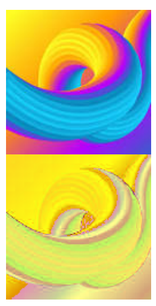
```
# DIGITAL IMAGE PROCESSING LAB 5


# CONVERT THE IMAGE TO HSV FORMAT
import numpy as np
import cv2
from google.colab.patches import cv2_imshow

image = cv2.imread('/content/download.jpeg')
hsvImage = cv2.cvtColor(image, cv2.COLOR_BGR2HSV)

cv2_imshow(image)
cv2_imshow(hsvImage)

cv2.waitKey(0)
```



```
#Erosion
import numpy as np
import cv2
from google.colab.patches import cv2_imshow

image = cv2.imread('/content/download.jpeg')

cv2_imshow(image)

kernel = np.ones((5, 5), np.uint8)

img_eroded = cv2.erode(image, kernel)

cv2_imshow(img_eroded)

cv2.waitKey(0)
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#Dilation
import numpy as np
import cv2
from google.colab.patches import cv2_imshow

image = cv2.imread('/content/download.jpeg')

cv2_imshow(image)

kernel = np.ones((5, 5), np.uint8)

img_dilation = cv2.dilate(image, kernel)

cv2_imshow(img_dilation)

cv2.waitKey(0)
```

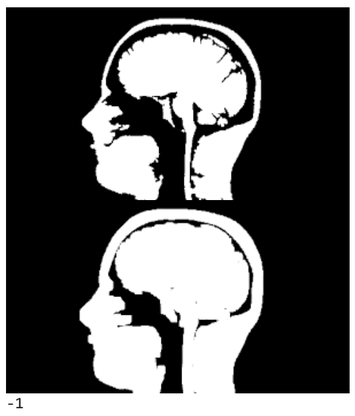

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# Opening

import numpy as np
import cv2
from google.colab.patches import cv2_imshow

image = cv2.imread('/content/download.jpeg')

cv2_imshow(image)

kernel = np.ones((5, 5), np.uint8)

prefinal_image = cv2.erode(image,kernel)
cv2_imshow(prefinal_image)
final_image = cv2.dilate(prefinal_image, kernel)
cv2_imshow(final_image)

cv2.waitKey(0)
```

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# Closing

import numpy as np
import cv2
from google.colab.patches import cv2_imshow
```
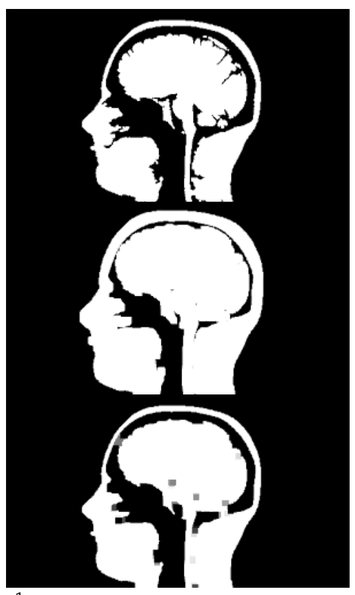

```
image = cv2.imread('/content/download.jpeg')

cv2_imshow(image)

kernel = np.ones((5, 5), np.uint8)

prefinal_image = cv2.dilate(image,kernel)
cv2_imshow(prefinal_image)

final_image = cv2.erode(prefinal_image, kernel)
cv2_imshow(final_image)

cv2.waitKey(0)
```



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# Morphological Gradient
import numpy as np
import cv2
from google.colab.patches import cv2_imshow

image = cv2.imread('/content/download.jpeg')

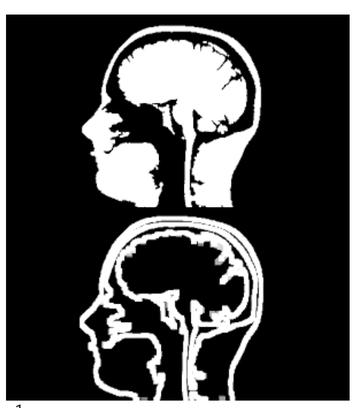
cv2_imshow(image)

kernel = np.ones((5, 5), np.uint8)

gradient = cv2.morphologyEx(image, cv2.MORPH_GRADIENT, kernel)

cv2_imshow(gradient)

cv2.waitKey(0)
```



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# Find the contours in an image
import cv2
import numpy as np
from google.colab.patches import cv2_imshow

img = cv2.imread('/content/cv2-resize-image-original.png', cv2.IMREAD_UNCHANGED)
cv2_imshow(img)

#convert img to grey
img_grey = cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
#set a thresh
thresh = 100
#get threshold image
ret,thresh_img = cv2.threshold(img_grey, thresh, 255, cv2.THRESH_BINARY)
#find contours
contours, hierarchy = cv2.findContours(thresh_img, cv2.RETR_TREE, cv2.CHAIN_APPROX_SIMPLE)

#create an empty image for contours
img_contours = np.zeros(img.shape)
# draw the contours on the empty image
cv2.drawContours(img_contours, contours, -1, (0,255,0), 3)
#save image
cv2_imshow(img_contours)
```

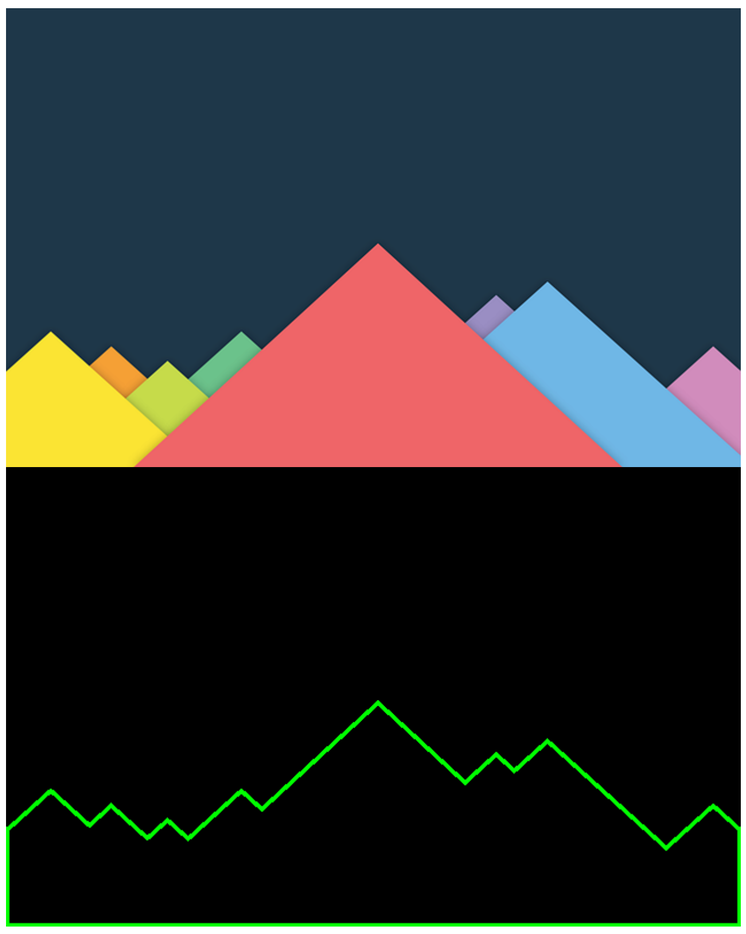

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