

#Inserting table values, to a numpy array 2x2x2

```
import numpy as np
p=np.zeros((2,2,2))
for a in (0,1):
    for b in (0,1):
        for c in (0,1):
            p[a][b][c]=input("Enter P({},{},{})".format(a,b,c))
```

```
Enter P(0,0,0)0.192
Enter P(0,0,1)0.144
Enter P(0,1,0)0.048
Enter P(0,1,1)0.216
Enter P(1,0,0)0.192
Enter P(1,0,1)0.064
Enter P(1,1,0)0.048
Enter P(1,1,1)0.096
```

#initializations

```
p_a1=0 # p(a=0)
p_a2=0 # p(a=1)
p_c1=0 # p(c=0)
p_c2=0 # p(c=1)
p_bc=np.zeros((2,2)) # p(b|c)
p_ca=np.zeros((2,2)) # p(c|a)
```

```
for a in (0,1):
    for b in (0,1):
        for c in (0,1):
            if c==0:
                p_c1+=p[a][b][0]
            elif c==1:
                p_c2+=p[a][b][1]
```

```
if a==0:
```

```

    p_a1+=p[a][b][c]
elif a==1:
    p_a2+=p[a][b][c]

for a in (0,1):

    for b in (0,1):
        for c in (0,1):

            if c==0:
                p_bc[b][c]=(p[0][b][c]+p[1][b][c])/p_c1

            else:
                p_bc[b][c]=(p[0][b][c]+p[1][b][c])/p_c2
                #print("for {}, {}, we get p(b|c)={}".format(b,c,p_bc[b][c]))    #---debug

            if a==0:

                p_ca[c][a]=(p[a][0][c]+p[a][1][c])/p_a1
                #print("for {}, {}, we get p(c|a)={}".format(c,a,p_ca[c][a]))    #---debug

            elif a==1:

                p_ca[c][a]=(p[a][0][c]+p[a][1][c])/p_a2


for 0,1, we get p(c|a)=0.6
for 1,1, we get p(c|a)=0.39999999999999997
for 0,1, we get p(c|a)=0.6
for 1,1, we get p(c|a)=0.39999999999999997

```

We validate that it holds :  $p(a, b, c) = p(a)p(c|a)p(b|c)$

```

bad_count=0
bad_save=[]
cond_ind=True
for a in (0,1):
    for b in (0,1):
        for c in (0,1):
            if a==0:
                if p[a][b][c]!=round(p_a1*p_bc[b][c]*p_ca[c][a],4):

                    bad_count+=1
                    #bad_save.append((a,b,c)) #-debug

            elif a==1:
                if p[a][b][c]!=round(p_a2*p_bc[b][c]*p_ca[c][a],4):
                    bad_count+=1
                    #bad_save.append((a,b,c)) #-debug
if bad_count!=0:
    cond_ind=False

print(cond_ind)

```

True

**Q.E.D.!** Now if we want to check for example a specific (random) combination like  $a = 0, b = 1, c = 0$  we get:

```
p[0][1][0]==round(p_a1*p_bc[1][0]*p_ca[0][0],4)    #(we've put p_a1<--> p(a=1) as a=1 here )
```

True