Artificial Intelligence (AI)

Assignment No 4

Total Marks: 10 **Due Date: 27th Dec 2023**

Consider the following Bayesian network and probabilities:

Rain
|
Umbrella
|
Grass

|Rain	P(Rain)
True	0.3
False	0.7

Rain	Umbrella	P(Umbrella | Rain)
True	True	0.9
True	False	0.1
False	True	0.2
False	False	0.8

Umbrella	Grass	P(Grass | Umbrella)
True	True	0.8
True	False	0.2
False	True	0.1
False	False	0.9

Write a Python program that calculates the following:

a. What is the probability of Rain being True given that Umbrella is False?
b. P(Rain = True, Umbrella = True)
c. P(Rain = True, Umbrella = False)
d. P(Rain = False, Umbrella = True)
e. P(Rain = False, Umbrella = False)
f. Find the probability of Umbrella being True given that Rain is False.
g. P(Grass = True | Umbrella = True)
h. P(Grass = False | Umbrella = False)

i. Determine the probability of Grass being False given that Umbrella is False.
j. Suppose you observe that the Grass is True. What is the probability that it is raining?

Note: You may also submit a handwritten assignment with a penalty. You must upload a .pdf of handwritten assignment. Make sure your PDF size is less than 2 MB.