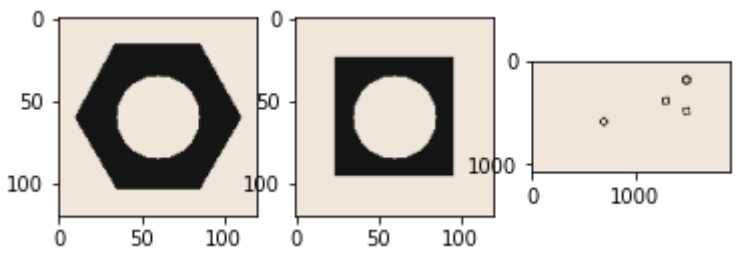
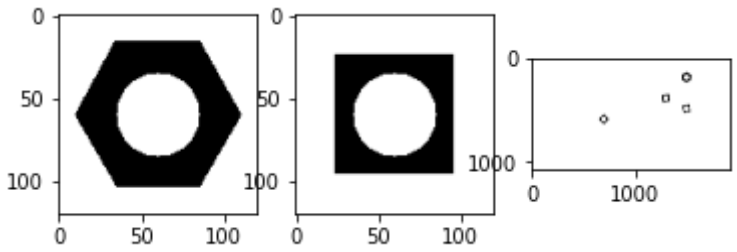
```
from google.colab import drive
drive.mount('/content/gdrive')
```

```
Mounted at /content/gdrive
```

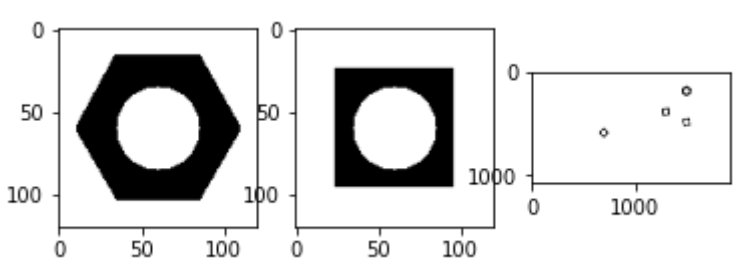
```
import cv2 as cv
import numpy as np
import matplotlib.pyplot as plt

hexnut_template = cv.imread('/content/gdrive/My Drive/ColabNotebooks/assignment3/hexnut_template.png', cv.IMREAD_COLOR)
squarenut_template =  cv.imread('/content/gdrive/My Drive/ColabNotebooks/assignment3/squarenut_template.png', cv.IMREAD_COLOR)
conveyor_f100 =  cv.imread('/content/gdrive/My Drive/ColabNotebooks/assignment3/conveyor_f100.png', cv.IMREAD_COLOR)

fig, ax = plt. subplots(1,3)
ax[0].imshow(cv.cvtColor(hexnut_template, cv.COLOR_RGB2BGR))
ax[1].imshow(cv.cvtColor(squarenut_template, cv.COLOR_RGB2BGR))
ax[2].imshow(cv.cvtColor(conveyor_f100, cv.COLOR_RGB2BGR))
plt.show()
```




```
hexnut_gray = cv.cvtColor(hexnut_template,cv.COLOR_BGR2GRAY)
squarenut_gray = cv.cvtColor(squarenut_template,cv.COLOR_BGR2GRAY)
conveyor_gray = cv.cvtColor(conveyor_f100,cv.COLOR_BGR2GRAY)

#blur1 = cv.GaussianBlur(hexnut_gray,(5,5),0)
#blur2= cv.GaussianBlur(squarenut_gray,(5,5),0)
#blur3 = cv.GaussianBlur(conveyor_gray,(5,5),0)

ret1,th1 = cv.threshold(hexnut_gray,0,255,cv.THRESH_BINARY+cv.THRESH_OTSU)
ret2,th2 = cv.threshold(squarenut_gray,0,255,cv.THRESH_BINARY+cv.THRESH_OTSU)
ret3,th3 = cv.threshold(conveyor_gray,0,255,cv.THRESH_BINARY+cv.THRESH_OTSU)

fig, ax = plt. subplots(1,3)
ax[0].imshow(th1,'gray')
ax[1].imshow(th2,'gray')
ax[2].imshow(th3,'gray')
plt.show()
```




```
kernel = np.ones((3,3),np.uint8)
closing1 = cv.morphologyEx(th1, cv.MORPH_CLOSE, kernel)
closing2 = cv.morphologyEx(th2, cv.MORPH_CLOSE, kernel)
closing3 = cv.morphologyEx(th3, cv.MORPH_CLOSE, kernel)

fig, ax = plt. subplots(1,3)
ax[0].imshow(closing1,'gray')
ax[1].imshow(closing2,'gray')
ax[2].imshow(closing3,'gray')
plt.show()
```



```
output1 = cv.connectedComponentsWithStats(closing1)
output2 = cv.connectedComponentsWithStats(closing2)
output3 = cv.connectedComponentsWithStats(closing3)
```

+ Code + Text

✓ 0s completed at 15:32