In [*]:
```
!pip install numpy --upgrade
!pip install mahotas
!pip install opencv-python

from scipy.spatial import distance as dist
import numpy as np
import mahotas
import cv2
import imutils

def describe_shapes(image):
    shapeFeatures = []

    gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
    blurred = cv2.GaussianBlur(gray, (13, 13), 0)
    thresh = cv2.threshold(blurred, 50, 255, cv2.THRESH_BINARY)[1]

    thresh = cv2.dilate(thresh, None, iterations=4)
    thresh = cv2.erode(thresh, None, iterations=2)

    cnts = cv2.findContours(thresh.copy(), cv2.RETR_EXTERNAL, cv2.CHAIN_APP
    cnts = imutils.grab_contours(cnts)

    for c in cnts:
        mask = np.zeros(image.shape[:2], dtype="uint8")
        cv2.drawContours(mask, [c], -1, 255, -1)

        (x, y, w, h) = cv2.boundingRect(c)
        roi = mask[y:y + h, x:x + w]

        features = mahotas.features.zernike_moments(roi, cv2.minEnclosingCi
        shapeFeatures.append(features)

    return (cnts, shapeFeatures)

refImagePath = "C://Users//vaishnavi//onedrive_backup//Desktop//BE//SEM 8//
refImage = cv2.imread(refImagePath)
(_, gameFeatures) = describe_shapes(refImage)

shapesImagePath = "C://Users//vaishnavi//onedrive_backup//Desktop//BE//SEM
shapesImage = cv2.imread(shapesImagePath)
(cnts, shapeFeatures) = describe_shapes(shapesImage)

D = dist.cdist(gameFeatures, shapeFeatures)
i = np.argmin(D)

for (j, c) in enumerate(cnts):
    if i != j:
        box = cv2.minAreaRect(c)
        box = np.int0(cv2.boxPoints(box))
        cv2.drawContours(shapesImage, [box], -1, (0, 0, 255), 2)

box = cv2.minAreaRect(cnts[i])
box = np.int0(cv2.boxPoints(box))
cv2.drawContours(shapesImage, [box], -1, (0, 255, 0), 2)
(x, y, w, h) = cv2.boundingRect(cnts[i])
cv2.putText(shapesImage, "FOUND!", (x, y - 10), cv2.FONT_HERSHEY_SIMPLEX, 0

cv2.imshow("Reference Image", refImage)
cv2.imshow("Shapes Image", shapesImage)
cv2.waitKey(0)
```

```
cv2.destroyAllWindows()
```

```
Requirement already satisfied: numpy in c:\users\vaishnavi\anaconda3\lib\s
ite-packages (1.26.4)
Requirement already satisfied: mahotas in c:\users\vaishnavi\anaconda3\lib
\site-packages (1.4.14)
Requirement already satisfied: numpy in c:\users\vaishnavi\anaconda3\lib\s
ite-packages (from mahotas) (1.26.4)
Requirement already satisfied: opencv-python in c:\users\vaishnavi\anacond
a3\lib\site-packages (4.9.0.80)
Requirement already satisfied: numpy>=1.19.3 in c:\users\vaishnavi\anacond
a3\lib\site-packages (from opencv-python) (1.26.4)

C:\Users\vaishnavi\AppData\Local\Temp\ipykernel_5420\1643845263.py:50: Dep
recationWarning: `np.int0` is a deprecated alias for `np.intp`.  (Deprecat
ed NumPy 1.24)
  box = np.int0(cv2.boxPoints(box))
C:\Users\vaishnavi\AppData\Local\Temp\ipykernel_5420\1643845263.py:54: Dep
recationWarning: `np.int0` is a deprecated alias for `np.intp`.  (Deprecat
ed NumPy 1.24)
  box = np.int0(cv2.boxPoints(box))
```

In [ ]: