

## Image Processing Sample Questions

1. Assume an image contains very bright pixels. Design a mapping function to enhance the contrast of this image.
2. Assume the histogram of an image contains values at the dark and bright sides (but no pixel at the middle). What is the best way for equalizing this histogram?
3. Assume noise in the form of line segments with a specific slope is added to an image. Propose a method for removing this noise in
  - a. Spatial domain
  - b. Frequency domain
4. Show how the Harris corner detection works using an example
5. Modify Hough transform to detect ellipses
6. Region growing is used to segment an image into multiple regions. Assume gray level values at a given range define each region ( $a < G < b$  for instance defines a region assuming that the pixels in this region can take gray level values between  $a$  and  $b$ ). Propose a method to estimate the initial seed points (the number of regions is not known)
7. Blob coloring is used for segmenting binary images.
  - a. How can we determine the area of each blob?
  - b. Can we use the area to eliminate salt-and-pepper noise?
8. Given the signature representation of an object, how can we detect the object in an image?
9. Assume an object boundary is represented by its Fourier descriptors. Using an example show how we can eliminate minor details to obtain a simpler representation while preserving the main form of the object.
10. Explain how Morphological operators can be used for noise removal
11. Define a simple deformable model to detect a half-circular shape (may be rotated). What will be the energy function?