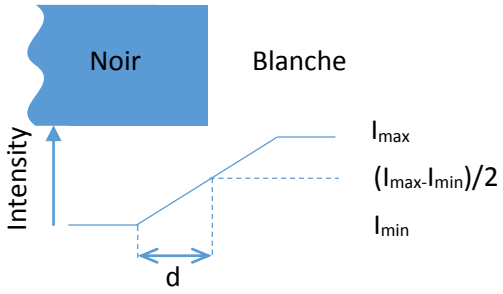
Read this reference and try the tutorials:

The parts in bold should be done in class. The other parts should be done afterwards (at home/in your office) using ImageJ.

A) **–Set up the inverted microscope by aligning all optics as done in class.**
B) **–Note the NA for the following objectives: 4x, 10x, 30x, 40x, 60x and the condenser.**
C) **–Using the following objectives: 4x, 10x, 30x, 40x, obtain an image of the micro ruler. (Note: make sure the printed side of the glass slide is close to the objective).**
-Using ImageJ, calibrate the images for each objective by obtaining a pixels/distance ratio (ie, 600 pixels/mm).
-Given that the calibration ratio is directly proportional to the objective zoom, calculate the calibration ratio for 60x. Make the calculation 4 times (using 4, 10, 30, 40x objectives) and take the average.
D) **Find a pattern on the photomask provided with a series of dark/bright regions. Obtain an image of this pattern, using 4x, 10x, 30x, 40x to measure the interface between a dark/bright edge.**
E) **Using the 60x oil objective, obtain images in the same region using the following conditions:**
-Move the NA slider on the objective to 0.65 (the minimum) and obtain an image at the dark/bright interface.
-Change the NA slider on the objective to 1.25 (the maximum) and repeat the above measurement.
F) Using ImageJ make a line profile at the interface of one of the dark/bright features. Note the intensity maximum (I_{max}) in the bright region and minimum (I_{min}) in the dark region. The light intensity should change rapidly at the interface, but there will be a zone where an intensity gradient exists. Find the distance d as shown in the figure below. This is the minimum size of a feature that can be resolved (resolution). Note you will have to use calibration ratio acquired in (A) to obtain a distance d in units of length. Plot your results on a bar graph for each measurement.



G) Explain how this measurement in (E) relates to the diffraction limit (refer to this reference). Compare each measured d in section (E) with the resolution given by: resolution = $1.22\lambda/(NA_{obj}+NA_{cond})$.