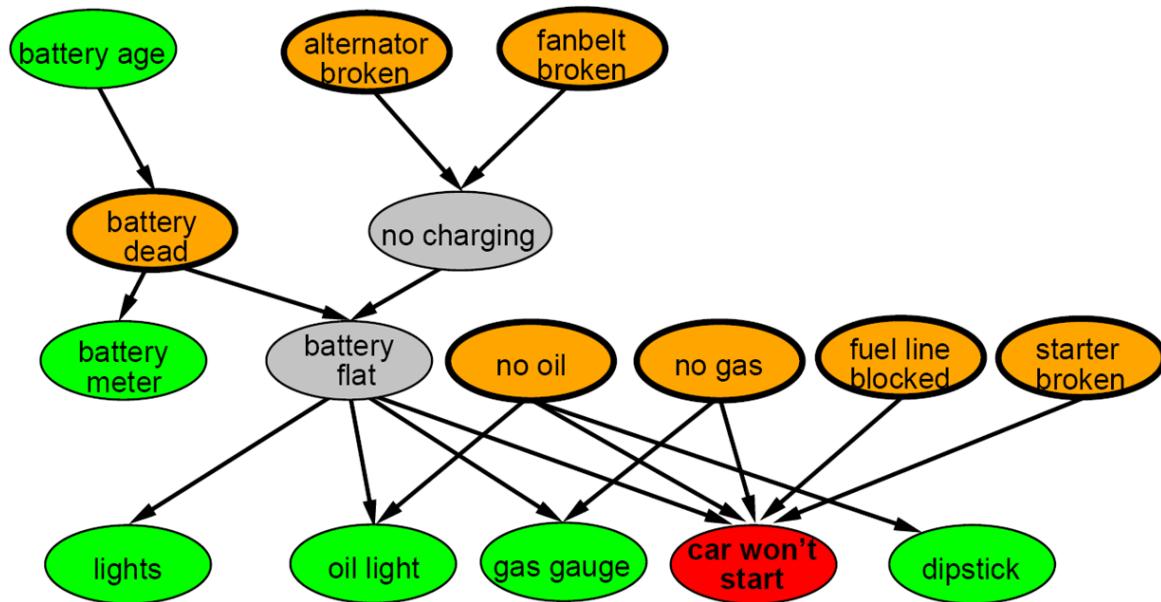


## Information

## 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.

## Information

### 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'.

