

Python For Electrical Workout - II

presented by "Pi Research Tech"

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1) Design XOR gate using Python?

Hint:

- X Y O
- 0 0 0
- 0 1 1
- 1 0 1
- 1 1 0

```
In [1]: x=int(input('Enter a 1st number:'))
y=int(input('Enter a 2nd number'))
if(x==1 and y==1):
    c=0
elif(x==0 and y==0):
    c=0
else:
    c=1
print('The formatted output is;',c)
```

```
Enter a 1st number:1
Enter a 2nd number:0
The formatted output is; 1
```

2) Find Binary to Decimal b='1010110'

Hint

$$b[-1]2^0 + b[-2]2^1 + \dots + b[-(n+1)]2^n$$

```
In [2]: # [ 0, 1, 2, 3, 4, 5, 6]
# [-7, -6, -5, -4, -3, -2, -1]
b='1010110'
d=0
for i in range (len(b)):
    d += int(b[-(i+1)])*2**i
print('the decimal value is:',d)
```

```
the decimal value is: 86
```

3) Plot 3 phase voltage using matplotlib & numpy

Hint

$V_m = 230V$

$t = 0$ to 10sec

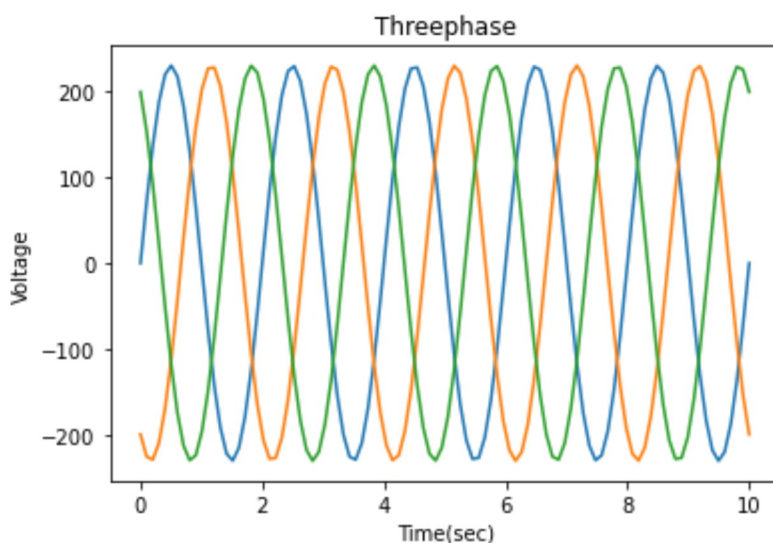
$f = 50\text{hz}$

$w = 2\pi f$

```
In [3]: import numpy as np
from matplotlib import pyplot as plt

Vm = 230
t = np.linspace(0,10,100)
f=50
w = 2*np.pi*f
v1 = Vm * np.sin(w*t)
v2 = Vm * np.sin(w*t-2*np.pi/3)
v3 = Vm * np.sin(w*t-4*np.pi/3)

plt.plot(t,v1)
plt.plot(t,v2)
plt.plot(t,v3)
plt.title("Threephase")
plt.xlabel("Time(sec)")
plt.ylabel("Voltage")
plt.show()
```



4)Find Energy of Discrete Signal X using while loop

Hint

$x = [1, 2, 3, 4, 5, 6]$

In [4]:

```
x = [1, 2, 4, 8, 16]
E = 0
i = 0
while(len(x)>i):
    E += x[i]**2
    i += 1

print(E)
```

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5) Compute Ton & Toff time of PWM pulse with D=20% and freq=50 hz

Hint

$D = T_{on} / (T_{on} + T_{off})$

$T = 1 / \text{freq}$

In [5]:

```
D = 20/100
f = 50 # 50 hz
T = 1/f
Ton=D*T
Toff=T-Ton
print(f'T --> {T} sec')
print(f'Ton-->{Ton} sec')
print(f'Toff-->{Toff} sec')
```

```
T --> 0.02 sec
Ton-->0.004 sec
Toff-->0.016 sec
```

6) Plot Efficiency of Transformer with respect to losses
=[10,20,30,40] and Pout= 100

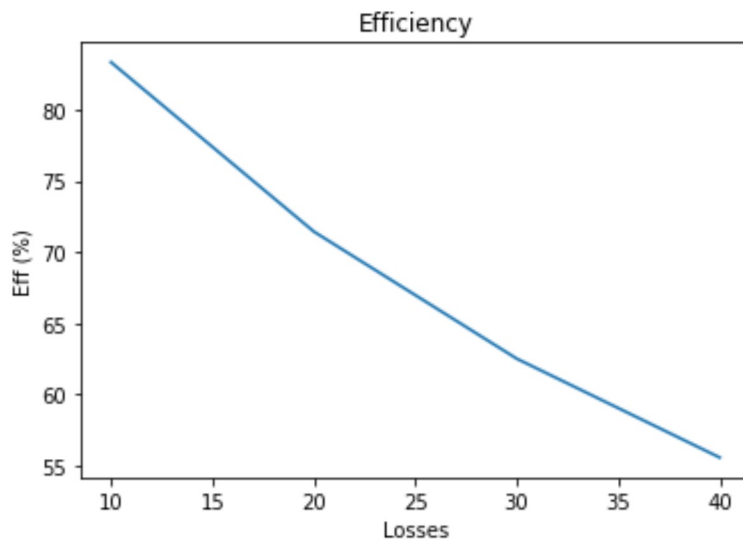
Hint

$\text{Efficiency} = (P_{out} / P_{in}) * 100$

```
In [6]: import numpy as np
from matplotlib import pyplot as plt

Pout = 100
losses = np.array([10,20,30,40])
pin = Pout + losses
Effi = (Pout/(pin + losses))*100

plt.plot(losses, Effi)
plt.title("Efficiency")
plt.xlabel("Losses")
plt.ylabel("Eff (%)")
plt.show()
```



7) If room temperature greater than 20 degree celsius
the cooler is ON otherwise cooler off

```
In [7]: temperature = int(input('Enter a Temperature value(deg):'))
if temperature > 20:
    print('Cooler on')
else:
    print('Cooler off')
```

```
Enter a Temperature value(deg):25
Cooler on
```