lec5-1-floodfill-2018-2-22.ppt

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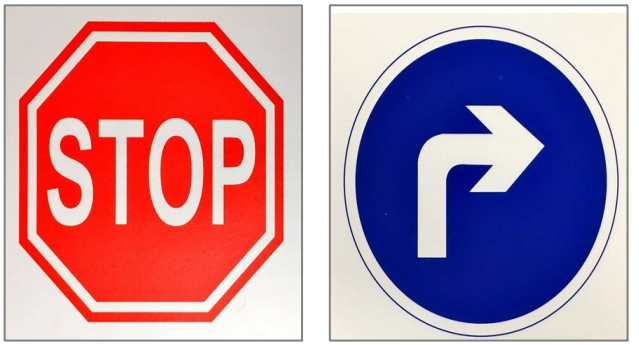
Intro to Moments for Objects Recognition



Objectives: Develop a technical to detect different shaped, different color, different size objects

Image Acquisition

Preprocessing (1): 2D Gaussian Convolution

Features Extraction 1

Features Extraction i

Moments

Feature Vector V(v1,...,vk)

Feature Vector Learning

Decision Making

Flood Fill Algorithm

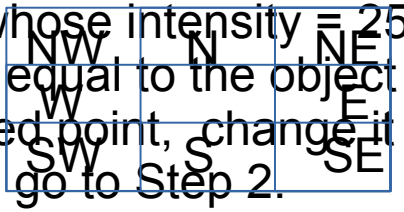
Note: Define 8-connected neighbors, N, NE, NW, S, SE, SW, E, W;

1. Find a “seed” point from an object (e.g., whose intensity = 255), change it to new color (label), and save this seed location (x,y);

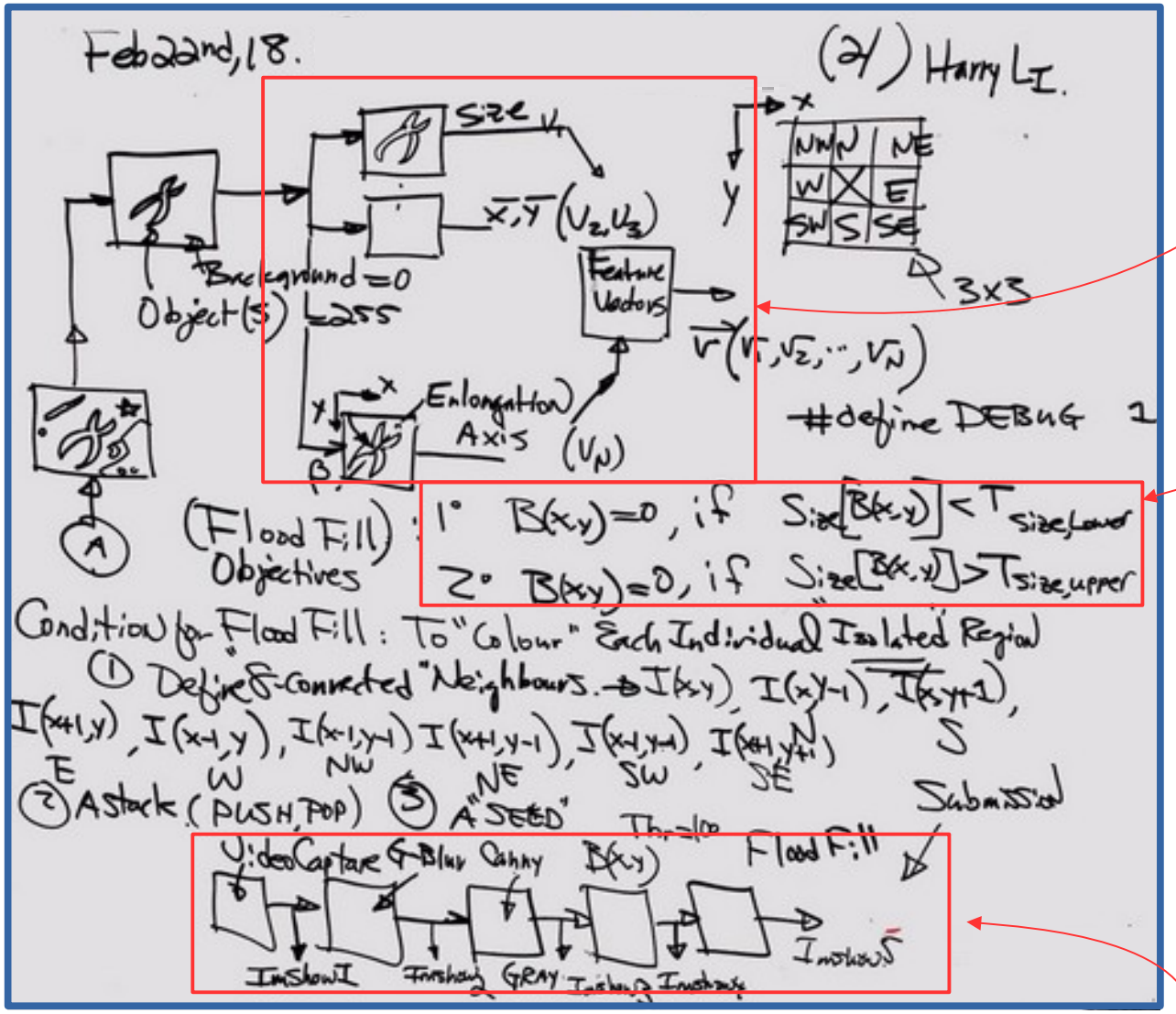
2. Then visit N to see if it is the same color as the previous color of the seed (before seed color changed to “1”), if yes, then push its location (x,y) into a stack, and then change its color to the same new color (label) as the new color of the seed to indicate this pixel being visited; continue this process till all the 8-connected neighbors were visited;

3. Then pop up (x,y) of a saved pixel from the stack, treat this pixel as a new seed point, go to Step 2, and continue.

4. If the stack is empty then it means this connected region has been colored, so go back to step 1, read the seed location (x,y) and continue to scan the image in a left to right, top to bottom fashion. If no new pixel whose intensity = 255 is found, then flood fill is finished. Otherwise till the next pixel equal to the object (its intensity = 255) is found, and make this pixel as a new seed point, change it to new color (label), and save this seed location (x,y); Then go to Step 2.



Preprocessing: Binarization Before Flood Fill

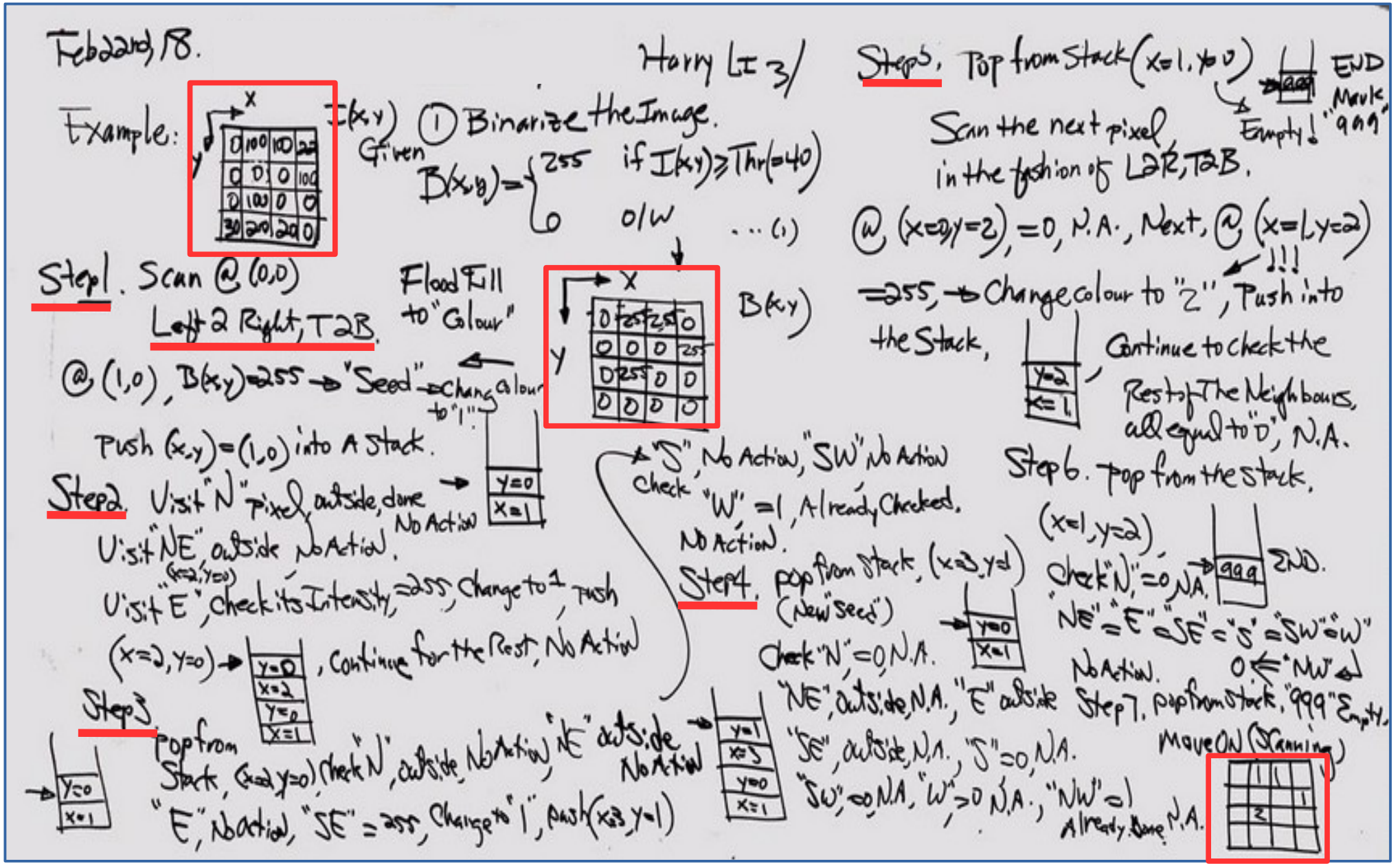


Moments computation to construct feature vectors

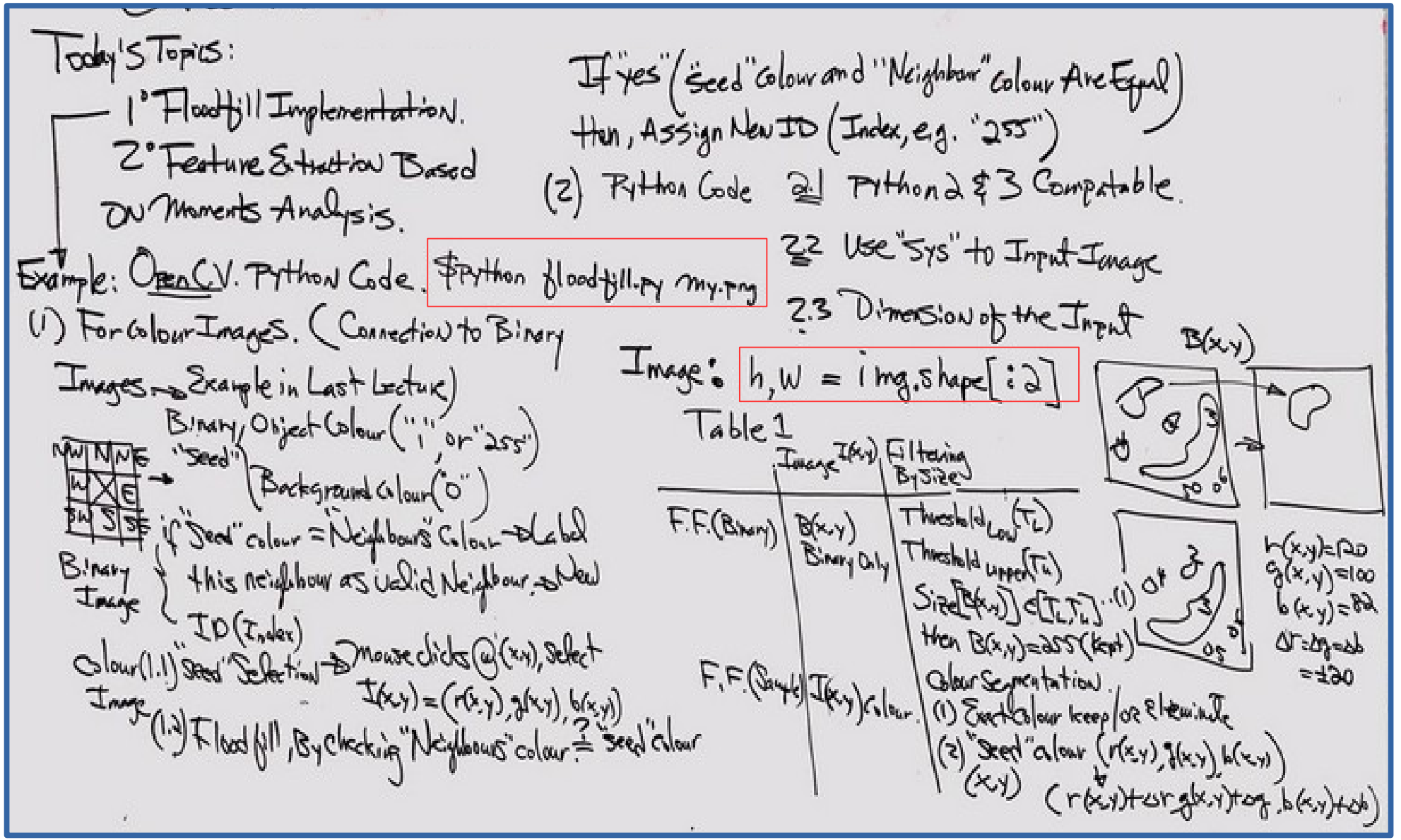
Selective removal capability

Preprocessing steps: (1) histogram equalization, (2) Gaussian; (3) Canny edge detection; (4) binarization; (5) flood fill filtering; Then (6) moments computation

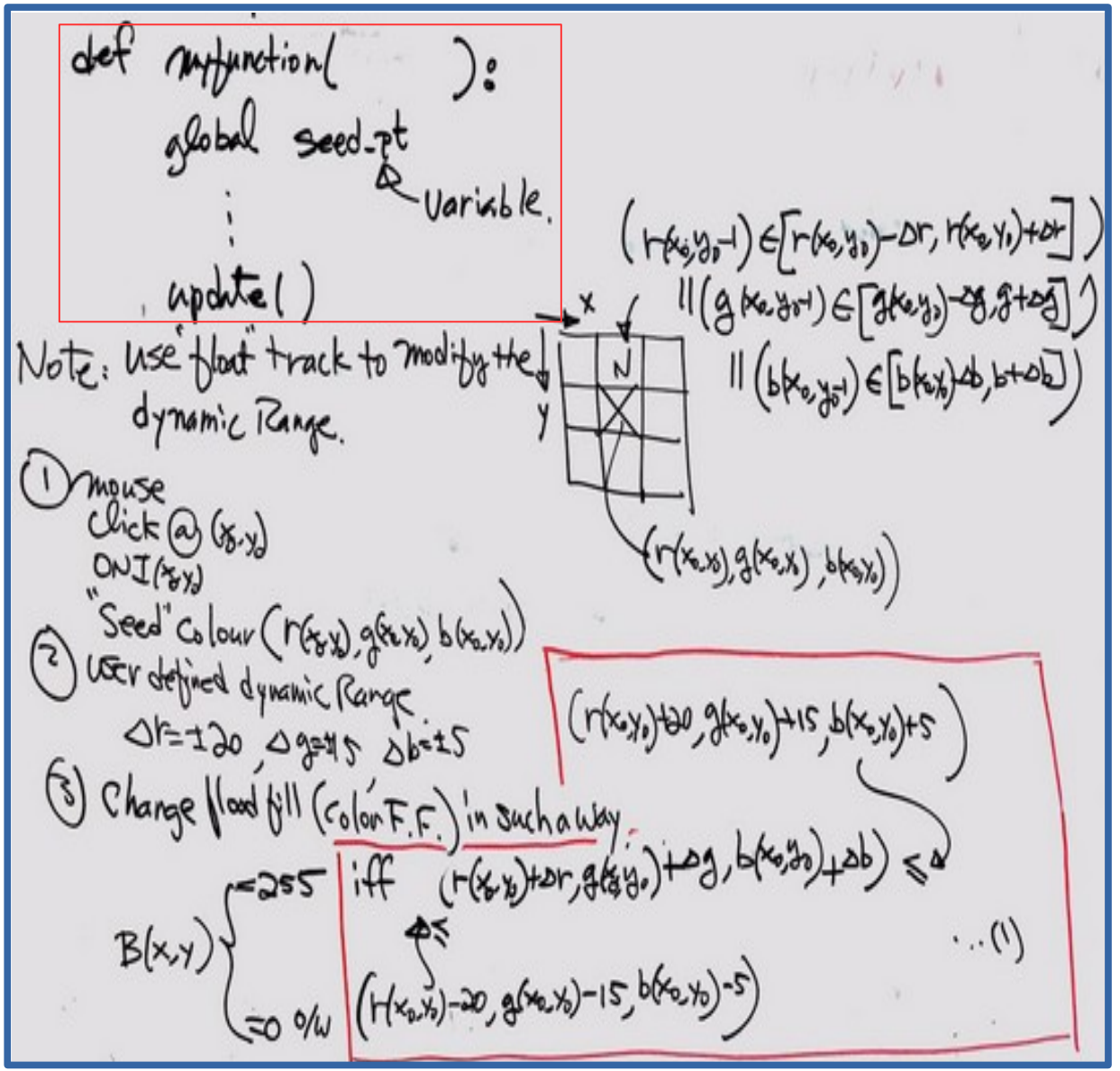
Hand Calculation Example



Flood Fill For Color Images



Flood Fill For Color Images



cv2.floodFill( ) Color Images