Digital Image Processing
UPEC - Optics, Image, Vision and Multimedia

1. Morphology

1.1. Structuring element

The function to define a structuring element is *strel* in Matlab and you can achieve the same functionality using *skimage.morphology* or *cv2* (OpenCV) in Python. . Try to define the classic V4 and V8.

1.2. Erosion/dilation

The functions to used are *erodion* and *dilation*, after having chosen the structuring element as before. Apply these functions to *'shapes'*. Remember to work on a binary image obtained after thresholding.

Is it possible to obtain some settings in order to obtain two different images, where it becomes possible to count (visually first) the diagonal and circular objects? Is it always possible with *'shapes2"*?

1.3. Closing/Opening

The functions to used are *closing* and *opening*. Try to treat the image *'eng'* in order to be able to count (visually first) the number of exterior teeth? How *binary_fill_holes* could be used to improve these treatments? Is it always possible in '*eng2"*?

1.4. Top-hat use

Try to automatic threshold the image '*I12'*. Before this step, apply the top-hat transformation *white_tophat*. Try it using a disk structuring element of radius 40.