

1. Calibrate your phone camera. (20 points)

→ Download the checkerboard calibration pattern from the website below :-

<http://www.vision.caltech.edu/bouguetj/calibdoc/htmls/pattern.pdf>

→ Place the two patterns in an orthogonal position. (eg. against a wall)



→ World coordinates $\begin{bmatrix} u_w^{(i)} \\ y_w^{(i)} \\ z_w^{(i)} \end{bmatrix}$ can be measured using a ruler on the checkerboard.

→ For image coordinates $\begin{bmatrix} u^{(i)} \\ v^{(i)} \end{bmatrix}$, click

→ For image coordinates $\begin{bmatrix} u^{(i)} \\ v^{(i)} \end{bmatrix}$, click a picture using your phone camera and on that picture find out the corresponding pixel coordinates.

→ Solve for **matrix P** using these world and image coordinates.

A minimum of 6 points correspondence is needed to solve for P.

→ Finally you have to find out **M_{int}** and **M_{ext}** matrix for your phone camera.

→ Compare your computed M_{int} and M_{ext} with any inbuilt library function.