**Hw #4: Due Sunday March 11ᵗʰ by midnight EST**
This homework will look at the role and use of calibrated cameras for simple photomosaicing. We assume throughout that you will be using your camera phone for all the imaging associated with this homework.

1. Camera Calibration. Take a look at the [Caltech Camera Calibration](#) toolbox. Print out a calibration pattern and stick it firmly to a really flat object. Now take pictures of the calibration object from different angles while making sure that the calibration object fills most of the image. Use the example that is provided to figure out how to calibrate your phone camera. Try and make sure that the reprojection error after calibration is reasonable.
2. Now go out on Forsyth street and take multiple, overlapping images of the mural on the Latino Students Center building. You should have at least five or six images.
3. Compensate these images for the intrinsic camera parameters you have derived from your camera calibration exercise.
4. Play with the harris feature detector file provided with his homework (note you also need the convolve2.m file - also provided) to get features well distributed across the image.
5. Use the Matlab example code to figure out how to make a panoramic mosaic of the entire building but make sure you use the harris detector that has been provided as opposed to the feature detector the Matlab example uses. Also estimate the position at which each camera was located.
6. Finally blend the images into a composite mosaic.
7. Now repeat the mosaicing exercise (should not have to recalibrate the camera) with images of a cinder block wall just like the example shown in class (again use 5-6 images that overlap by about 50%).
8. Collect one last set of images (of any other piece of graffiti art anywhere on campus) where the overlap is considerably smaller (say 15%). Does your mosaicing algorithm still work? What changes if any did you have to make.

## Submission Instructions:
Put all the data, matlab scripts and any other relevant files in a folder called "lab4" in your gitlab repository.
- Add, commit and push your files to the gitlab server
- Go to gitlab.com and verify that the files you have committed, show up there.
- Upload your gitlab link and a pdf file of the slides to Blackboard
- Email the TA and instructor with "EECE-5698 Lab #4" in the subject line.

### Individual Projects
Also think about your individual projects. As we discussed in class I want you to come with a robot that solves an interesting problem and give me a detailed design focusing on Power, System Architecture, Sensors and Navigation. You can bounce project ideas off of me anytime before the due date. On Sunday March 11th by Midnight EST you need to send me a two line description of your proposed project. Failure to submit your idea by the deadline will automatically lead to a lower grade.