Contours

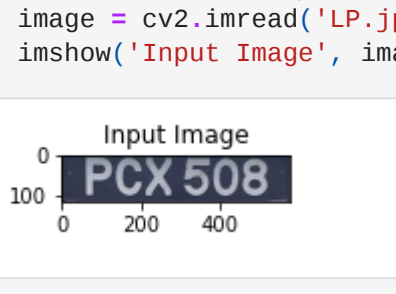
In this lesson we'll learn: Using findContours Drawing Contours Hierachy of Contours Contouring Modes (Simple vs Approx)

In [1]:

```
import cv2
import numpy as np
from matplotlib import pyplot as plt

# Define our imshow function
def imshow(title = "Image", image = None, size = 10):
    w, h = image.shape[0], image.shape[1]
    aspect_ratio = w/h
    plt.figure(figsize=(size * aspect_ratio,size))
    plt.imshow(cv2.cvtColor(image, cv2.COLOR_BGR2RGB))
    plt.title(title)
    plt.show()
```

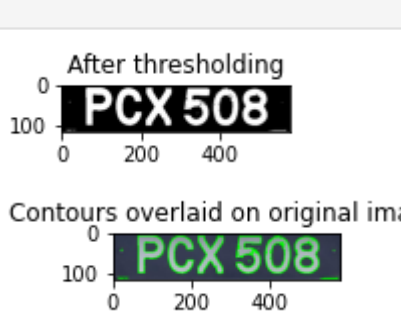
In [2]:

```
# Let's load a simple image license plate image
image = cv2.imread('LP.jpg')
imshow('Input Image', image)
```



In [3]:

```
image = cv2.imread('LP.jpg')

# Convert to Grayscale
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

_, th2 = cv2.threshold(gray, 0, 255, cv2.THRESH_BINARY + cv2.THRESH_OTSU)
imshow('After thresholding', th2)

# Finding Contours
# Use a copy of your image e.g. edged.copy(), since findContours alters the image
contours, hierarchy = cv2.findContours(th2, cv2.RETR_LIST, cv2.CHAIN_APPROX_NONE)

# Draw all contours, note this overwrites the input image (inplace operation)
# Use '-1' as the 3rd parameter to draw all
cv2.drawContours(image, contours, -1, (0,255,0), thickness = 2)
imshow('Contours overlaid on original image', image)

print("Number of Contours found = " + str(len(contours)))
```




```
Number of Contours found = 38
```

In [4]:

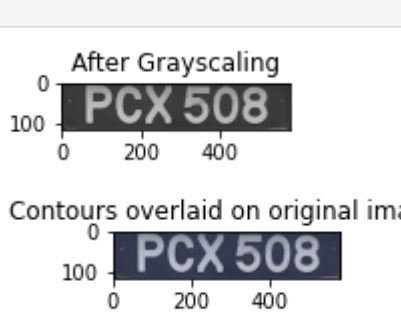
```
contours[0]
```

Out[4]:

```
array([[[564, 112]],

       [[563, 113]],

       [[562, 113]],

       [[561, 113]],

       [[560, 113]],

       [[559, 113]],

       [[558, 113]],

       [[557, 113]],

       [[556, 113]],

       [[555, 113]],

       [[554, 113]],

       [[553, 113]],

       [[552, 113]],

       [[551, 113]],

       [[550, 113]],

       [[549, 113]],

       [[548, 113]],

       [[547, 113]],

       [[546, 113]],

       [[545, 113]],

       [[544, 113]],

       [[543, 113]],

       [[542, 113]],

       [[541, 113]],

       [[540, 113]],

       [[539, 113]],

       [[538, 113]],

       [[537, 113]],

       [[536, 113]],

       [[535, 113]],

       [[534, 113]],

       [[533, 113]],

       [[532, 113]],

       [[531, 114]],

       [[530, 114]],

       [[529, 114]],

       [[528, 114]],

       [[527, 114]],

       [[526, 114]],

       [[525, 114]],

       [[524, 114]],

       [[523, 114]],

       [[524, 114]],

       [[525, 114]],

       [[526, 114]],

       [[527, 114]],

       [[528, 114]],

       [[529, 114]],

       [[530, 114]],

       [[531, 114]],

       [[532, 114]],

       [[533, 114]],

       [[534, 114]],

       [[535, 114]],

       [[536, 114]],

       [[537, 114]],

       [[538, 114]],

       [[539, 114]],

       [[540, 114]],

       [[541, 114]],

       [[542, 114]],

       [[543, 114]],

       [[544, 114]],

       [[545, 114]],

       [[546, 114]],

       [[547, 114]],

       [[548, 114]],

       [[549, 114]],

       [[550, 114]],

       [[551, 114]],

       [[552, 114]],

       [[553, 114]],

       [[554, 114]],

       [[555, 114]],

       [[556, 114]],

       [[557, 114]],

       [[558, 114]],

       [[559, 114]],

       [[560, 114]],

       [[561, 114]],

       [[562, 114]],

       [[563, 114]],

       [[564, 114]],

       [[565, 114]],

       [[566, 113]],

       [[566, 112]],

       [[565, 112]]], dtype=int32)
```

In [5]:

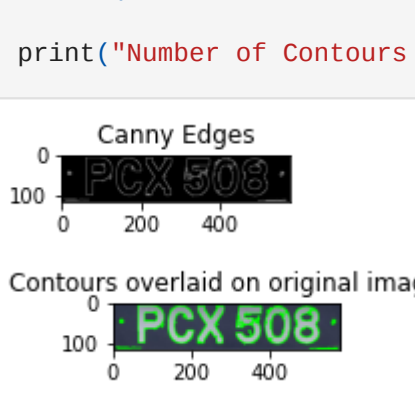
```
image = cv2.imread('LP.jpg')

# Convert to Grayscale
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
imshow('After Grayscaling', gray)

# Finding Contours
contours, hierarchy = cv2.findContours(gray, cv2.RETR_LIST, cv2.CHAIN_APPROX_NONE)

# Draw all contours, note this overwrites the input image (inplace operation)
# Use '-1' as the 3rd parameter to draw all
#cv2.drawContours(image, contours, -1, (0,255,0), thickness = 2)
imshow('Contours overlaid on original image', image)

print("Number of Contours found = " + str(len(contours)))
```




```
Number of Contours found = 1
```

In [6]:

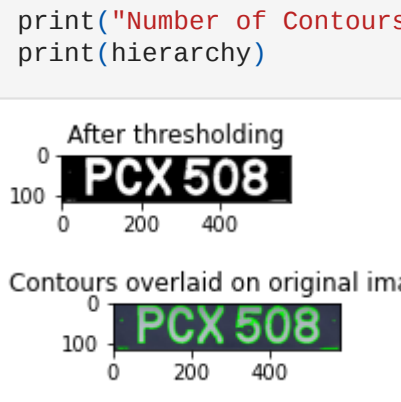
```
image = cv2.imread('LP.jpg')

# Convert to Grayscale
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

# Canny Edges
edged = cv2.Canny(gray, 30, 200)
imshow('Canny Edges', edged)

# Finding Contours
contours, hierarchy = cv2.findContours(edged, cv2.RETR_LIST, cv2.CHAIN_APPROX_NONE)

# Draw all contours, note this overwrites the input image (inplace operation)
# Use '-1' as the 3rd parameter to draw all
cv2.drawContours(image, contours, -1, (0,255,0), thickness = 2)
imshow('Contours overlaid on original image', image)

print("Number of Contours found = " + str(len(contours)))
```




```
Number of Contours found = 77
```

In [7]:

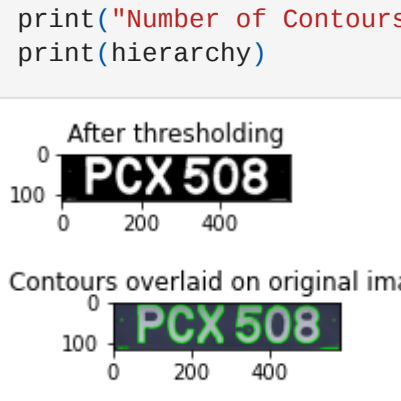
```
image = cv2.imread('LP.jpg')

# Convert to Grayscale
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

_, th2 = cv2.threshold(gray, 0, 255, cv2.THRESH_BINARY + cv2.THRESH_OTSU)
imshow('After thresholding', th2)

# Use a copy of your image e.g. edged.copy(), since findContours alters the image
contours, hierarchy = cv2.findContours(th2, cv2.RETR_LIST, cv2.CHAIN_APPROX_NONE)

# Draw all contours, note this overwrites the input image (inplace operation)
# Use '-1' as the 3rd parameter to draw all
cv2.drawContours(image, contours, -1, (0,255,0), thickness = 2)
imshow('Contours overlaid on original image', image)

print("Number of Contours found = " + str(len(contours)))
print(hierarchy)
```




```
Number of Contours found = 38
[[[ 1 -1 -1 -1]
  [ 2  0 -1 -1]
  [ 3  1 -1 -1]
  [ 4  2 -1 -1]
  [ 5  3 -1 -1]
  [ 6  4 -1 -1]
  [ 7  5 -1 -1]
  [ 8  6 -1 -1]
  [ 9  7 -1 -1]
  [10  8 -1 -1]
  [11  9 -1 -1]
  [12 10 -1 -1]
  [13 11 -1 -1]
  [14 12 -1 -1]
  [15 13 -1 -1]
  [16 14 -1 -1]
  [17 15 -1 -1]
  [18 16 -1 -1]
  [19 17 -1 -1]
  [20 18 -1 -1]
  [21 19 -1 -1]
  [22 20 -1 -1]
  [23 21 -1 -1]
  [24 22 -1 -1]
  [25 23 -1 -1]
  [26 24 -1 -1]
  [27 25 -1 -1]
  [28 26 -1 -1]
  [29 27 -1 -1]
  [30 28 -1 -1]
  [31 29 -1 -1]
  [32 30 -1 -1]
  [33 31 -1 -1]
  [34 32 -1 -1]
  [35 33 -1 -1]
  [36 34 -1 -1]
  [37 35 -1 -1]
  [-1 36 -1 -1]]]
```

In [10]:

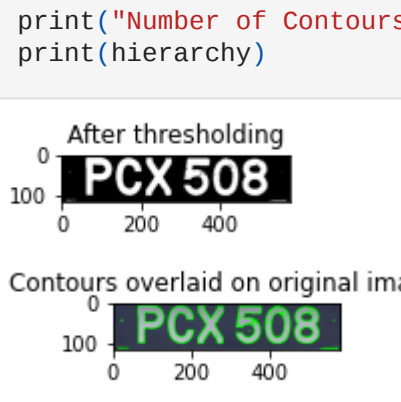
```
image = cv2.imread('LP.jpg')

# Convert to Grayscale
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

_, th2 = cv2.threshold(gray, 0, 255, cv2.THRESH_BINARY + cv2.THRESH_OTSU)
imshow('After thresholding', th2)

# Use a copy of your image e.g. edged.copy(), since findContours alters the image
contours, hierarchy = cv2.findContours(th2, cv2.RETR_EXTERNAL, cv2.CHAIN_APPROX_NONE)

# Draw all contours, note this overwrites the input image (inplace operation)
# Use '-1' as the 3rd parameter to draw all
cv2.drawContours(image, contours, -1, (0,255,0), thickness = 2)
imshow('Contours overlaid on original image', image, size = 10)

print("Number of Contours found = " + str(len(contours)))
print(hierarchy)
```




```
Number of Contours found = 16
[[[ 1 -1 -1 -1]
  [ 2  0 -1 -1]
  [ 3  1 -1 -1]
  [ 4  2 -1 -1]
  [ 5  3 -1 -1]
  [ 6  4 -1 -1]
  [ 7  5 -1 -1]
  [ 8  6 -1 -1]
  [ 9  7 -1 -1]
  [10  8 -1 -1]
  [11  9 -1 -1]
  [12 10 -1 -1]
  [13 11 -1 -1]
  [14 12 -1 -1]
  [15 13 -1 -1]
  [-1 14 -1 -1]]]
```

In [11]:

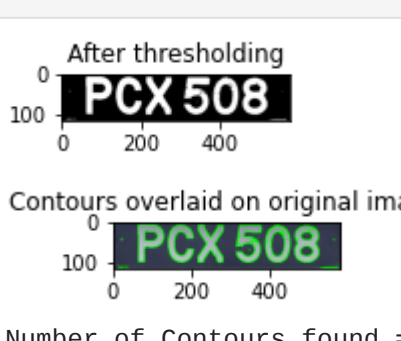
```
image = cv2.imread('LP.jpg')

# Convert to Grayscale
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

_, th2 = cv2.threshold(gray, 0, 255, cv2.THRESH_BINARY + cv2.THRESH_OTSU)
imshow('After thresholding', th2)

# Use a copy of your image e.g. edged.copy(), since findContours alters the image
contours, hierarchy = cv2.findContours(th2, cv2.RETR_CCOMP, cv2.CHAIN_APPROX_NONE)

# Draw all contours, note this overwrites the input image (inplace operation)
# Use '-1' as the 3rd parameter to draw all
cv2.drawContours(image, contours, -1, (0,255,0), thickness = 2)
imshow('Contours overlaid on original image', image)

print("Number of Contours found = " + str(len(contours)))
print(hierarchy)
```




```
Number of Contours found = 38
[[[ 1 -1 -1 -1]
  [ 2  0 -1 -1]
  [ 3  1 -1 -1]
  [ 4  2 -1 -1]
  [ 5  3 -1 -1]
  [ 6  4 -1 -1]
  [ 7  5 -1 -1]
  [ 8  6 -1 -1]
  [ 9  7 -1 -1]
  [10  8 -1 -1]
  [17  9 11 -1]
  [12 -1 -1 10]
  [13 11 -1 10]
  [14 12 -1 10]
  [15 13 -1 10]
  [16 14 -1 10]
  [-1 15 -1 10]
  [25 10 18 -1]
  [19 -1 -1 17]
  [20 18 -1 17]
  [21 19 -1 17]
  [22 20 -1 17]
  [23 21 -1 17]
  [24 22 -1 17]
  [-1 23 -1 17]
  [32 17 26 -1]
  [27 -1 -1 25]
  [28 26 -1 25]
  [29 27 -1 25]
  [30 28 -1 25]
  [31 29 -1 25]
  [-1 30 -1 25]
  [35 25 33 -1]
  [34 -1 -1 32]
  [-1 33 -1 32]
  [36 32 -1 -1]
  [-1 35 37 -1]
  [-1 -1 -1 36]]]
```

In [12]:

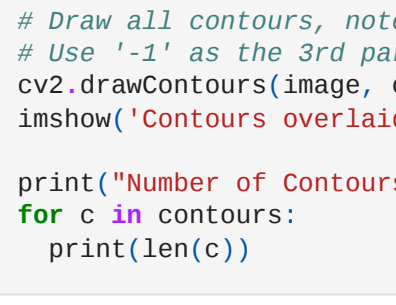
```
image = cv2.imread('LP.jpg')

# Convert to Grayscale
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

_, th2 = cv2.threshold(gray, 0, 255, cv2.THRESH_BINARY + cv2.THRESH_OTSU)
imshow('After thresholding', th2)

# Use a copy of your image e.g. edged.copy(), since findContours alters the image
contours, hierarchy = cv2.findContours(th2, cv2.RETR_TREE, cv2.CHAIN_APPROX_NONE)

# Draw all contours, note this overwrites the input image (inplace operation)
# Use '-1' as the 3rd parameter to draw all
cv2.drawContours(image, contours, -1, (0,255,0), thickness = 2)
imshow('Contours overlaid on original image', image)

print("Number of Contours found = " + str(len(contours)))
for c in contours:
  print(len(c))
```

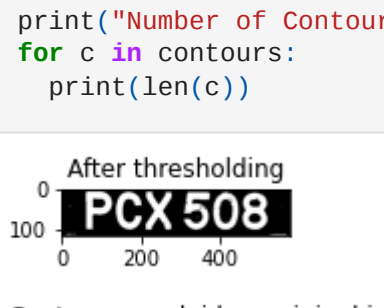



```
Number of Contours found = 38
87
50
7
1
1
1
1
4
2
1
236
80
6
75
10
4
8
426
6
4
4
10
14
21
17
241
6
14
15
155
14
9
358
4
4
347
272
92
```

In [13]:

```
image = cv2.imread('LP.jpg')

# Convert to Grayscale
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

_, th2 = cv2.threshold(gray, 0, 255, cv2.THRESH_BINARY + cv2.THRESH_OTSU)
imshow('After thresholding', th2)

# Use a copy of your image e.g. edged.copy(), since findContours alters the image
contours, hierarchy = cv2.findContours(th2, cv2.RETR_TREE, cv2.CHAIN_APPROX_SIMPLE)

# Draw all contours, note this overwrites the input image (inplace operation)
# Use '-1' as the 3rd parameter to draw all
cv2.drawContours(image, contours, -1, (0,255,0), thickness = 2)
imshow('Contours overlaid on original image', image)

print("Number of Contours found = " + str(len(contours)))
for c in contours:
  print(len(c))
```






```
Number of Contours found = 38
8
10
7
1
1
1
1
4
2
1
114
40
6
37
6
4
8
172
6
4
4
6
6
15
11
121
6
6
8
57
8
7
170
4
4
164
65
27
```

In [ ]: