In [63]:
```
import pandas as pd
```

In [64]:
```
df = pd.read_csv('weat.csv')
df
```

Out[64]:

| | OutLook | Temperature | Humidity | Windy | Play |
|---|---|---|---|---|---|
| **0** | sunny | hot | high | False | no |
| **1** | sunny | hot | high | True | no |
| **2** | overcast | hot | high | False | yes |
| **3** | rainy | mild | high | False | yes |
| **4** | rainy | cool | normal | False | yes |
| **5** | rainy | cool | normal | True | no |
| **6** | overcast | cool | normal | True | yes |
| **7** | sunny | mild | high | False | no |
| **8** | sunny | cool | normal | False | yes |
| **9** | rainy | mild | normal | False | yes |
| **10** | sunny | mild | normal | True | yes |
| **11** | overcast | mild | high | True | yes |
| **12** | overcast | hot | normal | False | yes |
| **13** | rainy | mild | high | True | no |

In [65]:
```
df.OutLook
```

Out[65]:
```
0        sunny
1        sunny
2     overcast
3        rainy
4        rainy
5        rainy
6     overcast
7        sunny
8        sunny
9        rainy
10       sunny
11    overcast
12    overcast
13       rainy
Name: OutLook, dtype: object
```

In [66]:
```
df.OutLook.unique()
```

Out[66]:
```
array(['sunny', 'overcast', 'rainy'], dtype=object)
```

In [67]:
```
list(df.OutLook.unique())
```

Out[67]:
```
['sunny', 'overcast', 'rainy']
```

In [68]:
```
df.Play.unique()
```

Out[68]:
```
array(['no', 'yes'], dtype=object)
```

In [69]:
```
col = ['yes','no','P(yes)','P(no)','P_yes','P_no']
```

In [70]:
```
df.OutLook.unique()
```

Out[70]:
```
array(['sunny', 'overcast', 'rainy'], dtype=object)
```

In [71]:
```
outlook_df = pd.DataFrame(index=df.OutLook.unique(), columns=col)
outlook_df
```

Out[71]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **sunny** | NaN | NaN | NaN | NaN | NaN | NaN |
| **overcast** | NaN | NaN | NaN | NaN | NaN | NaN |
| **rainy** | NaN | NaN | NaN | NaN | NaN | NaN |

In [72]:
```
df[(df.OutLook == 'sunny') & (df.Play == 'yes')].shape[0]
```

Out[72]: 2

In [73]:
```
outlook_df.loc['sunny']['no'] = df[(df.OutLook == 'sunny') & (df.Play == 'no')].shape[0]
outlook_df.loc['sunny']['yes'] = df[(df.OutLook == 'sunny') & (df.Play == 'yes')].shape[0]
```

In [74]:
```
outlook_df
```

Out[74]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **sunny** | 2 | 3 | NaN | NaN | NaN | NaN |
| **overcast** | NaN | NaN | NaN | NaN | NaN | NaN |
| **rainy** | NaN | NaN | NaN | NaN | NaN | NaN |

In [75]:
```
outlook_df.loc['overcast']['no'] = df[(df.OutLook == 'overcast') & (df.Play == 'no')].shape[0]
outlook_df.loc['overcast']['yes'] = df[(df.OutLook == 'overcast') & (df.Play == 'yes')].shape[0]
```

In [76]:
```
outlook_df
```

Out[76]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **sunny** | 2 | 3 | NaN | NaN | NaN | NaN |
| **overcast** | 4 | 0 | NaN | NaN | NaN | NaN |
| **rainy** | NaN | NaN | NaN | NaN | NaN | NaN |

In [77]:
```
outlook_df.loc['rainy']['no'] = df[(df.OutLook == 'rainy') & (df.Play == 'no')].shape[0]
outlook_df.loc['rainy']['yes'] = df[(df.OutLook == 'rainy') & (df.Play == 'yes')].shape[0]
```

In [78]:
```
outlook_df
```

Out[78]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **sunny** | 2 | 3 | NaN | NaN | NaN | NaN |
| **overcast** | 4 | 0 | NaN | NaN | NaN | NaN |
| **rainy** | 3 | 2 | NaN | NaN | NaN | NaN |

In [79]:
```
sum(list(outlook_df.yes))
```

Out[79]: 9

In [80]:
```
outlook_df.loc['sunny']['P(yes)'] = str(outlook_df.loc['sunny']['yes'])+str('/')+str(sum(outlook_df.yes))
outlook_df.loc['sunny']['P(no)'] = str(outlook_df.loc['sunny']['no'])+str('/')+str(sum(outlook_df.no))
```

In [81]:
```
outlook_df
print(2/9)
```

```
0.2222222222222222
```

In [82]:
```
outlook_df.loc['sunny']['P_yes'] = outlook_df.loc['sunny']['yes']/sum(outlook_df.yes)
outlook_df.loc['sunny']['P_no'] = outlook_df.loc['sunny']['no']/sum(outlook_df.no)
```

In [83]:
```
outlook_df
```

Out[83]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **sunny** | 2 | 3 | 2/9 | 3/5 | 0.222222 | 0.6 |
| **overcast** | 4 | 0 | NaN | NaN | NaN | NaN |
| **rainy** | 3 | 2 | NaN | NaN | NaN | NaN |

In [84]:
```
outlook_df.loc['overcast']['P(yes)'] = str(outlook_df.loc['overcast']['yes'])+str('/')+str(sum(outlook_df.yes))
outlook_df.loc['overcast']['P(no)'] = str(outlook_df.loc['overcast']['no'])+str('/')+str(sum(outlook_df.no))
```

In [85]:
```
outlook_df.loc['overcast']['P_yes'] = outlook_df.loc['overcast']['yes']/sum(outlook_df.yes)
outlook_df.loc['overcast']['P_no'] = outlook_df.loc['overcast']['no']/sum(outlook_df.no)
```

In [86]:
```
outlook_df
```

Out[86]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **sunny** | 2 | 3 | 2/9 | 3/5 | 0.222222 | 0.6 |
| **overcast** | 4 | 0 | 4/9 | 0/5 | 0.444444 | 0 |
| **rainy** | 3 | 2 | NaN | NaN | NaN | NaN |

In [87]:
```
outlook_df.loc['rainy']['P(yes)'] = str(outlook_df.loc['rainy']['yes'])+str('/')+str(sum(outlook_df.yes))
outlook_df.loc['rainy']['P(no)'] = str(outlook_df.loc['rainy']['no'])+str('/')+str(sum(outlook_df.no))
```

In [88]:
```
outlook_df.loc['rainy']['P_yes'] = outlook_df.loc['rainy']['yes']/sum(outlook_df.yes)
outlook_df.loc['rainy']['P_no'] = outlook_df.loc['rainy']['no']/sum(outlook_df.no)
```

In [89]:
```
outlook_df
```

Out[89]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **sunny** | 2 | 3 | 2/9 | 3/5 | 0.222222 | 0.6 |
| **overcast** | 4 | 0 | 4/9 | 0/5 | 0.444444 | 0 |
| **rainy** | 3 | 2 | 3/9 | 2/5 | 0.333333 | 0.4 |

In [90]:
```
temp_df = pd.DataFrame(index=df.Temperature.unique(), columns=col)
temp_df
```

Out[90]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **hot** | NaN | NaN | NaN | NaN | NaN | NaN |
| **mild** | NaN | NaN | NaN | NaN | NaN | NaN |
| **cool** | NaN | NaN | NaN | NaN | NaN | NaN |

In [91]:
```
temp_df.loc['hot']['no'] = df[(df.Temperature == 'hot') & (df.Play == 'no')].shape[0]
temp_df.loc['hot']['yes'] = df[(df.Temperature == 'hot') & (df.Play == 'yes')].shape[0]
```

In [92]:
```
temp_df
```

Out[92]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **hot** | 2 | 2 | NaN | NaN | NaN | NaN |
| **mild** | NaN | NaN | NaN | NaN | NaN | NaN |
| **cool** | NaN | NaN | NaN | NaN | NaN | NaN |

In [93]:
```
temp_df.loc['mild']['no'] = df[(df.Temperature == 'mild') & (df.Play == 'no')].shape[0]
temp_df.loc['mild']['yes'] = df[(df.Temperature == 'mild') & (df.Play == 'yes')].shape[0]
```

In [94]:
```
temp_df
```

Out[94]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **hot** | 2 | 2 | NaN | NaN | NaN | NaN |
| **mild** | 4 | 2 | NaN | NaN | NaN | NaN |
| **cool** | NaN | NaN | NaN | NaN | NaN | NaN |

In [95]:
```
temp_df.loc['cool']['no'] = df[(df.Temperature == 'cool') & (df.Play == 'no')].shape[0]
temp_df.loc['cool']['yes'] = df[(df.Temperature == 'cool') & (df.Play == 'yes')].shape[0]
```

In [96]:
```
temp_df
```

Out[96]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **hot** | 2 | 2 | NaN | NaN | NaN | NaN |
| **mild** | 4 | 2 | NaN | NaN | NaN | NaN |
| **cool** | 3 | 1 | NaN | NaN | NaN | NaN |

In [97]:
```
temp_df.loc['hot']['P(yes)'] = str(temp_df.loc['hot']['yes'])+str('/')+str(sum(temp_df.yes))
temp_df.loc['hot']['P(no)'] = str(temp_df.loc['hot']['no'])+str('/')+str(sum(temp_df.no))
```

In [98]:
```
temp_df
```

Out[98]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **hot** | 2 | 2 | 2/9 | 2/5 | NaN | NaN |
| **mild** | 4 | 2 | NaN | NaN | NaN | NaN |
| **cool** | 3 | 1 | NaN | NaN | NaN | NaN |

In [99]:
```
temp_df.loc['hot']['P_yes'] = temp_df.loc['hot']['yes']/sum(temp_df.yes)
temp_df.loc['hot']['P_no'] = temp_df.loc['hot']['no']/sum(temp_df.no)
```

In [100]:
```
temp_df
```

Out[100]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **hot** | 2 | 2 | 2/9 | 2/5 | 0.222222 | 0.4 |
| **mild** | 4 | 2 | NaN | NaN | NaN | NaN |
| **cool** | 3 | 1 | NaN | NaN | NaN | NaN |

In [101]:
```
temp_df.loc['mild']['P(yes)'] = str(temp_df.loc['mild']['yes'])+str('/')+str(sum(temp_df.yes))
temp_df.loc['mild']['P(no)'] = str(temp_df.loc['mild']['no'])+str('/')+str(sum(temp_df.no))
temp_df.loc['mild']['P_yes'] = temp_df.loc['mild']['yes']/sum(temp_df.yes)
temp_df.loc['mild']['P_no'] = temp_df.loc['mild']['no']/sum(temp_df.no)
```

In [102]:
```
temp_df
```

Out[102]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **hot** | 2 | 2 | 2/9 | 2/5 | 0.222222 | 0.4 |
| **mild** | 4 | 2 | 4/9 | 2/5 | 0.444444 | 0.4 |
| **cool** | 3 | 1 | NaN | NaN | NaN | NaN |

In [103]:
```
temp_df.loc['cool']['P(yes)'] = str(temp_df.loc['cool']['yes'])+str('/')+str(sum(temp_df.yes))
temp_df.loc['cool']['P(no)'] = str(temp_df.loc['cool']['no'])+str('/')+str(sum(temp_df.no))
temp_df.loc['cool']['P_yes'] = temp_df.loc['cool']['yes']/sum(temp_df.yes)
temp_df.loc['cool']['P_no'] = temp_df.loc['cool']['no']/sum(temp_df.no)
```

In [104]:
```
temp_df
```

Out[104]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **hot** | 2 | 2 | 2/9 | 2/5 | 0.222222 | 0.4 |
| **mild** | 4 | 2 | 4/9 | 2/5 | 0.444444 | 0.4 |
| **cool** | 3 | 1 | 3/9 | 1/5 | 0.333333 | 0.2 |

In [105]:
```
hum_df = pd.DataFrame(index=df.Humidity.unique(), columns=col)
hum_df
```

Out[105]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **high** | NaN | NaN | NaN | NaN | NaN | NaN |
| **normal** | NaN | NaN | NaN | NaN | NaN | NaN |

In [106]:
```
hum_df.loc['high']['no'] = df[(df.Humidity == 'high') & (df.Play == 'no')].shape[0]
hum_df.loc['high']['yes'] = df[(df.Humidity == 'high') & (df.Play == 'yes')].shape[0]
hum_df.loc['normal']['no'] = df[(df.Humidity == 'normal') & (df.Play == 'no')].shape[0]
hum_df.loc['normal']['yes'] = df[(df.Humidity == 'normal') & (df.Play == 'yes')].shape[0]

hum_df.loc['high']['P(yes)'] = str(hum_df.loc['high']['yes'])+str('/')+str(sum(hum_df.yes))
hum_df.loc['high']['P(no)'] = str(hum_df.loc['high']['no'])+str('/')+str(sum(hum_df.no))
hum_df.loc['high']['P_yes'] = hum_df.loc['high']['yes']/sum(hum_df.yes)
hum_df.loc['high']['P_no'] = hum_df.loc['high']['no']/sum(hum_df.no)

hum_df.loc['normal']['P(yes)'] = str(hum_df.loc['normal']['yes'])+str('/')+str(sum(hum_df.yes))
hum_df.loc['normal']['P(no)'] = str(hum_df.loc['normal']['no'])+str('/')+str(sum(hum_df.no))
hum_df.loc['normal']['P_yes'] = hum_df.loc['normal']['yes']/sum(hum_df.yes)
hum_df.loc['normal']['P_no'] = hum_df.loc['normal']['no']/sum(hum_df.no)

hum_df
```

Out[106]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **high** | 3 | 4 | 3/9 | 4/5 | 0.333333 | 0.8 |
| **normal** | 6 | 1 | 6/9 | 1/5 | 0.666667 | 0.2 |

In [107]:
```
win_df = pd.DataFrame(index=[str(df.Windy.unique()[0]),str(df.Windy.unique()[1])], columns=col)


win_df
```

Out[107]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **False** | NaN | NaN | NaN | NaN | NaN | NaN |
| **True** | NaN | NaN | NaN | NaN | NaN | NaN |

In [ ]:
```
```

In [108]:
```
win_df.loc['False']['no'] = df[(df.Windy == False) & (df.Play == 'no')].shape[0]
win_df.loc['False']['yes'] = df[(df.Windy == False) & (df.Play == 'yes')].shape[0]
win_df.loc['True']['no'] = df[(df.Windy == True) & (df.Play == 'no')].shape[0]
win_df.loc['True']['yes'] = df[(df.Windy == True) & (df.Play == 'yes')].shape[0]
```

In [109]:
```
win_df
```

Out[109]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **False** | 6 | 2 | NaN | NaN | NaN | NaN |
| **True** | 3 | 3 | NaN | NaN | NaN | NaN |

In [110]:
```
win_df.loc['False']['P(yes)'] = str(win_df.loc['False']['yes'])+str('/')+str(sum(win_df.yes))
win_df.loc['False']['P(no)'] = str(win_df.loc['False']['no'])+str('/')+str(sum(win_df.no))
win_df.loc['False']['P_yes'] = win_df.loc['False']['yes']/sum(win_df.yes)
win_df.loc['False']['P_no'] = win_df.loc['False']['no']/sum(win_df.no)
```

In [111]:
```
win_df
```

Out[111]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **False** | 6 | 2 | 6/9 | 2/5 | 0.666667 | 0.4 |
| **True** | 3 | 3 | NaN | NaN | NaN | NaN |

In [112]:
```
win_df.loc['True']['P(yes)'] = str(win_df.loc['True']['yes'])+str('/')+str(sum(win_df.yes))
win_df.loc['True']['P(no)'] = str(win_df.loc['True']['no'])+str('/')+str(sum(win_df.no))
win_df.loc['True']['P_yes'] = win_df.loc['True']['yes']/sum(win_df.yes)
win_df.loc['True']['P_no'] = win_df.loc['True']['no']/sum(win_df.no)
```

In [113]:
```
win_df
```

Out[113]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **False** | 6 | 2 | 6/9 | 2/5 | 0.666667 | 0.4 |
| **True** | 3 | 3 | 3/9 | 3/5 | 0.333333 | 0.6 |

In [114]:
```
play_df = pd.DataFrame(columns=col)
play_df
```

Out[114]:

| yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|

In [115]:
```
play_df['yes'] = df[df.Play == 'yes'].shape[0]
play_df['no'] = [df[df.Play == 'no'].shape[0]]
play_df['P(yes)'] = [str(play_df['yes'][0])+str('/')+str(df.shape[0])]
play_df['P(no)'] = [str(play_df['no'][0])+str('/')+str(df.shape[0])]
play_df['P_yes'] = [play_df['yes'][0]/df.shape[0]]
play_df['P_no'] = play_df['no'][0]/df.shape[0]
play_df
```

Out[115]:

| | yes | no | P(yes) | P(no) | P_yes | P_no |
|---|---|---|---|---|---|---|
| **0** | NaN | 5 | nan/14 | 5/14 | NaN | 0.357143 |

In [116]:
```
inp= 'sunny,mild,high,False'
inpp = inp.split(',')
inpp
```

Out[116]: ['sunny', 'mild', 'high', 'False']

In [117]:
```
play_df['P_yes'][0]*outlook_df.loc[inpp[0]]['P_yes']*temp_df.loc[inpp[1]]['P_yes']*hum_df.loc[inpp[2]]['P_yes']*win_df.loc[i
```

Out[117]: nan

In [118]:
```
all_df = [outlook_df,temp_df,hum_df,win_df]
```

In [119]:
```
res_yes = 1.0
for i,Df in zip(inpp,all_df):
    #print('\t\t',i,'\n\n',Df,'\n')
    res_yes*=Df.loc[i]['P_yes']
res_yes * play_df['P_yes'][0]
```

Out[119]: nan

In [120]:
```
play_df['P_no'][0]*outlook_df.loc[inpp[0]]['P_no']*temp_df.loc[inpp[1]]['P_no']*hum_df.loc[inpp[2]]['P_no']*win_df.loc[inpp[
```

Out[120]: 0.02742857142857143

In [121]:
```
res_no = 1.0
for i,Df in zip(inpp,all_df):
    #print('\t\t',i,'\n\n',Df,'\n')
    res_no*=Df.loc[i]['P_no']
res_no * play_df['P_no'][0]
```

Out[121]: 0.02742857142857143

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]: