Nama : Muhammad Zidan Fadillah

Nim : 312210277

Kelas : TI.22.A.2

Mata Kuliah : Pengolahan Citra

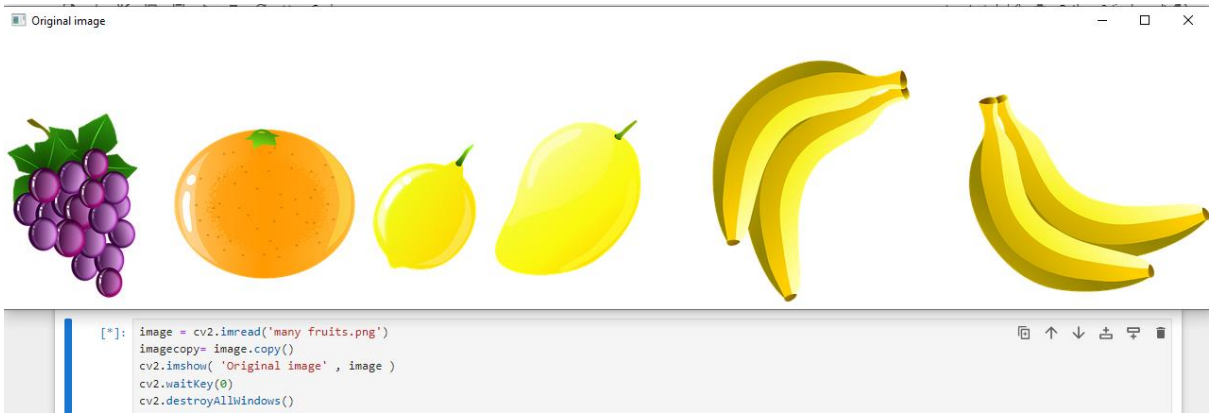
Manipulasi Citra Digital

- **Import Pustaka atau modul**

```
import cv2
```

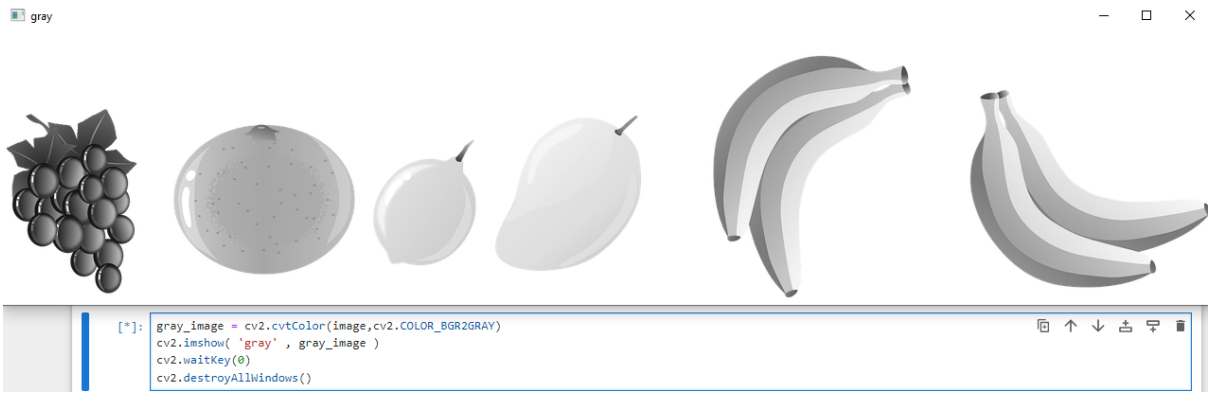
- **Original Image**

```
image = cv2.imread('many fruits.png')
imagecopy= image.copy()
cv2.imshow( 'Original image' , image )
cv2.waitKey(0)
cv2.destroyAllWindows()
```



- **gray**

```
gray_image = cv2.cvtColor(image,cv2.COLOR_BGR2GRAY)
cv2.imshow( 'gray' , gray_image )
cv2.waitKey(0)
cv2.destroyAllWindows()
```



- **binary**

ret,binary_im = cv2.threshold(gray_image,245,255,cv2.THRESH_BINARY)

cv2.imshow('binary' , binary_im)

cv2.waitKey(0)

cv2.destroyAllWindows()

- **inverted binary**

binary_im= ~binary_im

cv2.imshow('inverted binary' , binary_im)

cv2.waitKey(0)

cv2.destroyAllWindows()

- **contours marked on RGB image**

#find the external contours from binary image
contours,hierarchy
cv2.findContours(binary_im,cv2.RETR_EXTERNAL,cv2.CHAIN_APPROX_SIMPLE)

with_contours = cv2.drawContours(image,contours,-1,(0,0,255),3)

cv2.imshow('contours marked on RGB image' , with_contours)

cv2.waitKey(0)

cv2.destroyAllWindows()

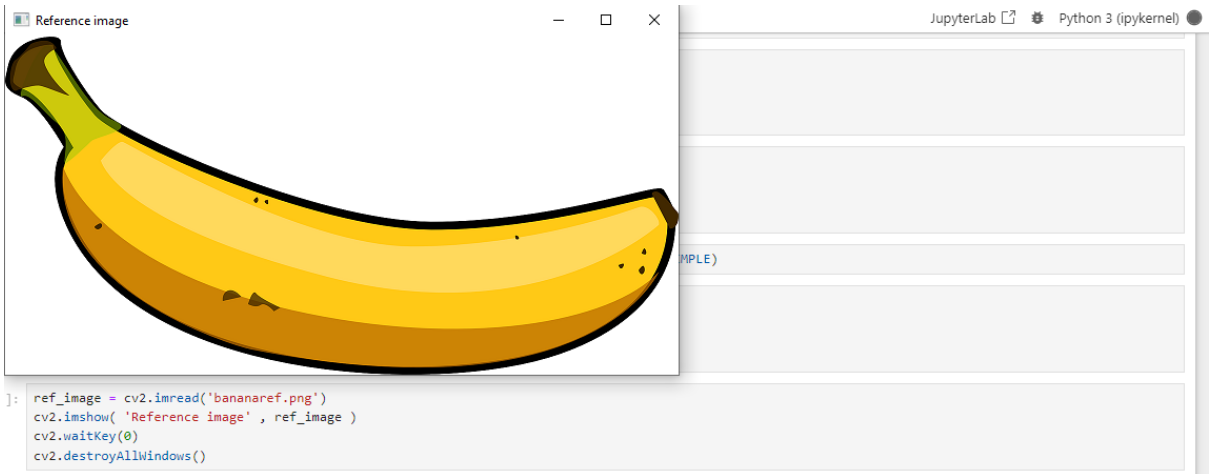
- **Refrence image**

ref_image = cv2.imread('bananaref.png')

cv2.imshow('Reference image' , ref_image)

cv2.waitKey(0)

cv2.destroyAllWindows()



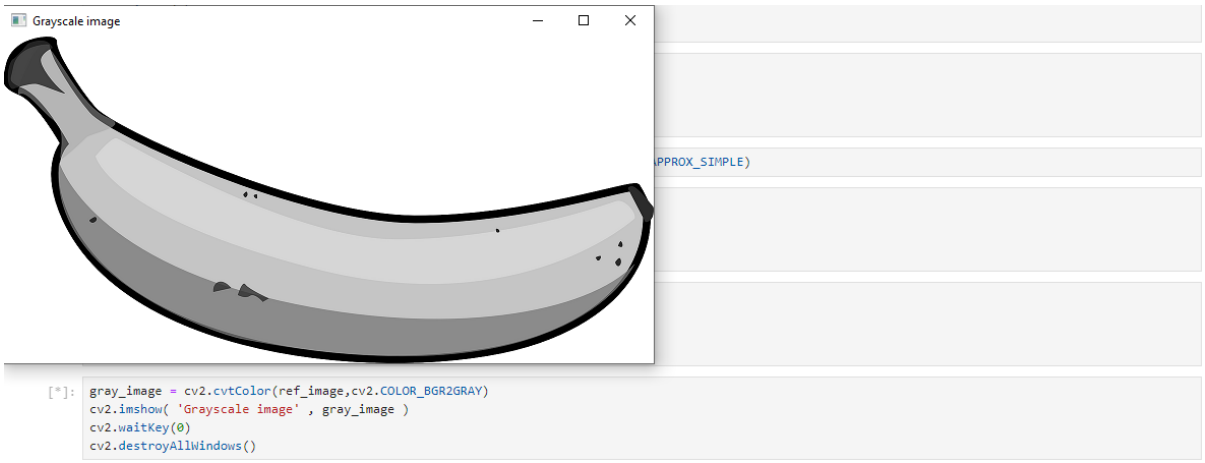
- **Grayscale image**

gray_image = cv2.cvtColor(ref_image,cv2.COLOR_BGR2GRAY)

cv2.imshow('Grayscale image' , gray_image)

cv2.waitKey(0)

cv2.destroyAllWindows()



- **Binary image**

ret,binary_im = cv2.threshold(gray_image,245,255,cv2.THRESH_BINARY)

cv2.imshow('Binary image' , binary_im)

cv2.waitKey(0)

cv2.destroyAllWindows()

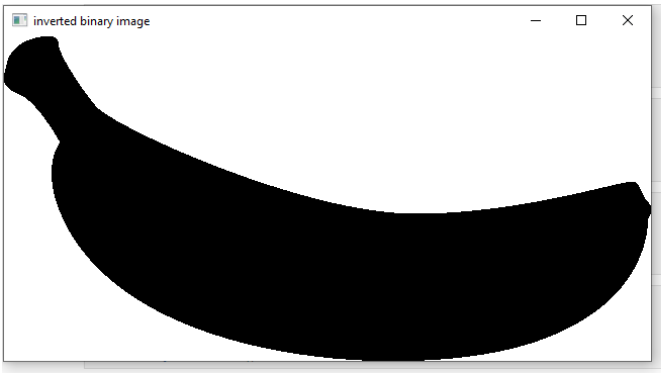
- **inverted binary image**

binary_im= binary_im

cv2.imshow('inverted binary image' , binary_im)

cv2.waitKey(0)

cv2.destroyAllWindows()




```
[*]: binary_im= binary_im
     cv2.imshow( 'inverted binary image' , binary_im )
     cv2.waitKey(0)
     cv2.destroyAllWindows()
```

- **Contours marked on RGB image**

reference_contour = contours[0]

```
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```

```
# Buat list kosong untuk menyimpan hasil perbandingan
dist_list = []

# Loop melalui setiap kontur dalam contours
for cnt in contours:
    # Hitung kesamaan bentuk antara kontur saat ini dan reference_contour
    retval = cv2.matchShapes(cnt, reference_contour, 1, 0)
    # Tambahkan hasil ke dalam list dist_list
    dist_list.append(retval)
```

Buat list kosong untuk menyimpan hasil perbandingan

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    # Tambahkan hasil ke dalam list dist_list

    dist_list.append(retval)

sorted_list= dist_list.copy()

sorted_list.sort() # sorts the list from smallest to largest

ind1_dist= dist_list.index(sorted_list[0])

ind2_dist= dist_list.index(sorted_list[1])

banana_cnts= []

banana_cnts.append(contours[ind1_dist])

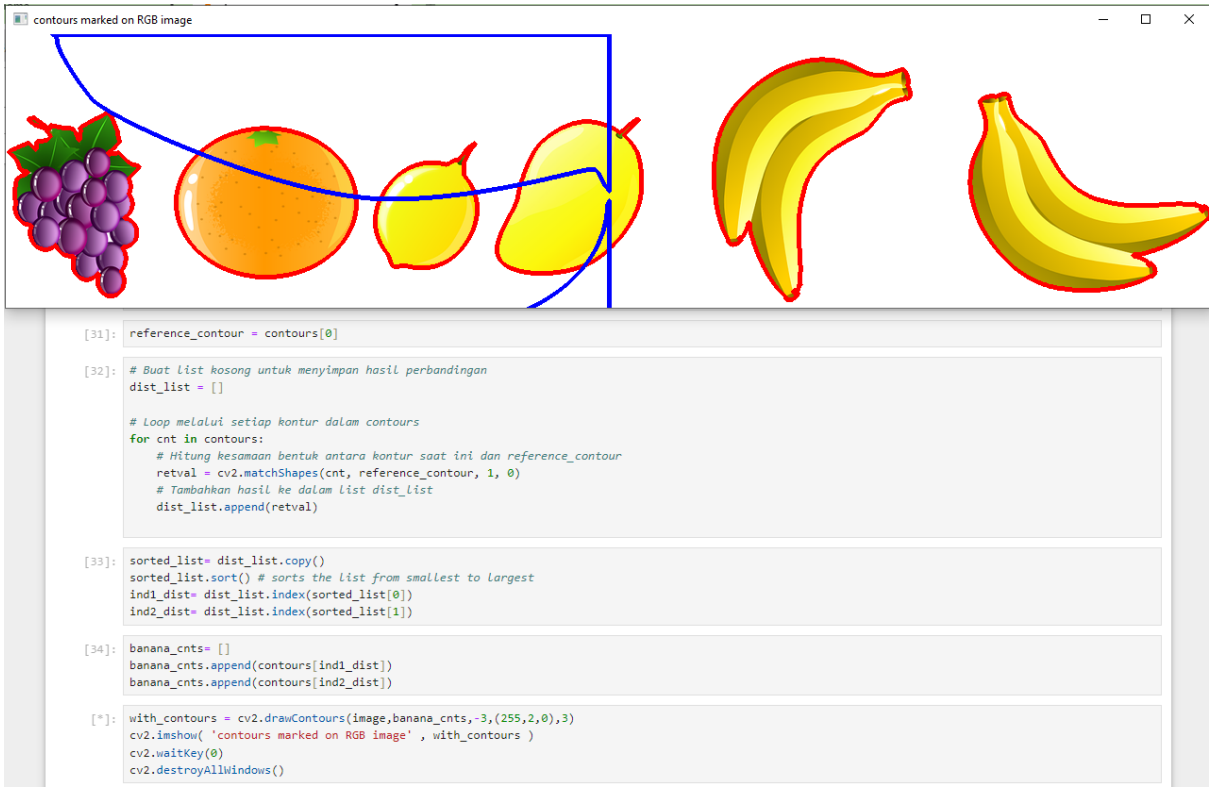
banana_cnts.append(contours[ind2_dist])

with_contours = cv2.drawContours(image,banana_cnts,-3,(255,2,0),3)

cv2.imshow('contours marked on RGB image' , with_contours)

cv2.waitKey(0)

cv2.destroyAllWindows()



- **Upright banana marked on RGB image**

for cnt in banana_cnts:

    x, y, w, h = cv2.boundingRect(cnt)

    if h > w:

        # Calculate the center and radius of the circle

        center = (x + w // 2, y + h // 2)

        radius = max(w, h) // 2

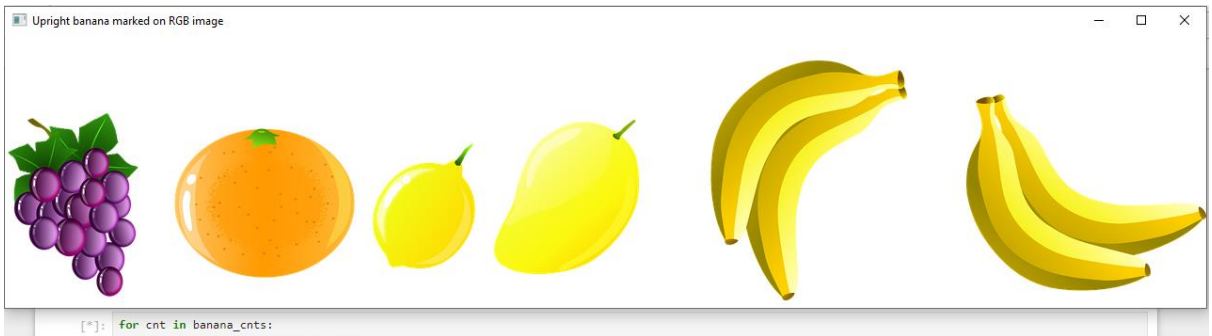
        # Draw the circle

        cv2.circle(imagecopy, center, radius, (255, 0, 0), 5)

cv2.imshow('Upright banana marked on RGB image', imagecopy)

cv2.waitKey(0)

cv2.destroyAllWindows()




```
[*]: for cnt in banana_cnts:
         x, y, w, h = cv2.boundingRect(cnt)
         if h > w:
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             center = (x + w // 2, y + h // 2)
             radius = max(w, h) // 2
             # Draw the circle
             cv2.circle(imagecopy, center, radius, (255, 0, 0), 5)

     cv2.imshow('Upright banana marked on RGB image', imagecopy)
     cv2.waitKey(0)
     cv2.destroyAllWindows()
```