



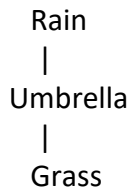
Artificial Intelligence (AI)

Assignment No 4

Total Marks: 10

Due Date: 27th Dec 2023

Consider the following Bayesian network and probabilities:



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:

- What is the probability of Rain being True given that Umbrella is False?
- $P(\text{Rain} = \text{True}, \text{Umbrella} = \text{True})$
- $P(\text{Rain} = \text{True}, \text{Umbrella} = \text{False})$
- $P(\text{Rain} = \text{False}, \text{Umbrella} = \text{True})$
- $P(\text{Rain} = \text{False}, \text{Umbrella} = \text{False})$
- Find the probability of Umbrella being True given that Rain is False.
- $P(\text{Grass} = \text{True} \mid \text{Umbrella} = \text{True})$
- $P(\text{Grass} = \text{False} \mid \text{Umbrella} = \text{False})$



- 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.