In [1]:

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

```
Mounted at /content/drive
```

In [2]:

```
import os
os.chdir("/content/drive/MyDrive/PR_Assignment/Q2/")
```

In [3]:

```
# IMPORT REQUIRED PACKAGES
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import cv2
```

In [4]:

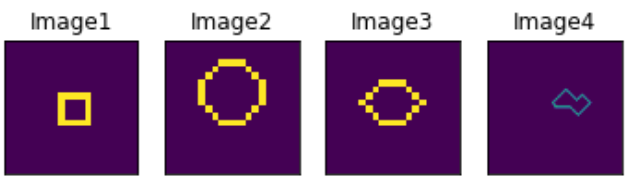
```
# LOAD INPUTS
img1 = cv2.imread('1.png',cv2.IMREAD_UNCHANGED)
img2 = cv2.imread('2.png',cv2.IMREAD_UNCHANGED)
img3 = cv2.imread('3.png',cv2.IMREAD_UNCHANGED)
img4 = cv2.imread('4.png',cv2.IMREAD_UNCHANGED)
```

In [5]:

```
# VISUALIZE IMAGES
plt.subplot(1,4,1)
plt.xticks([],[])
plt.yticks([],[])
plt.title("Image1")
plt.imshow(img1)

plt.subplot(1,4,2)
plt.xticks([],[])
plt.yticks([],[])
plt.title("Image2")
plt.imshow(img2)

plt.subplot(1,4,3)
plt.xticks([],[])
plt.yticks([],[])
plt.title("Image3")
plt.imshow(img3)

plt.subplot(1,4,4)
plt.xticks([],[])
plt.yticks([],[])
plt.title("Image4")
plt.imshow(img4)
```

Out[5]:

```
<matplotlib.image.AxesImage at 0x7f723ef56650>
```



In [6]:

```
# GET START POINT
```

```
def start_point(img):
    for i in range(img.shape[0]):
        for j in range(img.shape[1]):
            if img[i][j] == 1:
                return i,j

print('Start Point of img1: {0}'.format(start_point(img1)))
print('Start Point of img2: {0}'.format(start_point(img2)))
print('Start Point of img3: {0}'.format(start_point(img3)))
print('Start Point of img4: {0}'.format(start_point(img4)))
```

```
Start Point of img1: (8, 8)
Start Point of img2: (3, 8)
Start Point of img3: (6, 8)
Start Point of img4: (37, 58)
```

Following the direction, as given in question.

- **1 : (0,1)**
- **2 : (1,1)**
- **3 : (1,0)**
- **4 : (1,-1)**
- **5 : (0,-1)**
- **6 : (-1,-1)**
- **7 : (-1,0)**
- **8 : (-1,1)**

In [7]:

```
def getChainCode(img): # FUNCTION TO GET CHAIN CODE
    x,y = start_point(img)
    a,b = x,y
    checked = np.zeros_like(img)
    checked[x][y] = 1
    while True:
        # Checking for each image location and print their corrusponding code.
        if img[x][y+1] == 1 and not checked[x][y+1]:
            print("1",end="")
            y += 1
            checked[x][y] = 1

        elif img[x+1][y+1] == 1 and not checked[x+1][y+1]:
            print("2",end="")
            x += 1
            y += 1
            checked[x][y] = 1

        elif img[x+1][y] == 1 and not checked[x+1][y]:
            print("3",end="")
            x += 1
            checked[x][y] = 1

        elif img[x+1][y-1] == 1 and not checked[x+1][y-1]:
            print("4",end="")
            x += 1
            y -= 1
            checked[x][y] = 1

        elif img[x][y-1] == 1 and not checked[x][y-1]:
            print("5",end="")
            y -= 1
            checked[x][y] = 1

        elif img[x-1][y-1] == 1 and not checked[x-1][y-1]:
            print("6",end="")
            x -= 1
            y -= 1
            checked[x][y] = 1
```

```
        elif img[x-1][y] == 1 and (not checked[x-1][y]):
            print("7",end="")
            x -= 1
            checked[x][y] = 1

        elif img[x-1][y+1] == 1 and not checked[x-1][y+1]:
            print("8",end="")
            x -= 1
            y += 1
            checked[x][y] = 1

        else:
           # CONDITION FOR END POINT CHAIN CODE
            diff_x = (a-x)
            diff_y = (b-y)
            if diff_x in [-1,0,1] and diff_y in [-1,0,1]:
                if (diff_x,diff_y) == (0,1):
                    print("1",end="")

                elif (diff_x,diff_y) == (1,1):
                    print("2",end="")

                elif (diff_x,diff_y) == (1,0):
                    print("3",end="")

                elif (diff_x,diff_y) == (1,-1):
                    print("4",end="")

                elif (diff_x,diff_y) == (0,-1):
                    print("5",end="")

                elif (diff_x,diff_y) == (-1,-1):
                    print("6",end="")

                elif (diff_x,diff_y) == (-1,0):
                    print("7",end="")

                elif (diff_x,diff_y) == (-1,1):
                    print("8",end="")
            print('\n')
            break

print("Chain Codes,")
print("Image_1:")
getChainCode(img1) # code for Image1

print("Image_2:")
getChainCode(img2) # code for Image2

print("Image_3:")
getChainCode(img3) # code for Image3

print("Image_4:")
getChainCode(img4) # code for Image4
```

```
Chain Codes,
Image_1:
1111333355557777

Image_2:
11122233344455566677788 8

Image_3:
111222444555666888

Image_4:
22222222888822222244444444466666655555555557668888888888
```