

# Lab 1: OpenCV-Python basics


---

**Due** Aug 31, 2020 by 4pm      **Points** 10

**Submitting** a text entry box, a website url, a media recording, or a file upload

---

This is a hands-on lab assignment to be done in class, in teams of two, that will be graded on a complete/incomplete basis, and must be turned in before the next class for credit.

This exercise is to be done using the functions in OpenCV. Write a Python program to read the video “earth.wmv”, which is on the course website at this link: [earth.wmv](https://elearning.mines.edu/courses/25410/files/1952332/download?download_frd=1)  ([https://elearning.mines.edu/courses/25410/files/1952332/download?download\\_frd=1](https://elearning.mines.edu/courses/25410/files/1952332/download?download_frd=1))

Assume the camera that took this video has the following parameters: The focal length is 500 pixels, and the principal point is in the center of the image.

You have four points in camera coordinates which form a square. Their starting locations are:

- P1: (X,Y,Z): (-1.0, -1.0, 1.0)
- P2: (X,Y,Z): (+1.0, -1.0, 1.0)
- P3: (X,Y,Z): (+1.0, +1.0, 1.0)
- P4: (X,Y,Z): (-1.0, +1.0, 1.0)

For each frame in the video, project these four points onto the image and draw a red dot or marker at each point. After each frame, add 0.1 to the Z coordinate of each point, so that the square appears to recede into the distance. Finally, write the frame number on the image in the top left corner.

Write out a video with the graphic overlays and upload it to Canvas. Or, post your video on YouTube and upload the link to the video to Canvas (make sure the video is viewable!) Each person on the team should upload to Canvas.