Project 4A Simulation of CT Projection Data

I. Image Rotation

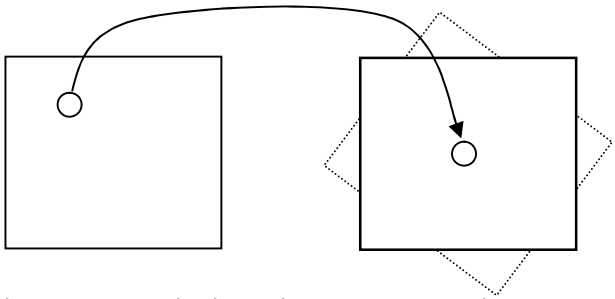
- Computation of new coordinates

$$x_n = x_o \cos\theta - y_o \sin\theta$$
$$y_n = x_o \sin\theta + y_o \cos\theta$$

- Note
  - The center of rotation must be specified.
  - If new coordinates are outside of the image area, what do we do?

II. Mapping of Pixel Intensities

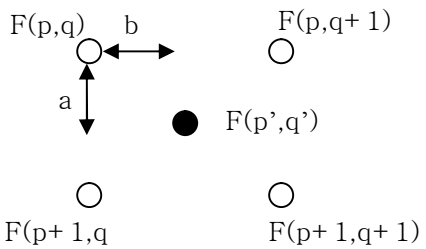
- To rotate an image, compute new coordinates of each pixel



- In implementation, think in the reverse way, how to get the pixel value in the new image from the old image.

III. Image Interpolation

- Bilinear Interpolation



$$F(p',q') = (1-a)[(1-b)F(p,q) + bF(p,q+1)] + a[(1-b)F(p+1,q) + bF(p+1,q+1)]$$

IV. Simulate Projection Data