Dilation, Erosion and Edge Detection

In this lesson we'll learn: Dilation Erosion Opening Closing Canny Edge Detection

In [1]:

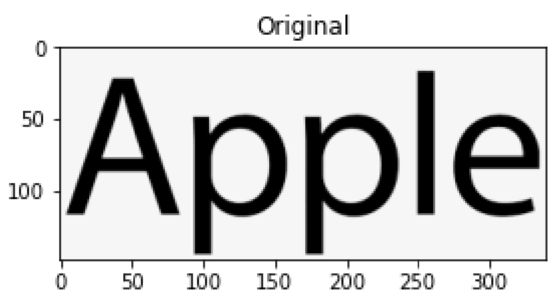
```python
import cv2
import numpy as np
from matplotlib import pyplot as plt

# 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()
```

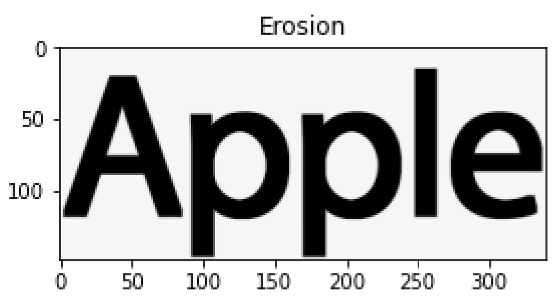
Dilation – Adds pixels to the boundaries of objects in an image

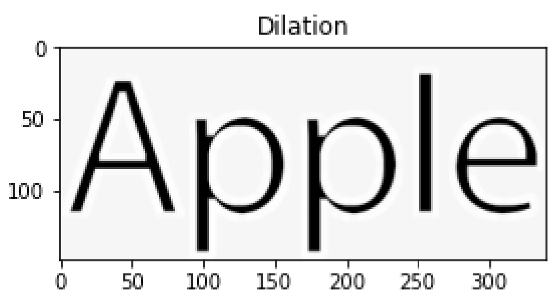
Erosion – Removes pixels at the boundaries of objects in an image Opening - Erosion followed by dilation Closing - Dilation followed by erosion

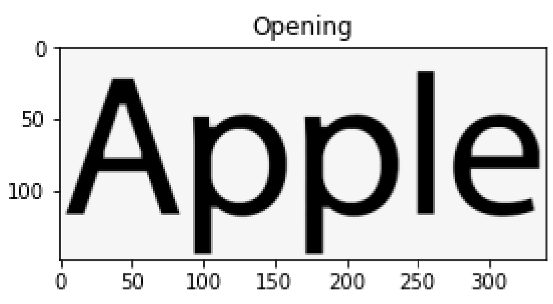
In [2]:

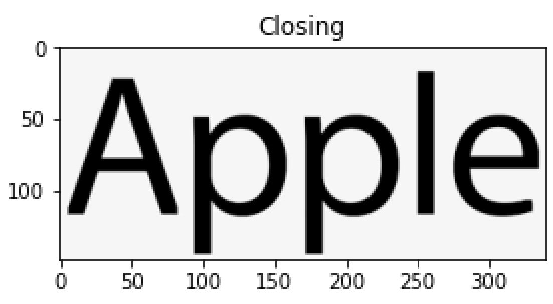
```python
import cv2
import numpy as np

image = cv2.imread('download.png', 0)
imshow('Original', image)

# Let's define our kernel size
kernel = np.ones((5,5), np.uint8)

# Now we erode
erosion = cv2.erode(image, kernel, iterations = 1)
imshow('Erosion', erosion)

# Dilate here
dilation = cv2.dilate(image, kernel, iterations = 1)
imshow('Dilation', dilation)

# Opening - Good for removing noise
opening = cv2.morphologyEx(image, cv2.MORPH_OPEN, kernel)
imshow('Opening',opening)

# Closing - Good for removing noise
closing = cv2.morphologyEx(image, cv2.MORPH_CLOSE, kernel)
imshow('Closing',closing)
```





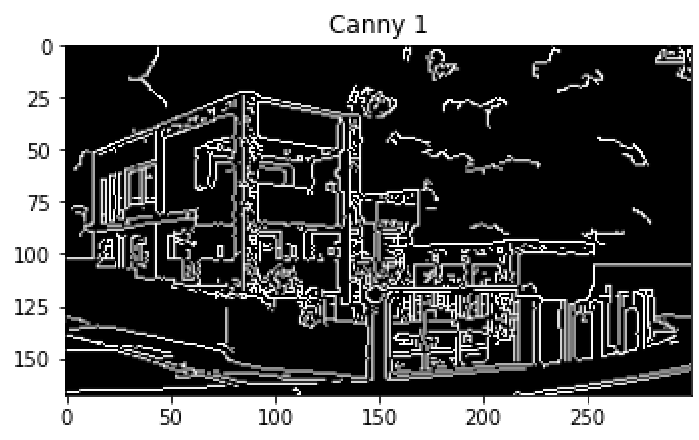


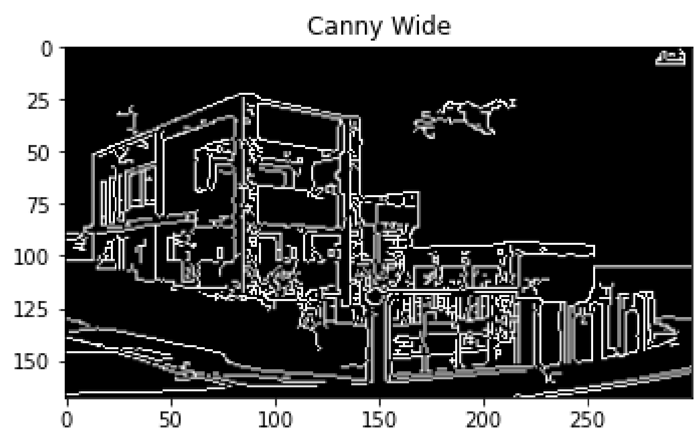


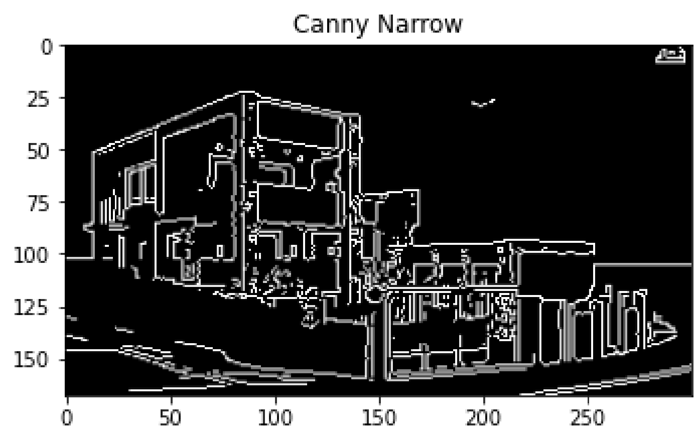


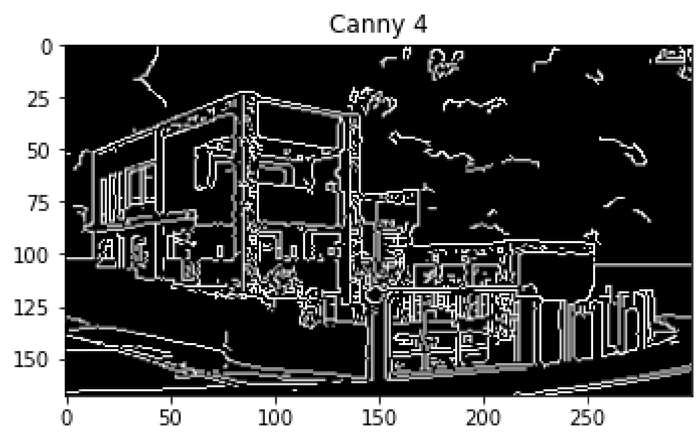
In [4]:

```python
image = cv2.imread('house.jpg',0)

# Canny Edge Detection uses gradient values as thresholds
# The first threshold gradient
canny = cv2.Canny(image, 50, 120)
imshow('Canny 1', canny)

# Wide edge thresholds expect lots of edges
canny = cv2.Canny(image, 10, 200)
imshow('Canny Wide', canny)

# Narrow threshold, expect less edges
canny = cv2.Canny(image, 200, 240)
imshow('Canny Narrow', canny)

canny = cv2.Canny(image, 60, 110)
imshow('Canny 4', canny)
```



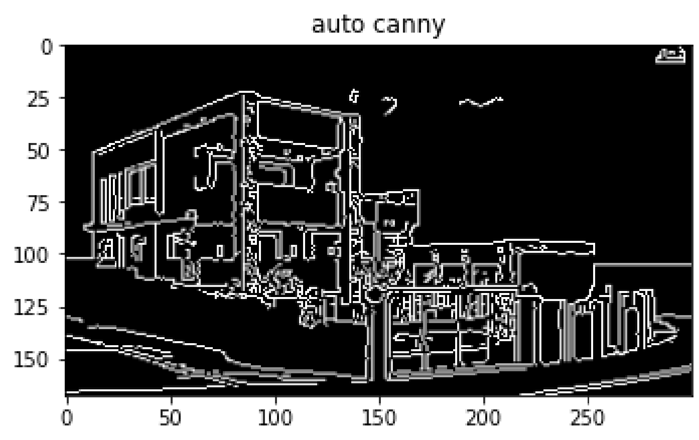






In [5]:

```python
def autoCanny(image):
  # Finds optimal thresholds based on median image pixel intensity
  blurred_img = cv2.blur(image, ksize=(5,5))
  med_val = np.median(image)
  lower = int(max(0, 0.66 * med_val))
  upper = int(min(255, 1.33 * med_val))
  edges = cv2.Canny(image=image, threshold1=lower, threshold2=upper)
  return edges

auto_canny = autoCanny(image)
imshow("auto canny", auto_canny)
```



In [ ]: