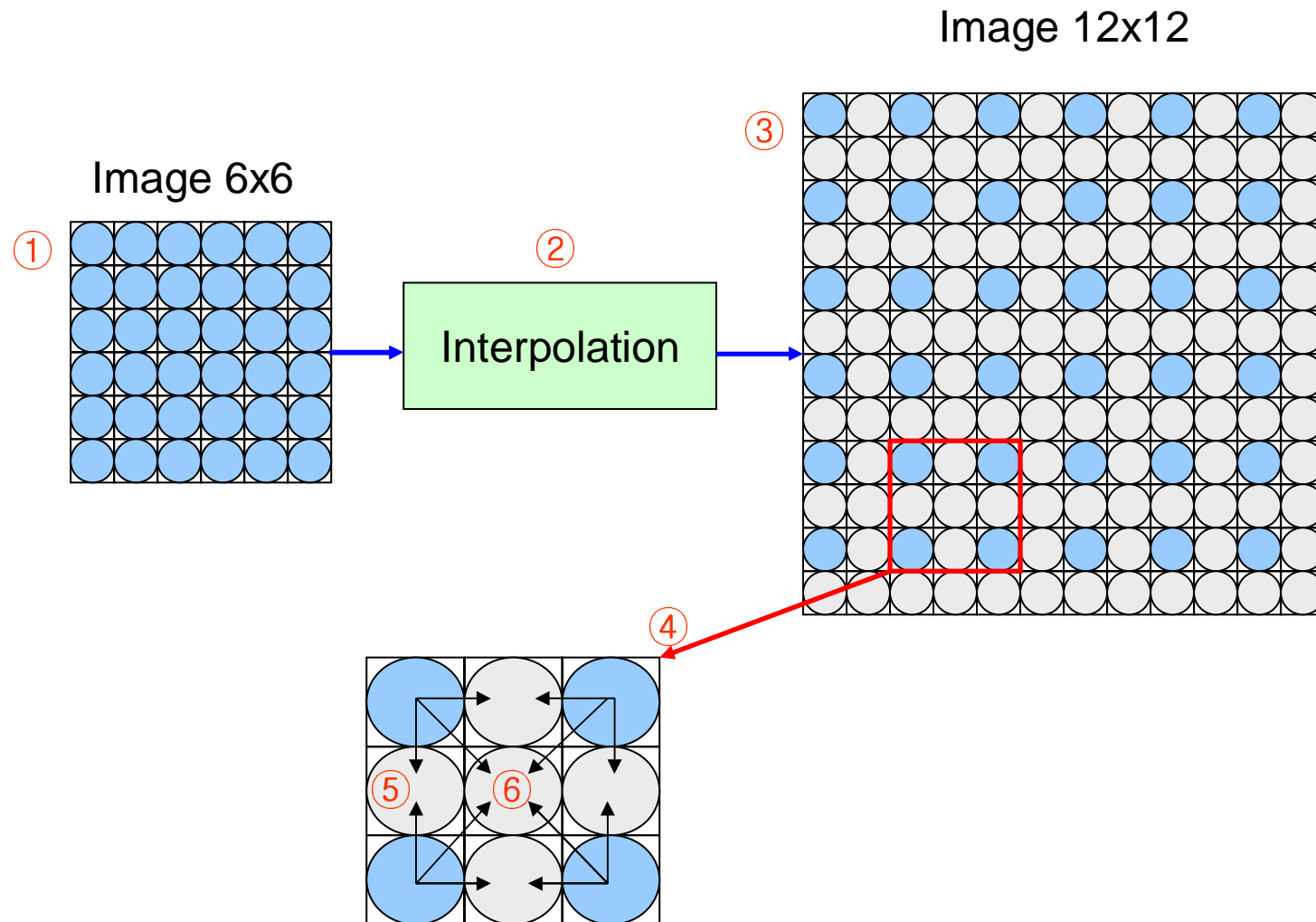


Resizing Images (Interpolation)

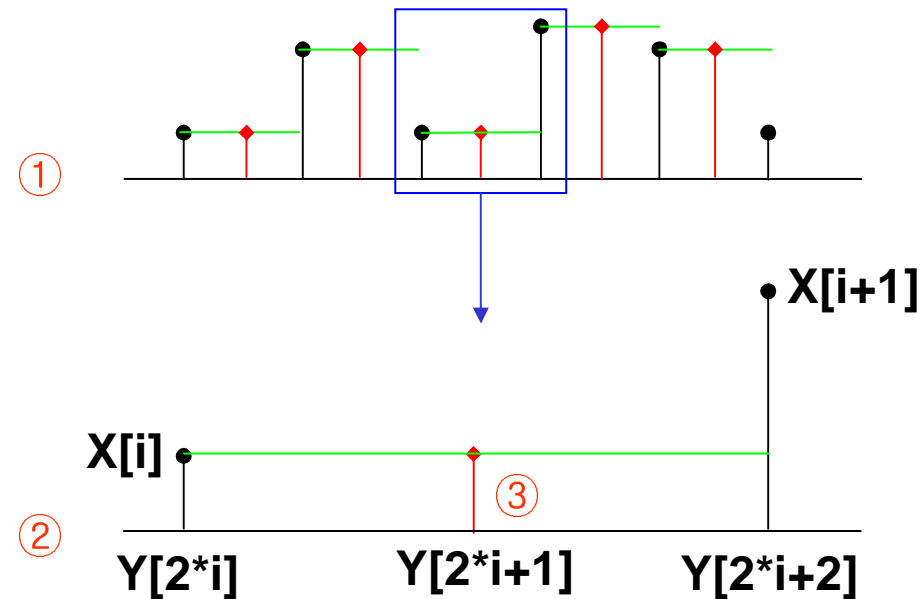


Hoon Yoo, Ph.D.

Image Resizing Using Interpolation



Zeroth Order Interpolation

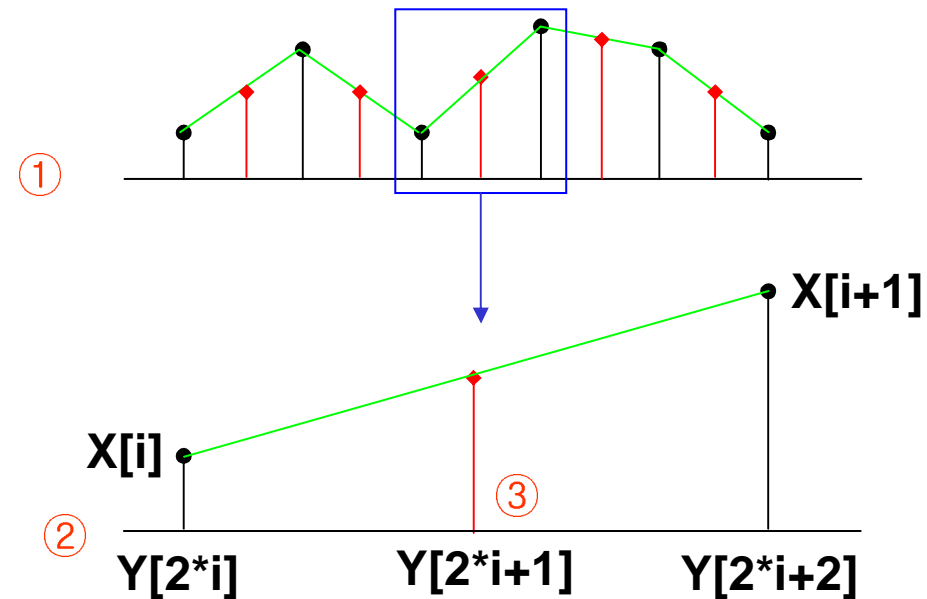


$$Y[2*i] = X[i]$$

③

$$Y[2*i+1] = X[i]$$

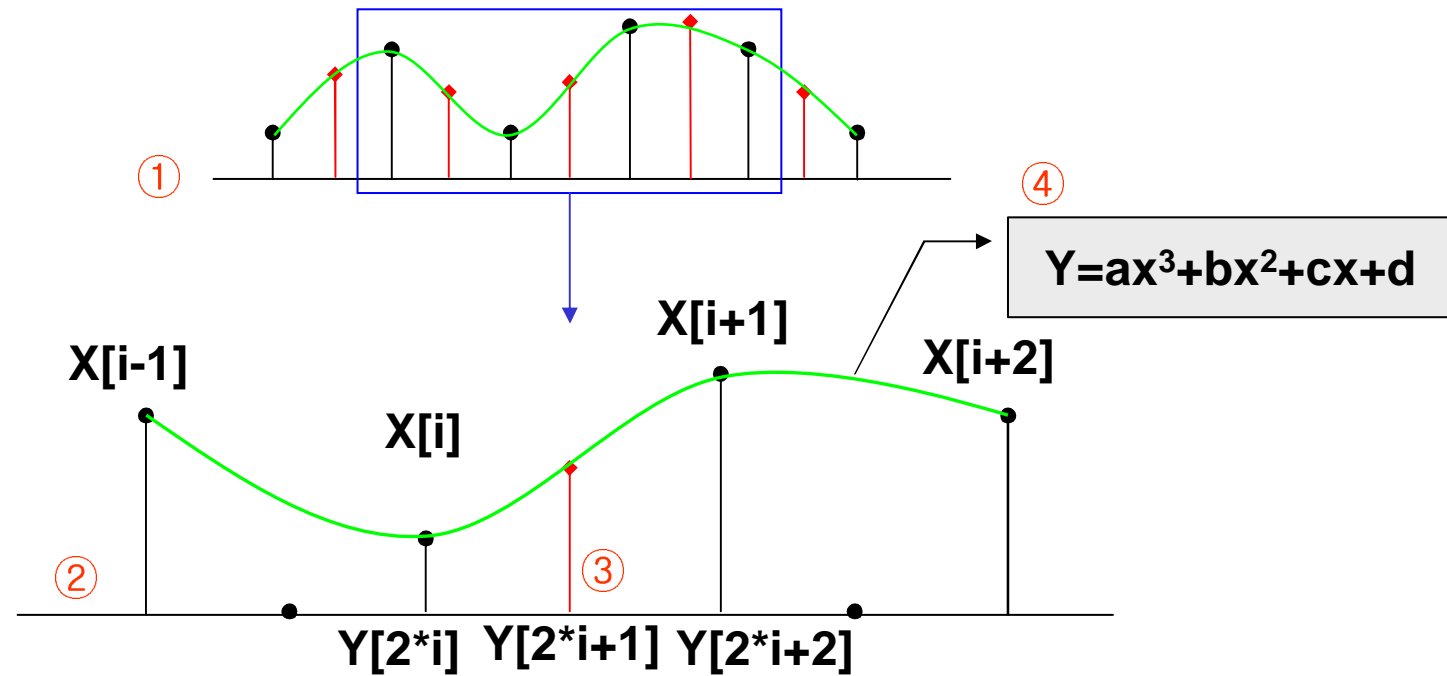
Linear (1st) Interpolation



④

$$Y[2*i+1] = (X[i] + X[i+1])/2$$

Cubic (3rd) Interpolation



⑤

$$Y[2*i+1] = (-X[i-1] + 9*X[i] + 9*X[i+1] - X[i+2])/16$$

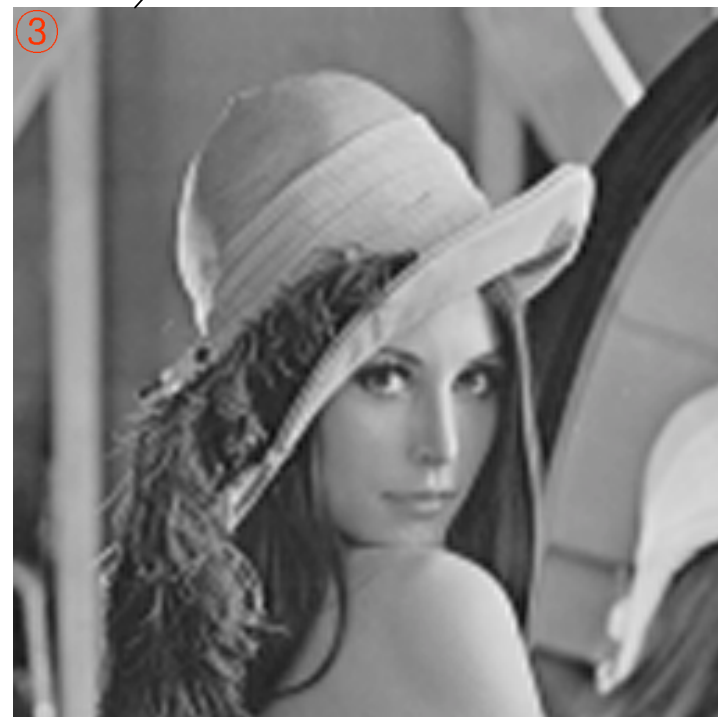
Example for Resizing Images



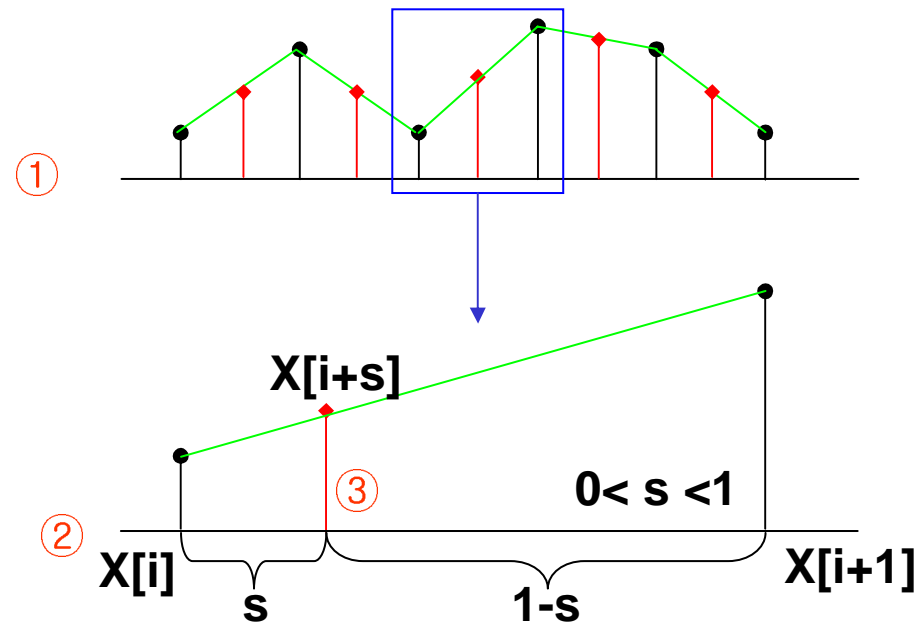
Zeroth order



Linear



Arbitrary Size Conversion Using Linear

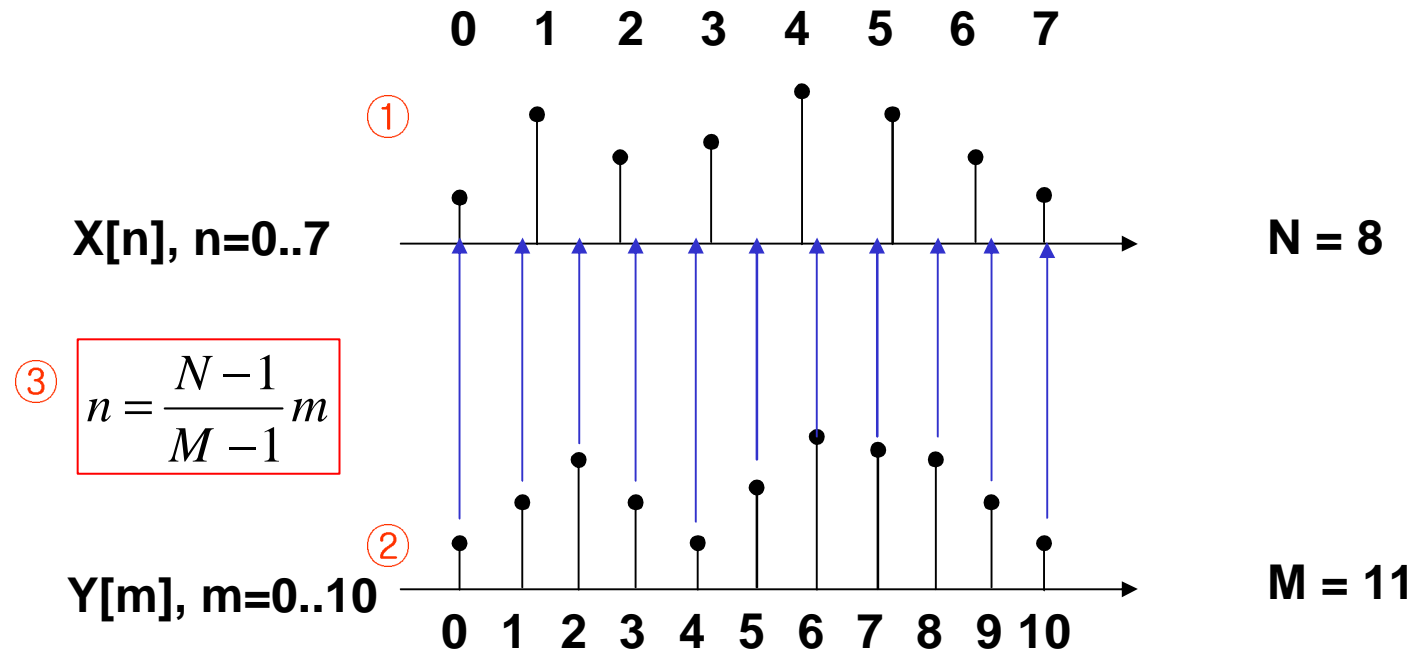


④

$$X[i+s] = (1-s)*X[i] + s*X[i+1]$$

$$X[2.15] = (0.85)*X[2] + (0.15)*X[3]$$

Arbitrary Size Conversion Using Linear



$$Y[0]=X[0.0]$$

$$Y[4]=X[2.7]$$

$$Y[8]=X[5.6]$$

$$Y[1]=X[0.7]$$

$$Y[5]=X[3.4]$$

$$Y[9]=X[6.3]$$

$$Y[2]=X[1.4]$$

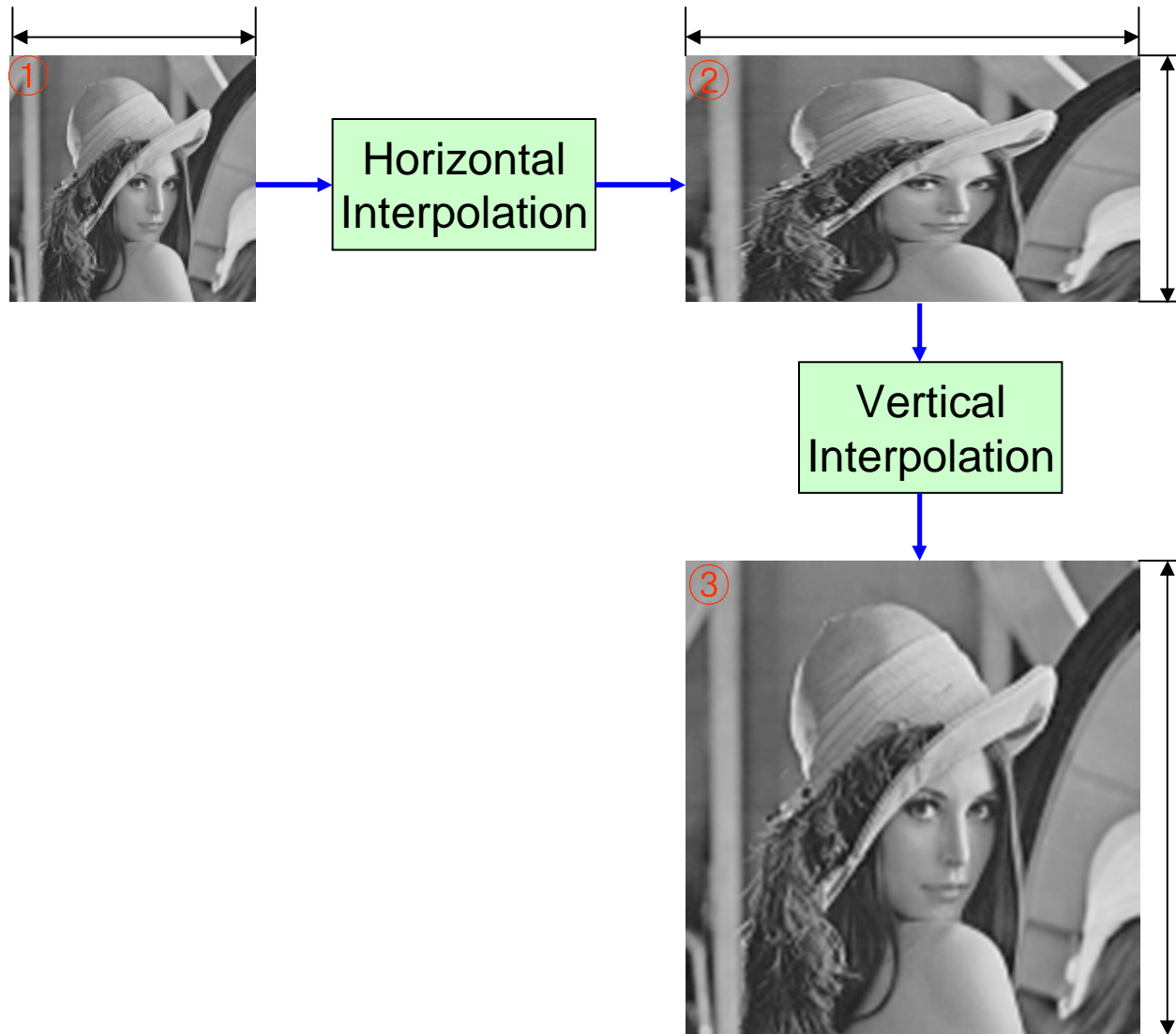
$$Y[6]=X[4.1]$$

$$Y[10]=X[7.0]$$

$$Y[3]=X[2.1]$$

$$Y[7]=X[4.8]$$

Example for Arbitrary Size Conversion



Summary

- Image Interpolation
 - Zeroth order, Linear, Cubic
- Arbitrary size conversion