

# Assignment - 0

- Color Image Manipulation
  1. Image Merging
  2. Color Slicing

**Due Date: Feb. 7<sup>th</sup>, 2023 (11:59 PM)**

# Merging

- Merge two color images horizontally to create a new image.
- Input:
  - Image left
  - Image right
  - Column at which to merge the images

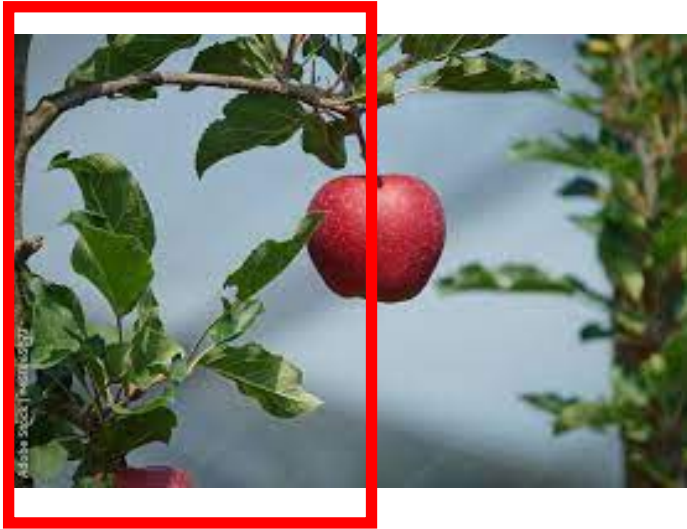
Column = 149



Image left



Image right



Output



# Color Slicing

- Extract objects based on a target color

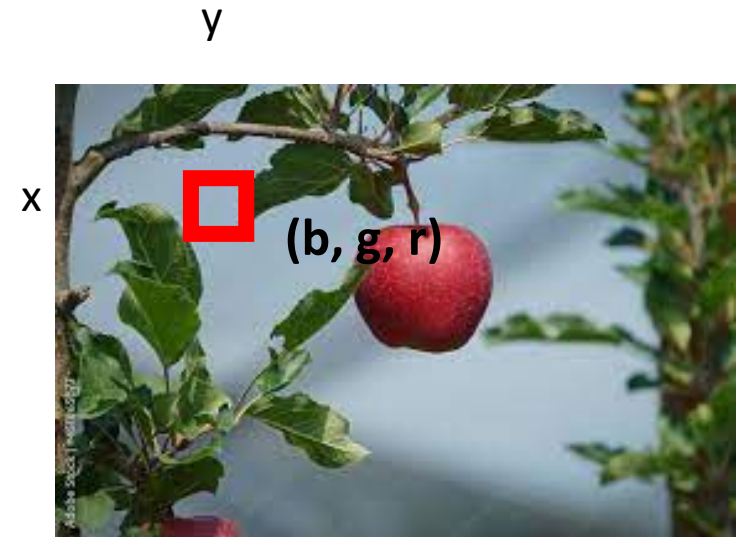


# Color Slicing

- Extract objects based on a target color
- Input:
  - Color image
  - Blackwhite image
  - Target color: color of the object of interest
  - Threshold: min distance to decide if the pixel belong to the object of interest

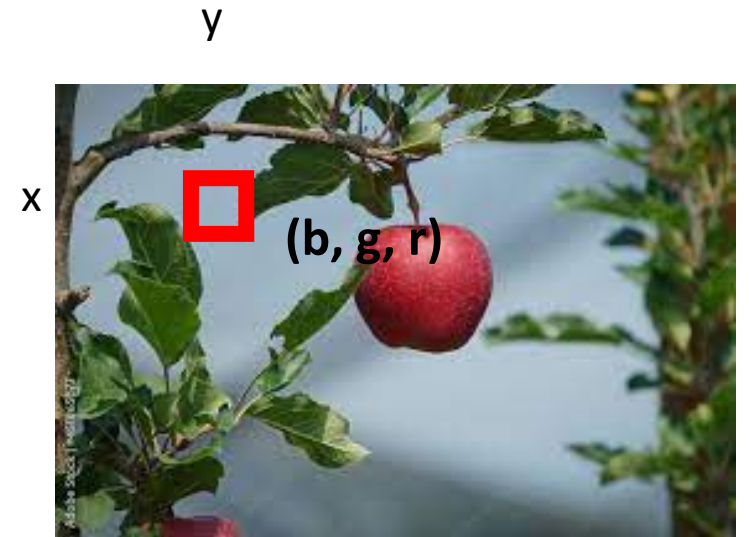
# Idea

- Each pixel in the image at co-ordinate  $(x, y)$  has three values  $(b, g, r)$ 
  - $b$  – blue value
  - $g$  – value
  - $r$  – value



# Idea

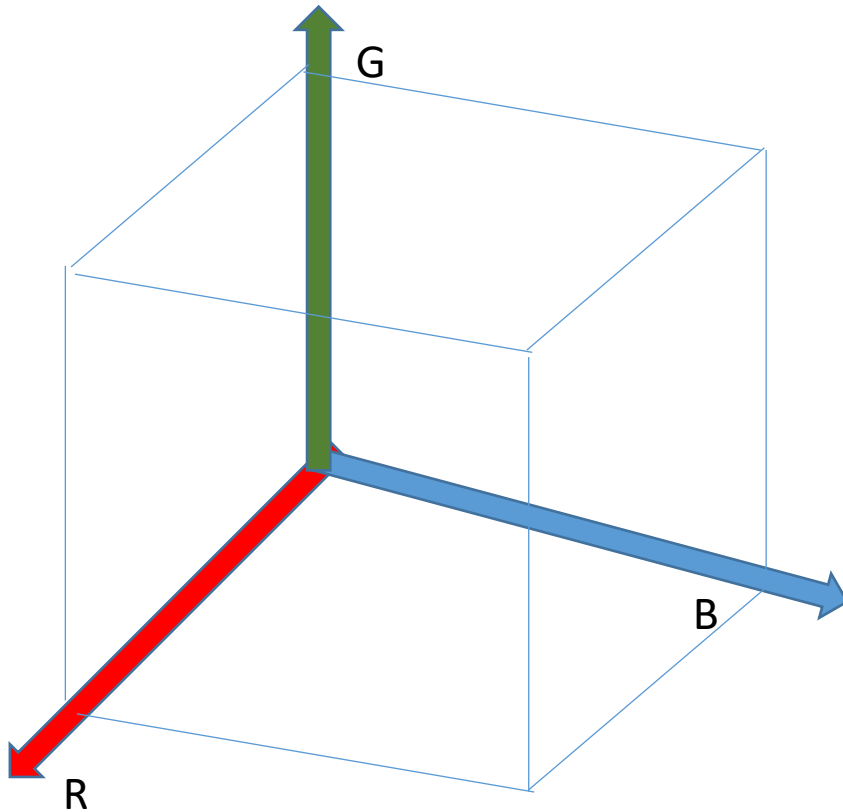
- Each pixel in the image at co-ordinate  $(x, y)$  has three values  $(b, g, r)$ 
  - $b$  – blue value
  - $g$  – value
  - $r$  – value
- If we think of this value as a point in 3D space where  $B$ ,  $G$ , and  $R$  are three axis





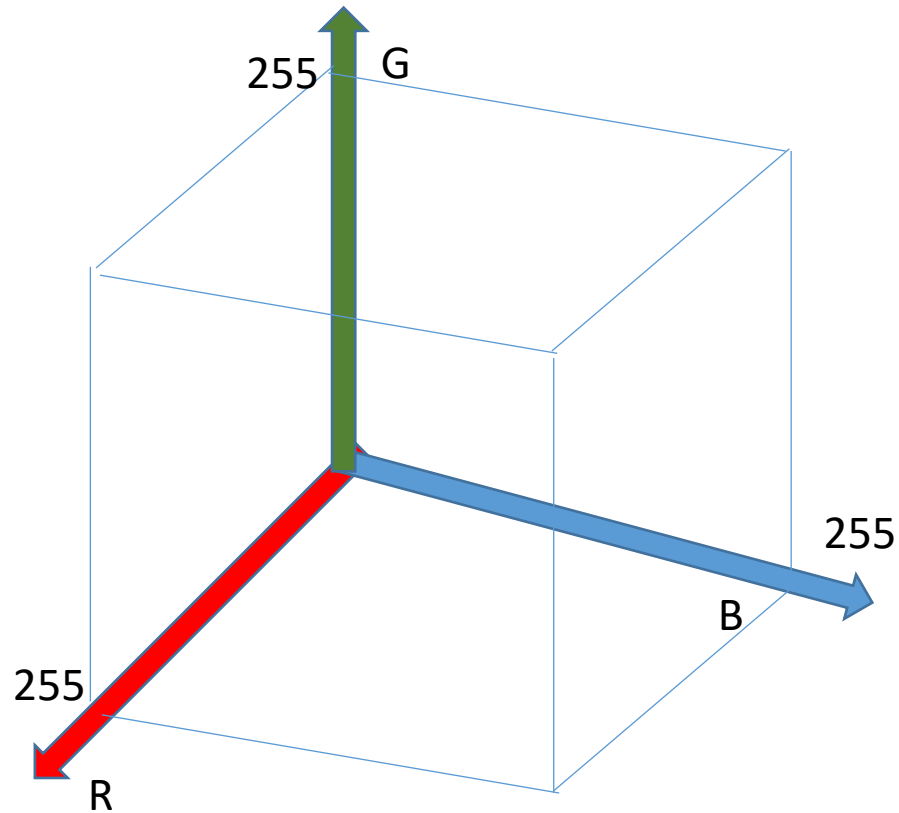
# Setup

- If we think of this value as a point in 3D space where B, G, and R are three axis



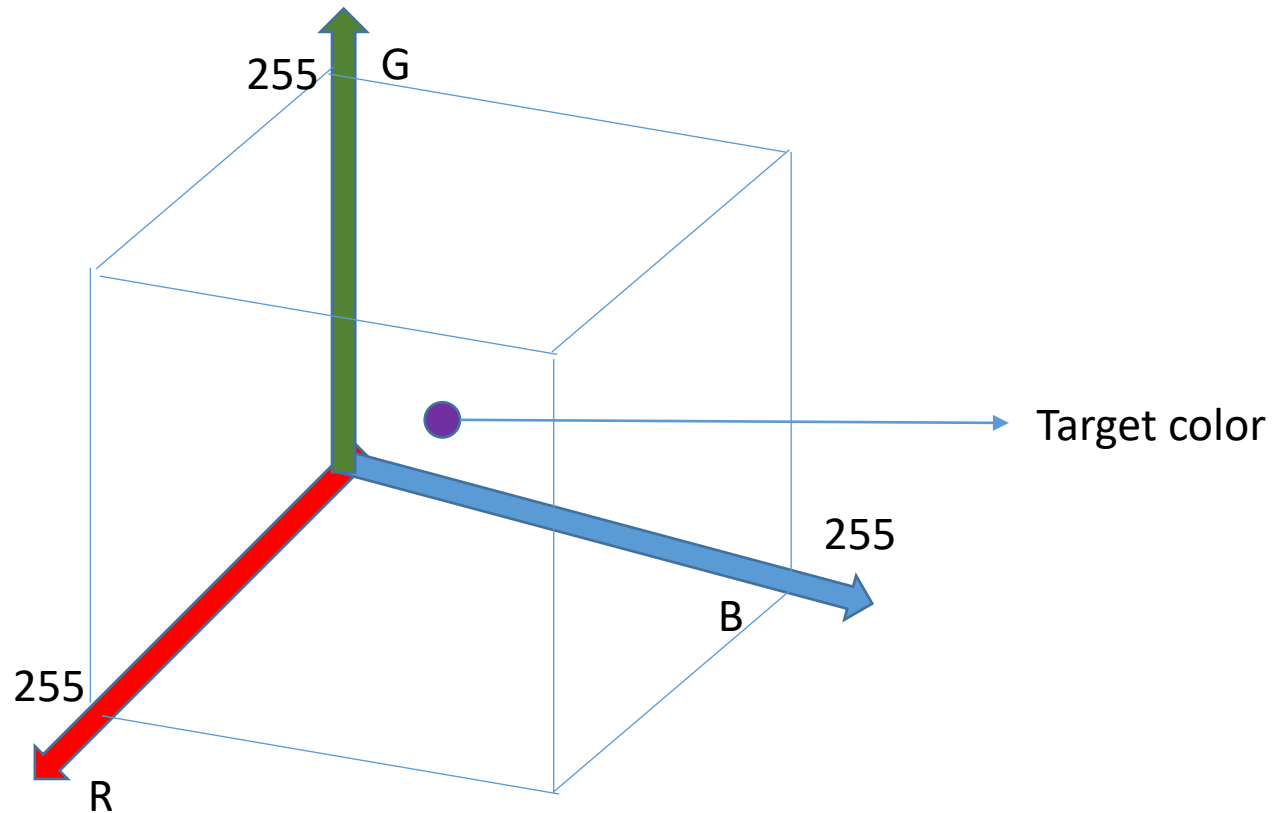
# Setup

- If we think of this value as a point in 3D space where B, G, and R are three axis



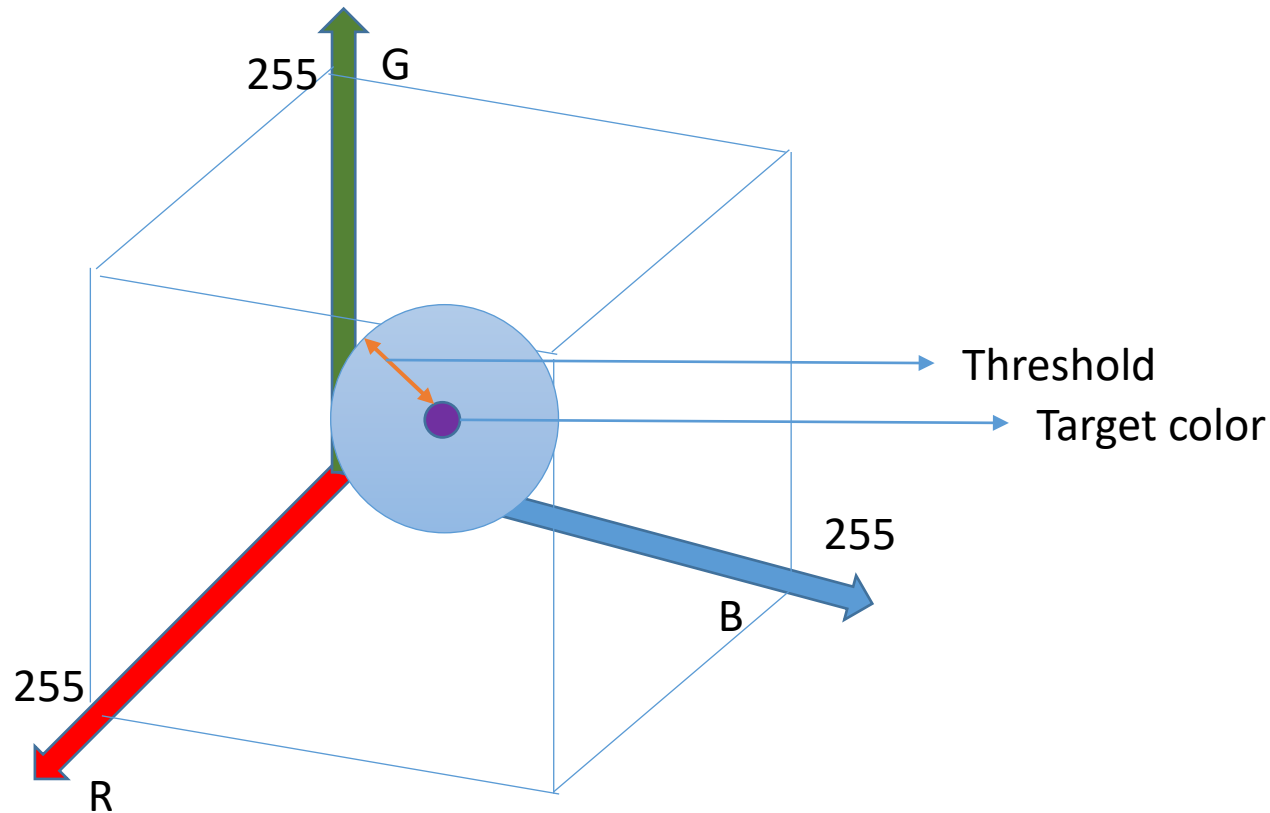
# Setup

- If we think of this value as a point in 3D space where B, G, and R are three axis



# Setup

- If we think of this value as a point in 3D space where B, G, and R are three axis



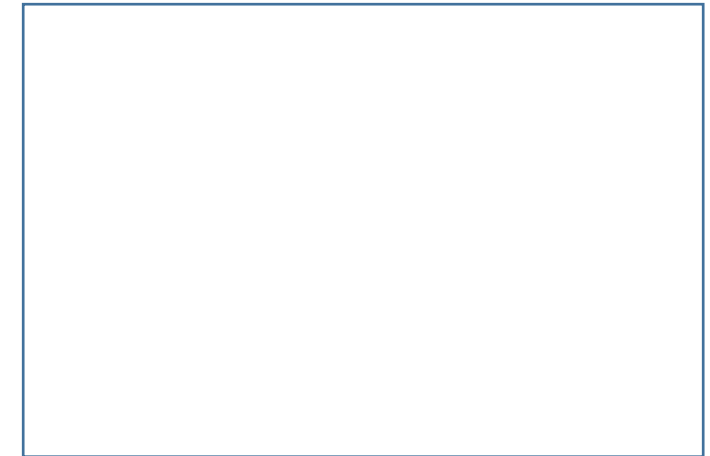
If a pixel value falls inside the sphere,  
we use the color value,  
Else we use the blackwhite value

# Method



Let  $t$  be the threshold, and  $t_c = (b, g, r)$  be the target color

For each pixel  $(x, y)$  in the color image.

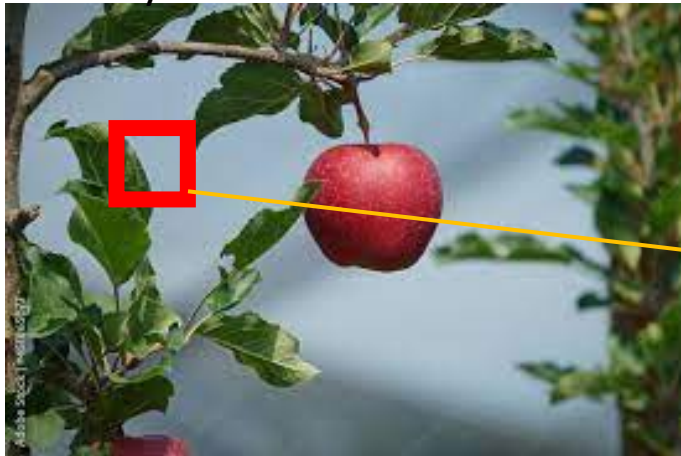


Output image  
(0)

$I_B$

$I_c$

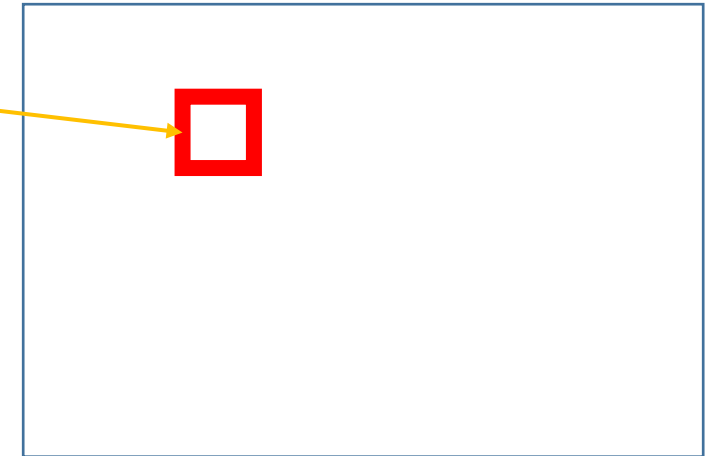
# Method



Let  $t$  be the threshold, and  $t_c = (b, g, r)$  be the target color

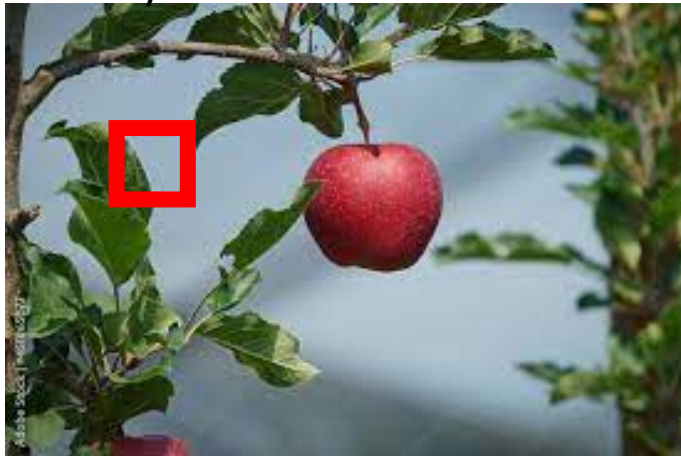
For each pixel  $(x, y)$  in the color image.

If  $\text{dist}(I_c(x, y), t_c) \leq t$  then  
 $O(x, y) = I_c(x, y)$



Output image  
(O)

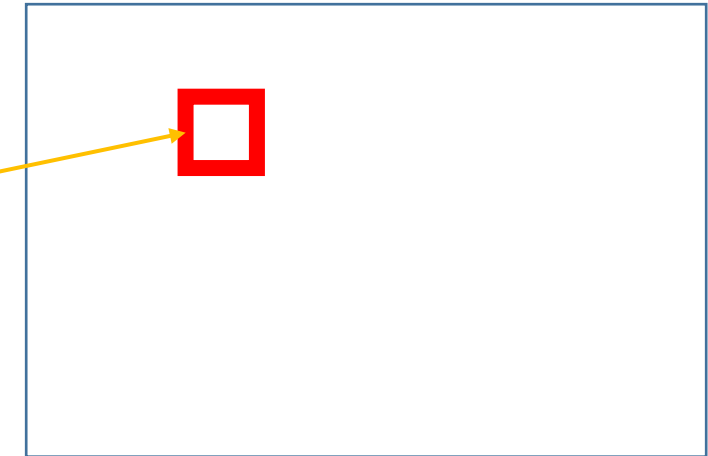
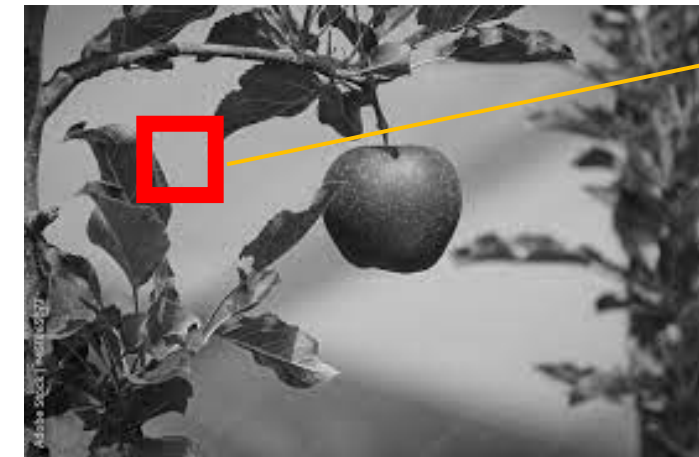
# Method



Let  $t$  be the threshold, and  $t_c = (b, g, r)$  be the target color

For each pixel  $(x, y)$  in the color image.

If  $\text{dist}(I_c(x, y), t_c) > t$  then  
 $O(x, y) = I_B(x, y)$



Output image  
(O)

# Color Slicing

- Result





# Assignment - 0

1. Merging (10 Pts.)
2. Color Slicing (20 Pts)

**Total: 30 Pts.**

# Submission Instructions

- Must use the **starter code** available in **Github**
- Submission allowed only through **Github**
- You will receive an email with invitation to join **Github** classroom
- Start by reading the **readme.md** file.
- Instructions are available here
- Github will **automatically** save the **last commit as a submission** before the deadline