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p_john_calls_alarm = 0.95
p_john_calls_no_alarm = 0.3
p_mary_calls_alarm = 0.6
p_mary_calls_no_alarm = 0.2
p_alarm_burglary_earthquake = 0.92
p_alarm_burglary_no_earthquake = 0.54
p_alarm_no_burglary_earthquake = 0.05
p_alarm_no_burglary_no_earthquake = 0.001
p_burglary = 0.7
p_no_burglary = 0.3
p_earthquake = 0.2
p_no_earthquake = 0.8

p_alarm= p_alarm_burglary_earthquake*
(p_burglary*p_earthquake)+p_alarm_burglary_no_earthquake*(p_burglary*p_no_earthquake)+
p_alarm_no_burglary_earthquake*(p_no_burglary*p_earthquake)+p_alarm_no_burglary_no_earthquake*(p_no_burglary*p_no_earthquake)
p_no_alarm= (1- p_alarm_burglary_earthquake)*
(p_burglary*p_earthquake)+(1-p_alarm_burglary_no_earthquake)*(p_burglary*p_no_earthquake)+(1-p_alarm_no_burglary_earthquake)*(p_no_burglary*p_earthquake)+(1-p_alarm_no_burglary_no_earthquake)*(p_no_burglary*p_no_earthquake)
p_john_calls = p_alarm * p_john_calls_alarm + p_no_alarm * p_john_calls_no_alarm
p_mary_calls = p_alarm * p_mary_calls_alarm + p_no_alarm * p_mary_calls_no_alarm
p_both_calls = p_john_calls * p_mary_calls
p_both_calls_no_alarm = p_john_calls * p_mary_calls * p_alarm_no_burglary_no_earthquake
p_neither_burglary_nor_earthquake = p_no_burglary * p_no_earthquake
p_both_calls_no_burglary_no_earthquake =
p_john_calls_alarm*p_mary_calls_alarm*p_no_earthquake*p_no_burglary*p_alarm_no_burglary_no_earthquake

print("Probability of John calling: {:.2f}".format(p_john_calls))
print("Probability of Mary calling: {:.2f}".format(p_mary_calls))
print("Probability of both John and Mary calling: {:.4f}".format(p_both_calls))
print("Probability of both John and Mary calling, but no burglary or earthquake happened: {:.4f}".format(p_both_calls_no_burglary_no_earthquake))

```

```

PS C:\Users\CHARLIE> & "C:/Program Files/Python310/python.exe" c:/Users/CHARLIE/exp8.py
0.43444000000000005
0.56556
Probability of John calling: 0.58
Probability of Mary calling: 0.37
Probability of both John and Mary calling: 0.2177
Probability of both John and Mary calling, but no burglary or earthquake happened: 0.0001
PS C:\Users\CHARLIE>

```