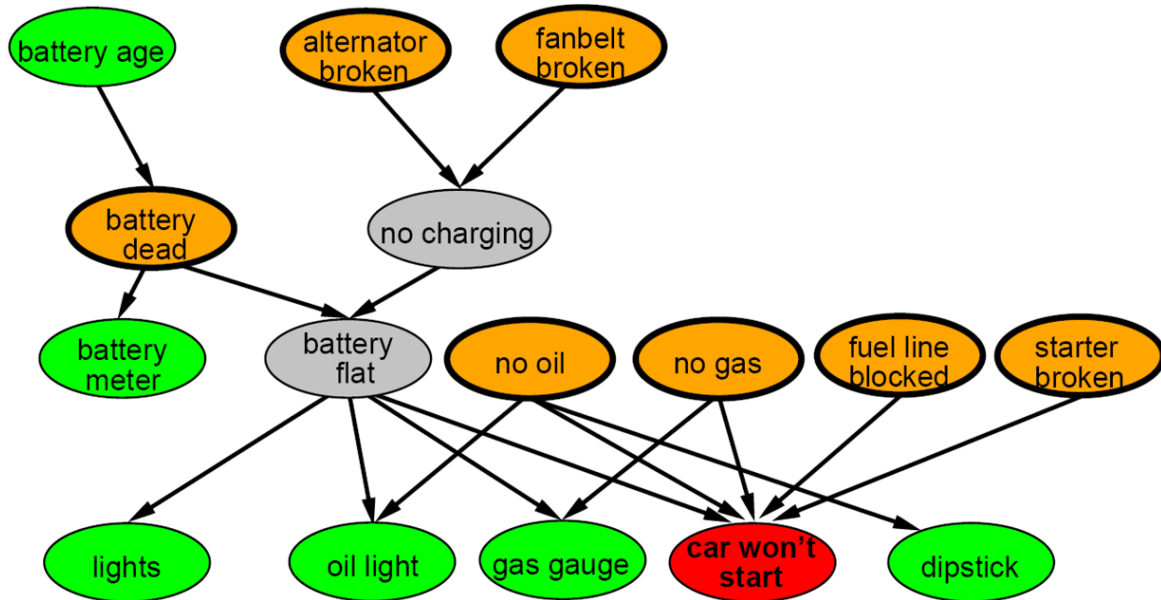


Inference in BNs

Consider again our simple model for car diagnosis, in the form of a Bayesian network graph:



Assume the following practical categorisation of the variables, in terms of what we expect to be observable in a specific case:

- **red:** problem to be explained (observable variable)
- **green:** 'tests' -- information that can be obtained (observable)
- **orange:** 'diagnoses' -- possible explanations of the problem, assumed to be boolean (not directly observable)
- **grey:** auxiliary concepts to make for a more structured, compact model (not observable)

and assume the model is complemented with appropriate conditional distribution tables.

a. Exact Inference

Which of the following statements about this network are correct?

Frage 10

Richtig

Erreichte Punkte 1,00 von 1,00

All the green variables are independent of each other

- ☐ Wahr
- ☒ Falsch ✓

Die richtige Antwort ist 'Falsch'.

Frage 11

Richtig

Erreichte Punkte 1,00 von 1,00

We cannot calculate the distribution over variable 'Battery_flat' if we don't know the values of 'Battery_dead', 'Alternator_broken', and 'Fanbelt_broken'

- ☐ Wahr
- ☒ Falsch ✓

Die richtige Antwort ist 'Falsch'.

Frage 12

Richtig

Erreichte Punkte 1,00 von 1,00

The dipstick tells us nothing about the oil light

- ☐ Wahr
- ☒ Falsch ✓

Die richtige Antwort ist 'Falsch'.

Frage 13

Richtig

Erreichte Punkte 1,00 von 1,00

The query $P(\text{Car_won't_start})$ will give us the probability of the car not starting when the values of all the green variables are known

- ☐ Wahr
- ☒ Falsch ✓

Die richtige Antwort ist 'Falsch'.

Information**b. Approximate Inference**

Which of the following sentences are true?

Frage 14

Falsch

Erreichte Punkte 0,00 von 1,00

Given a query with only Car_won't_start as evidence, all the orange variables will contribute a weight of 1.0 to a sample in likelihood weighting

- ☐ Wahr
- ☒ Falsch ✖

Die richtige Antwort ist 'Wahr'.

Frage 15

Richtig

Erreichte Punkte 1,00 von 1,00

In a query where all green variables are given as evidence, 9 variables have to be sampled in forward sampling

- ☐ Wahr
- ☒ Falsch ✔

Die richtige Antwort ist 'Falsch'.

Frage 16

Richtig

Erreichte Punkte 1,00 von 1,00

Given a query with only Car_won't_start as evidence, all the green variables will contribute a weight of 1.0 to a sample in likelihood weighting

- ☒ Wahr ✔
- ☐ Falsch

Die richtige Antwort ist 'Wahr'.

Frage 17

Richtig

Erreichte Punkte 1,00 von 1,00

There is no variable in this network whose Markov blanket contains more than 5 variables

- ☐ Wahr
- ☒ Falsch ✔

Die richtige Antwort ist 'Falsch'.

