**Lab10-DIP-Morphological Operations**

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**10-B**

**Libraries Used**

* **#Libraries Used**
* **import cv2**
* **from PIL import Image, ImageChops**
* **import numpy as np**
* **from google.colab.patches import cv2\_imshow**

**Lab Task 1**

**Erode the image “fp.tif” using a suitable structural element so that all the noise is removed**

**from the image. Apply erosion on Fig01.tif with structuring elements of different sizes.**

**Code**

#Reading Image File

im=cv2.imread("/content/fp.tif")

#gray = cv2.cvtColor(image, cv2.COLOR\_BGR2GRAY)

cv2\_imshow(im)

#Making Various Size Structuring Element

struct\_element\_rect5=cv2.getStructuringElement(cv2.MORPH\_RECT,(5,5))

struct\_element\_rect3=cv2.getStructuringElement(cv2.MORPH\_RECT,(3,3))

struct\_element\_rect7=cv2.getStructuringElement(cv2.MORPH\_RECT,(7,7))

#Different size element structures

#Applying erosions

erosion\_im\_rect3=cv2.erode(im,struct\_element\_rect3,iterations=1)

erosion\_im\_rect5=cv2.erode(im,struct\_element\_rect5,iterations=1)

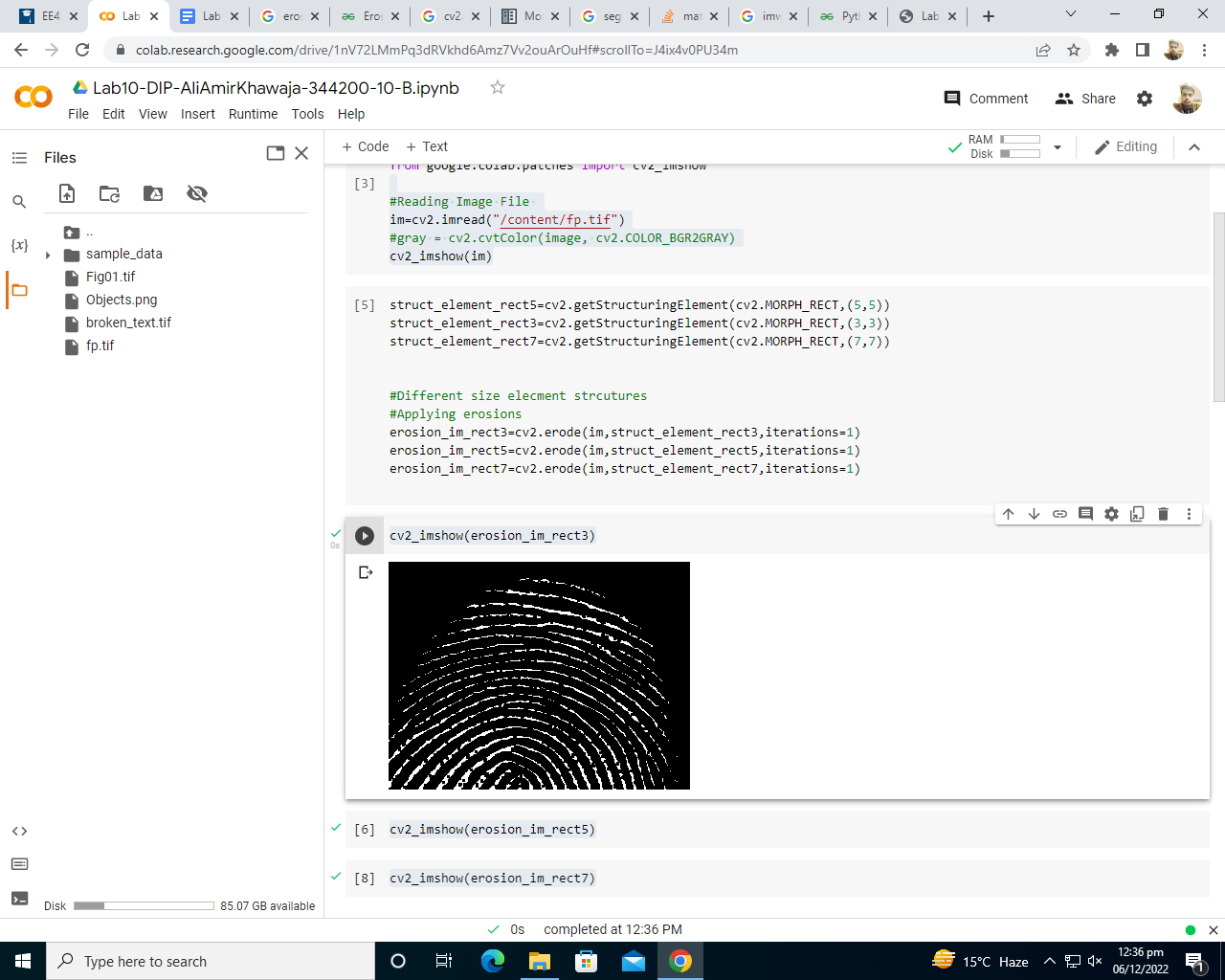
erosion\_im\_rect7=cv2.erode(im,struct\_element\_rect7,iterations=1)

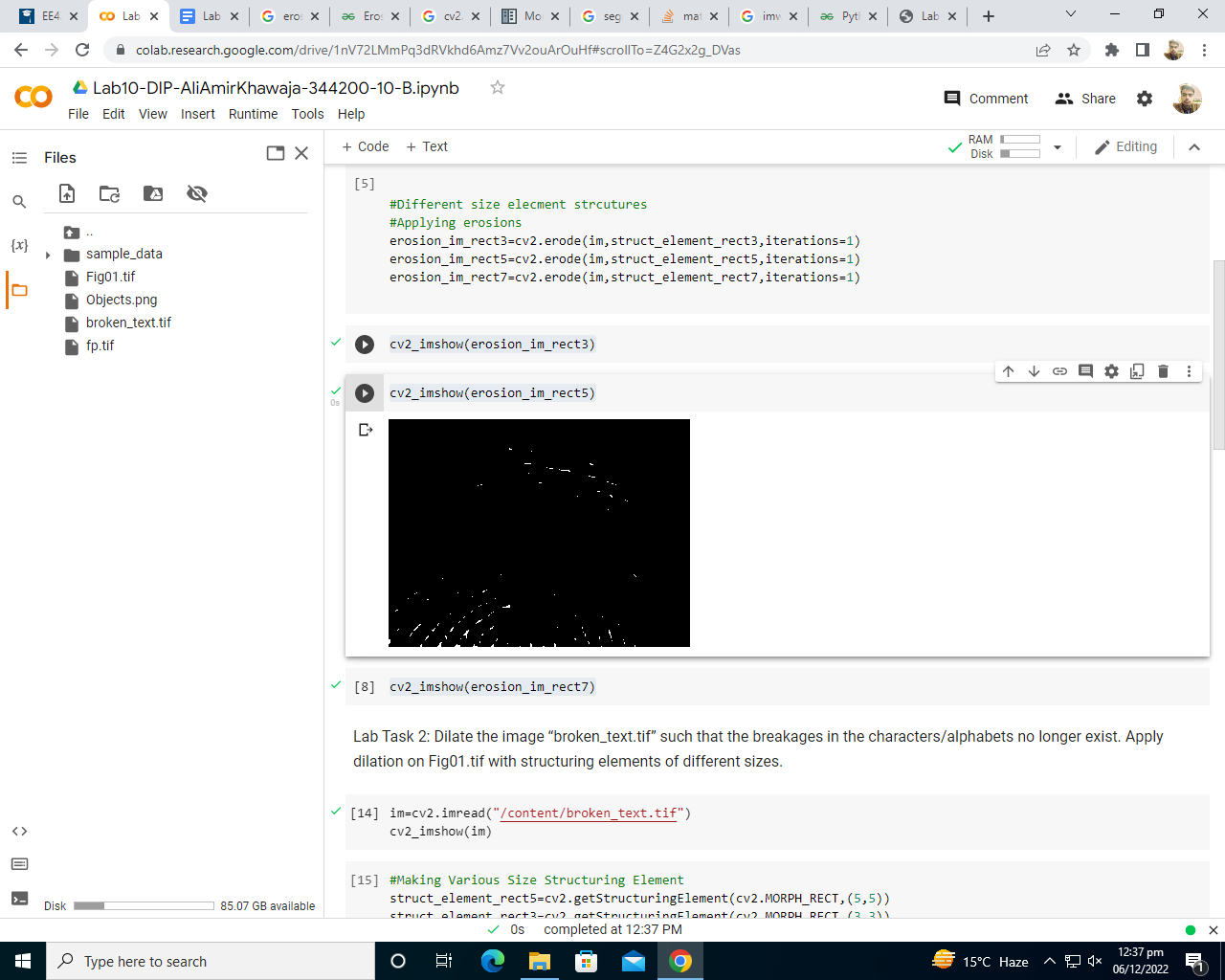
cv2\_imshow(erosion\_im\_rect3)

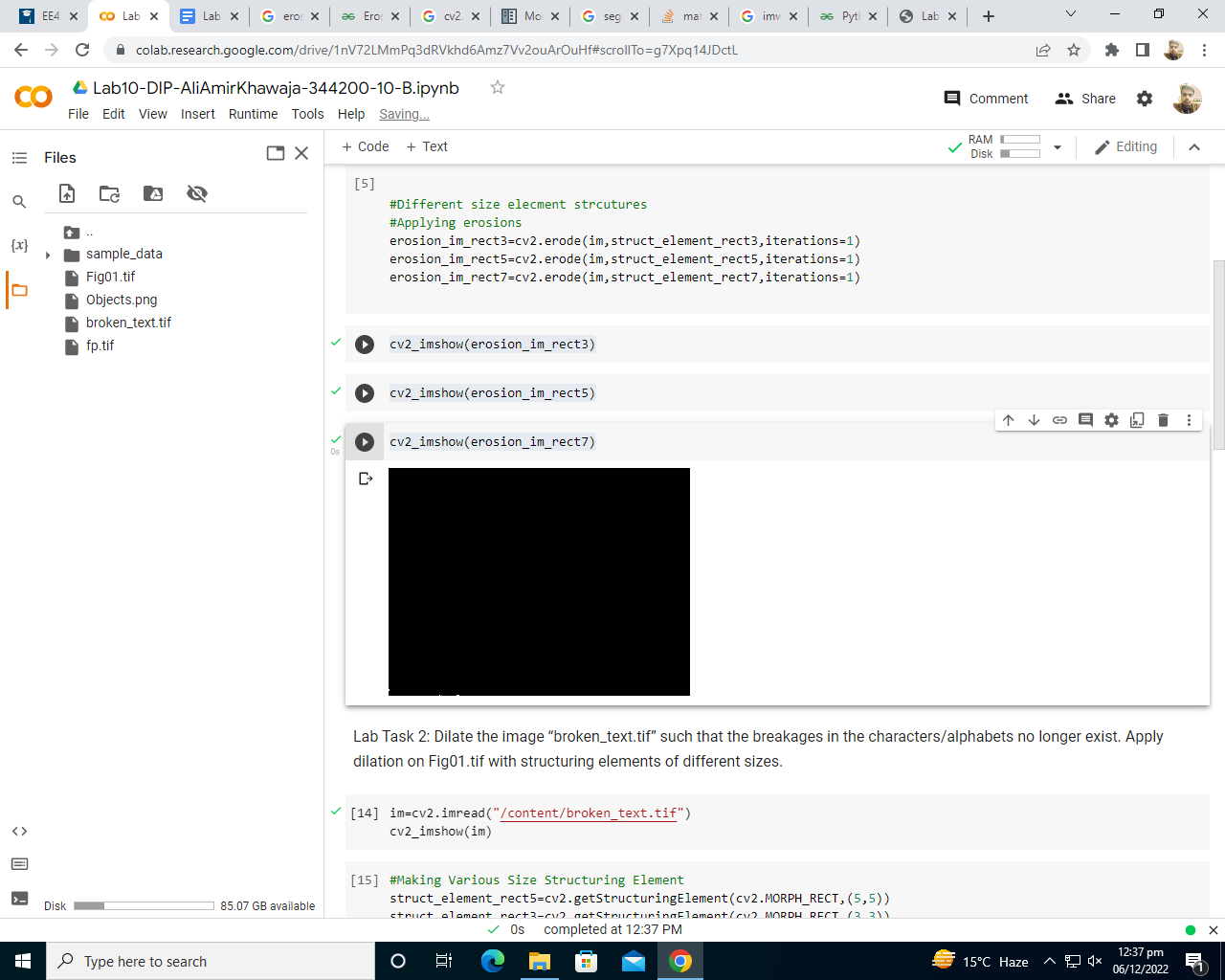
cv2\_imshow(erosion\_im\_rect5)

cv2\_imshow(erosion\_im\_rect7)

**Screenshot**

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**Lab Task 2**

**Dilate the image “broken\_text.tif” such that the breakages in the characters/alphabets no longer exist. Apply dilation on Fig01.tif with structuring elements of different sizes.**

**Code**

im=cv2.imread("/content/broken\_text.tif")

cv2\_imshow(im)

#Making Various Size Structuring Element

struct\_element\_rect5=cv2.getStructuringElement(cv2.MORPH\_RECT,(5,5))

struct\_element\_rect3=cv2.getStructuringElement(cv2.MORPH\_RECT,(3,3))

struct\_element\_rect7=cv2.getStructuringElement(cv2.MORPH\_RECT,(7,7))

#Different size element structures

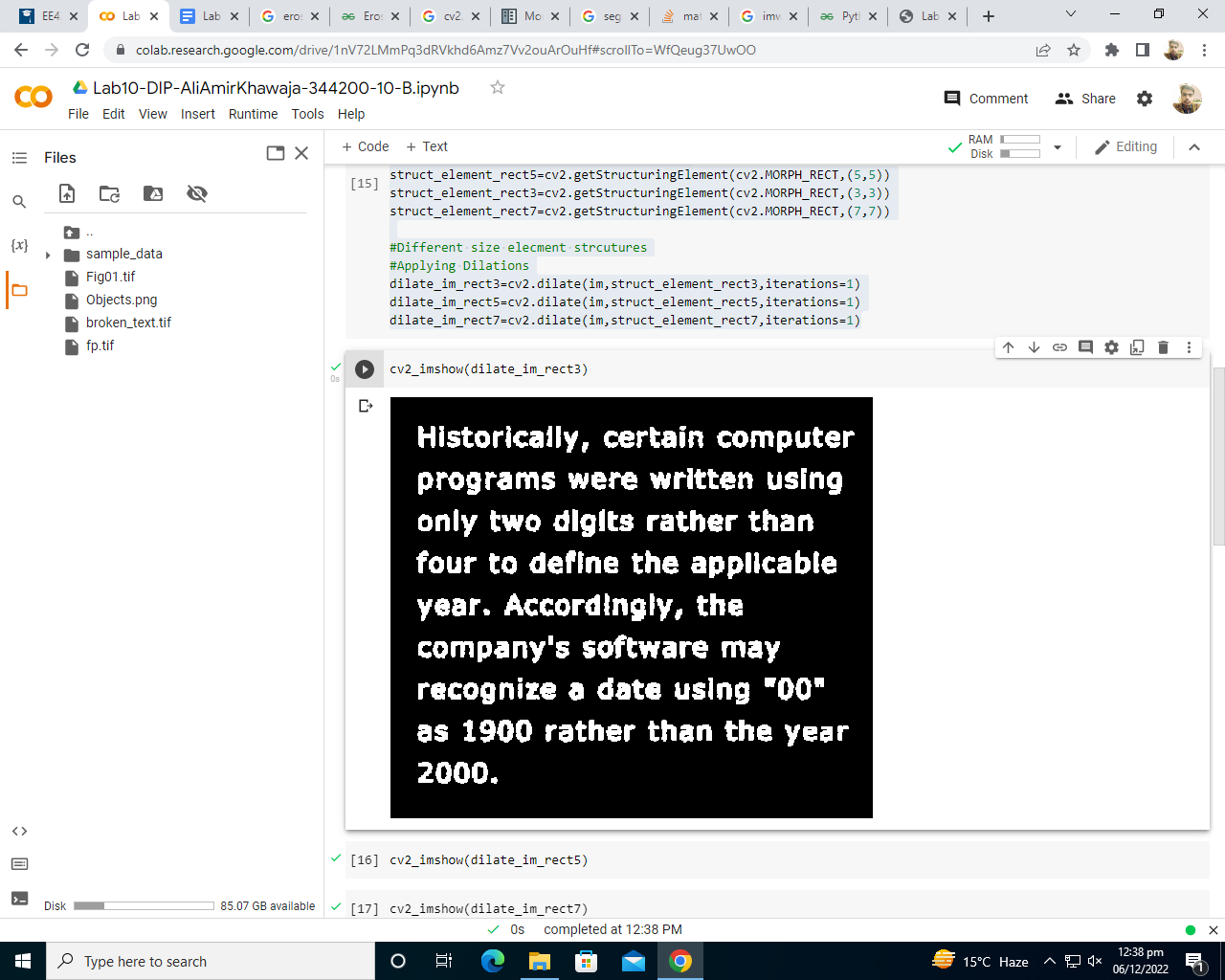
#Applying Dilations

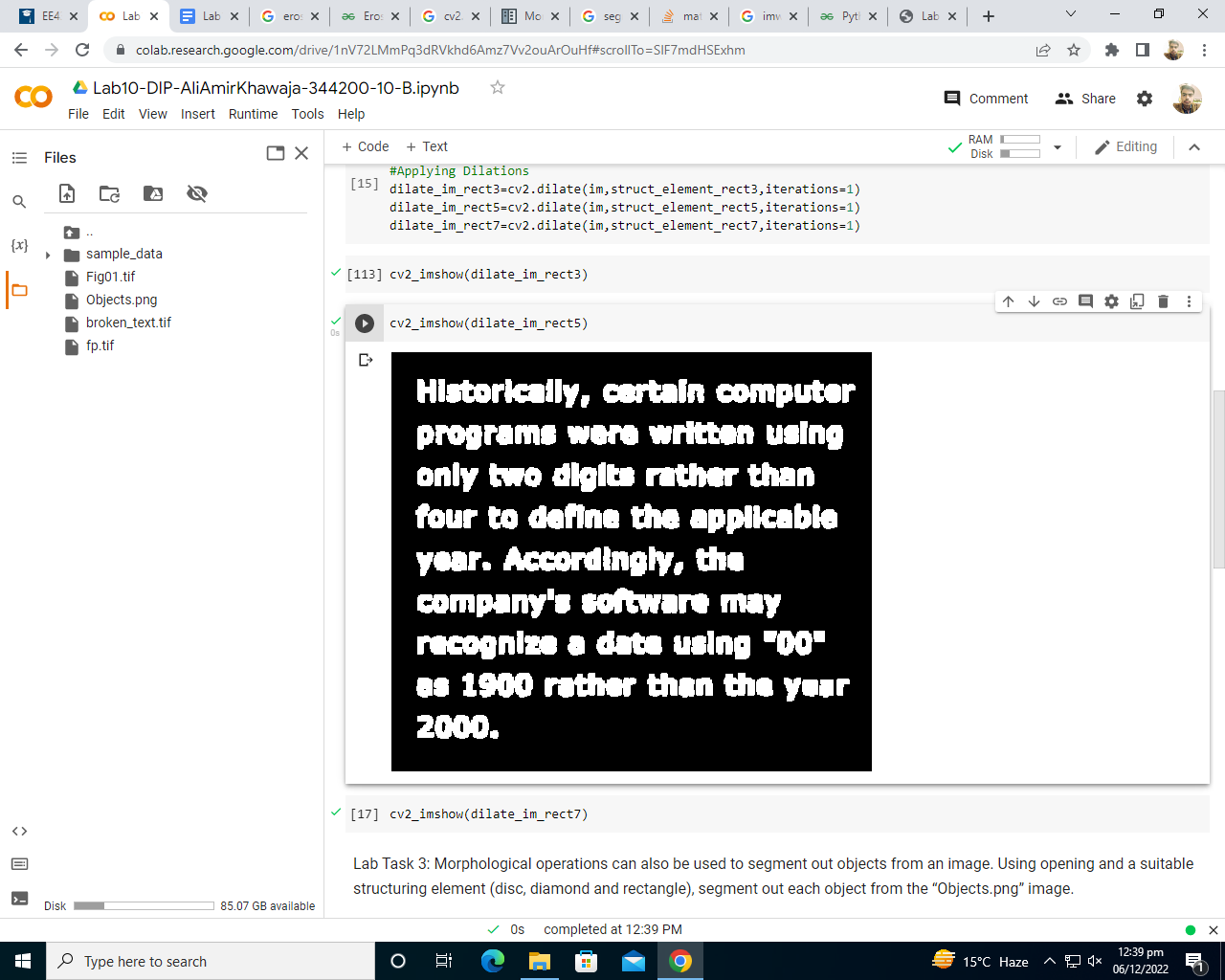
dilate\_im\_rect3=cv2.dilate(im,struct\_element\_rect3,iterations=1)

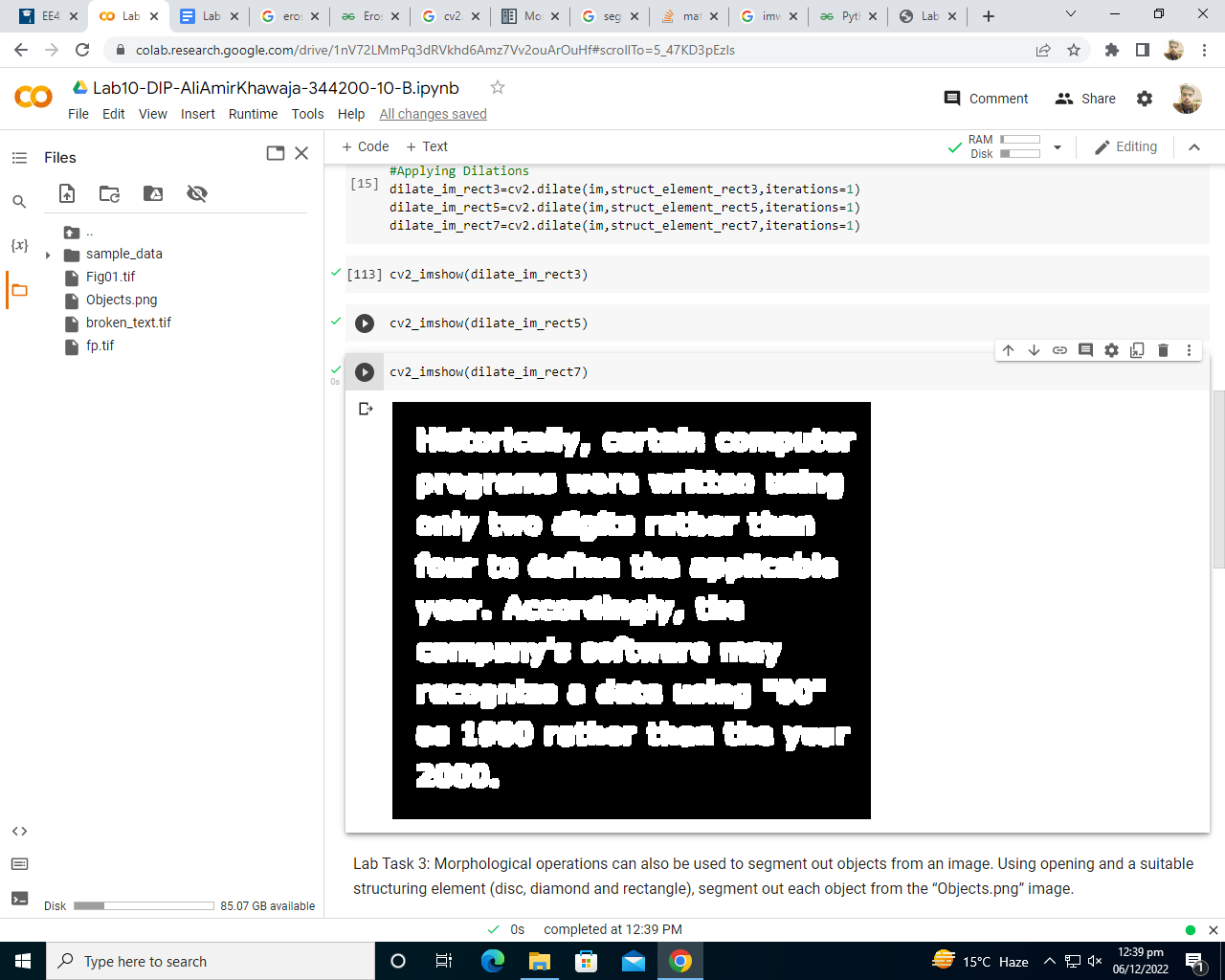
dilate\_im\_rect5=cv2.dilate(im,struct\_element\_rect5,iterations=1)

dilate\_im\_rect7=cv2.dilate(im,struct\_element\_rect7,iterations=1)

**Screenshot**







**Lab Task 3**

**Morphological operations can also be used to segment out objects from an image. Using opening and a suitable structuring element (disc, diamond and rectangle), segment out each object from the “Objects.png” image.**

Code:

im=cv2.imread("/content/Objects.png")

cv2\_imshow(im)

struct\_element\_recte=cv2.getStructuringElement(cv2.MORPH\_RECT,(11,11))

struct\_element\_rectd=cv2.getStructuringElement(cv2.MORPH\_RECT,(65,65))

struct\_element\_ellie=cv2.getStructuringElement(cv2.MORPH\_ELLIPSE,(13,13))

struct\_element\_ellid=cv2.getStructuringElement(cv2.MORPH\_ELLIPSE,(45,45))

struct\_element\_crosse=cv2.getStructuringElement(cv2.MORPH\_CROSS,(9,9))

struct\_element\_crossd=cv2.getStructuringElement(cv2.MORPH\_CROSS,(3,3))

#Different 5X5 elecment strcutures

#Applying Erosions and Dilation (Rectangule)

'''

array([[1, 1, 1, 1, 1],

[1, 1, 1, 1, 1],

[1, 1, 1, 1, 1],

[1, 1, 1, 1, 1],

[1, 1, 1, 1, 1]]

'''

erosion\_im\_rect=cv2.erode(im,struct\_element\_recte,iterations=7)

erosion\_im\_rect=cv2.dilate(erosion\_im\_rect,struct\_element\_rectd,iterations=1)

#Applying Erosions and Dilation (Elliptical)

'''

array([[0, 0, 1, 0, 0],

[1, 1, 1, 1, 1],

[1, 1, 1, 1, 1],

[1, 1, 1, 1, 1],

[0, 0, 1, 0, 0]]

'''

erosion\_im\_elli=cv2.erode(im,struct\_element\_ellie,iterations=7)

erosion\_im\_elli=cv2.dilate(erosion\_im\_elli,struct\_element\_ellid,iterations=2)

#Applying Erosions and Dilation (Cross-shaped)

'''

array([[0, 0, 1, 0, 0],

[0, 0, 1, 0, 0],

[1, 1, 1, 1, 1],

[0, 0, 1, 0, 0],

[0, 0, 1, 0, 0]]

'''

erosion\_im\_cross=cv2.erode(im,struct\_element\_crosse,iterations=12)

erosion\_im\_cross=cv2.dilate(erosion\_im\_cross,struct\_element\_crossd,iterations=50)

**Screenshot**

