appropriate images in the shared repository:
https://gitlab.cs.ttu.ee/its8030-2021/3dcampus
in a subdirectory (where you should replace "uniid" with your actual UniID)
`uniid-calibration`
Put the actual code you use into a file `calibration_code.py`
Store the calibration matrix results obtained by running caliblration in a file `calibration.xml` using the following XML format:

```xml
<camera_matrix type_id="opencv-matrix">
<rows>3</rows>
<cols>3</cols>
<dt>d</dt>
<data>
6.5746697944293521e+002 0. 3.1950000000000000e+002 0.
6.5746697944293521e+002 2.3950000000000000e+002 0. 0. 1.</data></camera_matrix>
<distortion_coefficients type_id="opencv-matrix">
<rows>5</rows>
<cols>1</cols>
<dt>d</dt>
<data>
-4.1802327176423804e-001 5.0715244063187526e-001 0. 0.
-5.7843597214487474e-001</data></distortion_coefficients>
```

Follow the procedure described here:
https://docs.opencv.org/4.5.4/d4/d94/tutorial_camera_calibration.html
An idea how to convert it to python can be found here:
https://docs.opencv.org/4.5.4/dc/dbb/tutorial_py_calibration.html
Additional reading: Chapter 18 from the OpenCV 3 book.

2) **Take at least 20 snapshots from different viewpoints of the Mektory building and 20 snapshots from different viewpoints of the IT College building.**

Add the images to the
https://gitlab.cs.ttu.ee/its8030-2021/3dcampus
repository into a subdirectory with your UniID.
Take the images with the same camera that you calibrated in the previous task. NB! Please make sure the image names do not contain any spaces or nonalphanumeric characters not belonging to the ASCII character set.

3) **Take at least 20 snapshots from different viewpoints of the Mektory building and 20 snapshots from different viewpoints of the IT College building with a thermal imaging camera.**

Write the temperature range into imagename.yaml file next to each image where mintemp and maxtemp are numeric values in a root object. Add the images to the

https://gitlab.cs.ttu.ee/its8030-2021/3dcampus
repository into a subdirectory with your UniID.
Take the images with the same camera that you calibrated in the previous task. NB! Please
make sure the image names do not contain any spaces or nonalphanumeric characters not
belonging to the ASCII character set.

Additional reading: Chapter 19 from the OpenCV book.
Chapter 11 in Szeliski's Computer Vision: Algorithms and Applications 2nd edition.