ICA 1 :

1) Prob of Thief

$P(t_1) = 0.01$

2) Given alarm is going off, prob of thief:

$$P(t_1 \mid a_1) = \frac{P(t_1 \mid a_1)}{P(a_1)}$$

$$P(t_1 \mid a_1) = \frac{0.0061}{0.016} = 0.38125$$

Although the prob of thief is low, the likelihood of a thief is higher when the alarm goes off.

3) Given alarm is going off + dog is barking, prob of thief

$$P(t_1 \mid a_1 b_1) = \frac{P(t_1 \mid a_1 b_1)}{P(a_1 b_1)}$$

$$P(t_1 \mid a_1 b_1) = \frac{0.0036478}{0.009568} = 0.38125$$

The prob of the thief is equal to prob in number 2 because the dog's barking and the sound of the alarm are two different independent variables; neither variables caused each other to go off.

4) Given alarm is going off + dog is barking + there is an earthquake, prob of thief:

$$P(t_1 \mid a_1 b_1 e_1) = \frac{P(t_1 \mid a_1 b_1 e_1)}{P(a_1 b_1 e_1)}$$

$$P(t_1 \mid a_1 b_1 e_1) = \frac{0.0002392}{0.0061594} = 0.038834$$

The prob of the thief is lower than the prob in number 2 because the alarm is most likely warning sound for the earthquake that is occurring and animals are more sensitive to natural disasters (dog barking is a warning sign).

ICA 2:

Design Interface of a Bayes Net library
- specify a bayes net on discrete random vari.
- quering:
  - conditional distributions
  - marginal distributions

Create a class w/ the following objects:

- individual prob. of the variable (state)
- compute conditional distribution w/ given state + condition
- compute marginal distribution w/ given state + condition
- joint table — table w/ all of the above

OR

Create sql databases:

1) prob of individual state
2) prob of marginal dis.
3) prob of conditional dis

use sql query to find specific data + change it + create new table
→ joint all new data at the end