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Enrolment No.: BT19ECE029

Subject: Digital Image Processing

Date: January 21st, 2022

ASSIGNMENT 1

Code:

```
# ASSIGNMENT 1
# TANISHK CHANDRASHEKHAR SHEWARE - BT19ECE029

import cv2
import numpy as np
import math

img = cv2.imread('T.jpg')

B, G, R = img[:,:,0], img[:,:,1], img[:,:,2]

#I1 = (G + R + B)/3
I1 = 0.33*R + 0.59*B + 0.11*G

M = len(I1)
N = len(I1[0])

I2 = I1.copy()


for x in range(M):
    for y in range(N):
        intensity = I1[x][y]
        if intensity>127:
            I2[x][y] = 255
        else:
            I2[x][y] = 0


I01 = I1+I2
I02 = I1 + 20

print("M = ", M," ", "N = ", N)

print("Color Image: - ")
cv2_imshow(img)

print("Gray Image: - ")
```

```
cv2_imshow(I1)

print("Black and White Image: - ")
cv2_imshow(I2)

print("Gray Image + Black and White Image: - ")
cv2_imshow(I01)

print("Gray Image + 20: - ")
cv2_imshow(I02)
```

Output:

```
M =  559   N =  399
Color Image: -
```

```
Gray Image: -
```

```
Black and White Image: -
```

Gray Image + Black and White Image: -

Gray Image + 20: -

ASSIGNMENT 2

Code:

```
# ASSIGNMENT 2
# TANISHK CHANDRASHEKHAR SHEWARE - BT19ECE029

img = cv2.imread('T.jpg')

B, G, R = img[:,:,0], img[:,:,1], img[:,:,2]

#I1 = (G + R + B)/3
I1 = 0.33*R + 0.59*B + 0.11*G

print("Color Image: - ")
cv2_imshow(img)

print("Gray Image: - ")
cv2_imshow(I1)

I2 = I1.copy()

# Putting a Black box on the face
for i in range(50,400):
  for j in range(50,300):
    I2[i][j]= 0

print("Image with black box on the face: - ")
cv2_imshow(I2)

# Subtraction of Images

I3 = I1 - I2

print("Result of the Subtraction: - ")
cv2_imshow(I3)
```

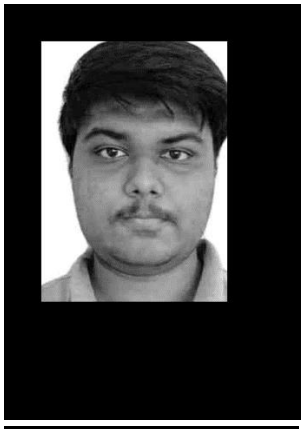
Output:

```
Color Image: -
```

Gray Image: -

Image with black box on the face: -

Result of the Subtraction: -



ASSIGNMENT 3

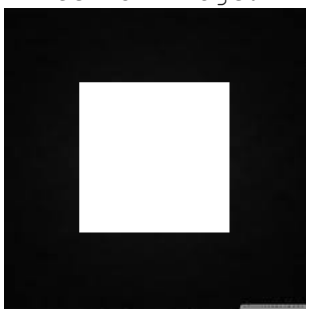
Code:

```
# ASSIGNMENT 3
# TANISHK CHANDRASHEKHAR SHEWARE - BT19ECE029


I_Square = cv2.imread('Black Image.png') #Plane Black Image
I_Circle = cv2.imread("white circle.png") #Image with circle on it


#Dimensions of white box
squareLStart = int(len(I_Square)*0.25)
squareLStop = int(len(I_Square)*0.75)
squareWStart = int(len(I_Square[0])*0.25)
squareWStop = int(len(I_Square[0])*0.75)

# Making a Square Box
for i in range(squareLStart,squareLStop):
  for j in range(squareWStart,squareWStop):
    I_Square[i][j][0] = 255
    I_Square[i][j][1] = 255
    I_Square[i][j][2] = 255


print("White Box Image: - ")
cv2_imshow(I_Square)

print("White Circle Image: - ")
cv2_imshow(I_Circle)

I_AND = np.bitwise_and(I_Square,I_Circle)
I_OR = np.bitwise_or(I_Square,I_Circle)
I_NAND = np.bitwise_not(np.bitwise_and(I_Square,I_Circle))
I_NOR = np.bitwise_not(np.bitwise_or(I_Square,I_Circle))
I_Square_NOT = np.bitwise_not(I_Square )
I_Circle_NOT = np.bitwise_not(I_Circle)
I_XOR = np.bitwise_or(np.bitwise_and(I_Square,I_Circle) , np.bitwise_an
d(np.bitwise_not(I_Square),np.bitwise_not(I_Circle)))
I_XNOR = np.bitwise_and(np.bitwise_or(I_Square,I_Circle), np.bitwise_or
(np.bitwise_not(I_Square),np.bitwise_not(I_Circle)))


print("AND: - ")
cv2_imshow(I_AND)
print("OR: - ")
cv2_imshow(I_OR)
print("NAND: - ")
cv2_imshow(I_NAND)
```

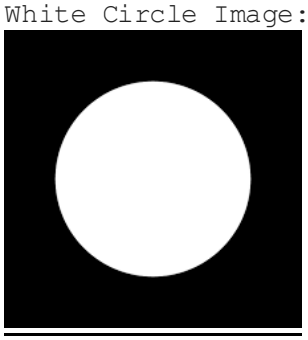
```
print("NOR: - ")
cv2_imshow(I_NOR)
print("SQUARE NOT: - ")
cv2_imshow(I_Square_NOT)
print("CIRCLE NOT: - ")
cv2_imshow(I_Circle_NOT)
print("XOR: - ")
cv2_imshow(I_XOR)
print("XNOR: - ")
cv2_imshow(I_XNOR)
```

Output:

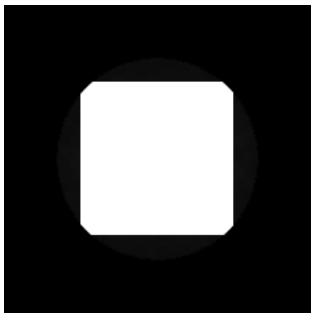
White Box Image: -



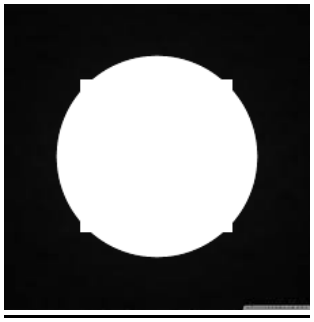
White Circle Image: -



AND: -

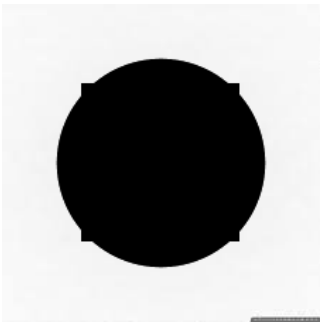


OR: -

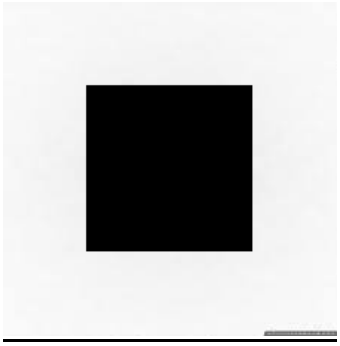


NAND: -

NOR: -

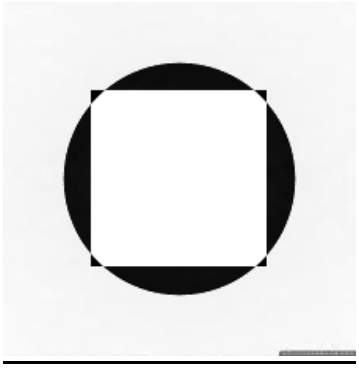


SQUARE NOT: -

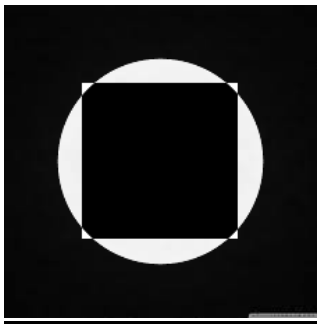


CIRCLE NOT: -

XOR: -



XNOR: -



ASSIGNMENT 4

Code:

```
# ASSIGNMENT 4
# TANISHK CHANDRASHEKHAR SHEWARE - BT19ECE029

img = cv2.imread("T.jpg")

zero = np.zeros([len(img), len(img[0])])

I_Red = img.copy()
I_Green = img.copy()
I_Blue = img.copy()

I_Red[:,:,0] = zero
I_Red[:,:,1] = zero
I_Red[:,:,2] = img[:,:,2]

I_Blue[:,:,0] = img[:,:,0]
I_Blue[:,:,1] = zero
I_Blue[:,:,2] = zero

I_Green[:,:,0] = zero
I_Green[:,:,1] = img[:,:,1]
I_Green[:,:,2] = zero



print("RED: - ")
cv2_imshow(I_Red)

print("GREEN: - ")
cv2_imshow(I_Green)
print("BLUE: - ")
cv2_imshow(I_Blue)
```

Output:

RED: -

GREEN: -

BLUE: -