Team Quiz

- **New rules:**
  - Get in groups of about 8
  - Designate one runner per group
  - First three correct answers get 2 points
  - Other correct answers get 1 point
  - I’ll eventually call time
Question 1

- Which of the following statements hold given this net structure?

1. $C \perp D|\emptyset$
2. $C \perp D|\{B\}$
3. $A \perp D|\{B\}$
4. $A \perp D|\{B, F\}$
5. $A \perp D|\{B, F, E\}$

Question 2

- Which nets guarantee each statement:

1. $A \perp C|\emptyset$
2. $A \perp C|\{B\}$
Question 3

- What is:

\[ P(B|a, \neg c) \]

\[
\begin{array}{c|c}
\text{a} & 1/3 \\
\hline
\neg a & 2/3 \\
\end{array}
\]

\[
\begin{array}{c|c}
\text{b} & 1/4 \\
\hline
\neg b & 3/4 \\
\end{array}
\]

\[
\begin{array}{c|c}
\text{b} & 1/2 \\
\hline
\neg b & 1/2 \\
\end{array}
\]

\[
\begin{array}{c|c}
\text{c} & 2/5 \\
\hline
\neg c & 3/5 \\
\end{array}
\]

\[
\begin{array}{c|c}
\text{c} & 1/5 \\
\hline
\neg c & 4/5 \\
\end{array}
\]

Question 4

- What fraction of prior samples from this network will be:

\[ P(a, b, \neg c) \]

\[
\begin{array}{c|c}
a & 1/3 \\
\hline
\neg a & 2/3 \\
\end{array}
\]

\[
\begin{array}{c|c}
b & 1/4 \\
\hline
\neg b & 3/4 \\
\end{array}
\]

\[
\begin{array}{c|c}
b & 1/2 \\
\hline
\neg b & 1/2 \\
\end{array}
\]

\[
\begin{array}{c|c}
c & 2/5 \\
\hline
\neg c & 3/5 \\
\end{array}
\]

\[
\begin{array}{c|c}
c & 1/5 \\
\hline
\neg c & 4/5 \\
\end{array}
\]
Question 5

What fraction of likelihood weighted samples from this network will be:

\[ P(a, b, \neg c) \]

if we condition on \( A=a \) and \( C=\neg c \) and what will each such sample's weight be?

- \( P(B|a) \)
  - \( b \): 1/4
  - \( \neg b \): 3/4

- \( P(B|\neg a) \)
  - \( b \): 1/2
  - \( \neg b \): 1/2

- \( P(C|b) \)
  - \( c \): 2/5
  - \( \neg c \): 3/5

- \( P(C|\neg b) \)
  - \( c \): 1/5
  - \( \neg c \): 4/5

Question 6

Which of the following are true:

1. \( P(X_t, e_{1:t}) = \sum_{x_{t-1}} P(x_t, x_{t-1}, e_{1:t}) \)
2. \( P(X_t, e_{1:t}) = P(e_t|x_t) \sum_{x_{t-1}} P(x_t|x_{t-1}) P(x_{t-1}, e_{1:t-1}) \)
3. \( P(X_t|e_{1:t}) = P(e_t|x_t) \sum_{x_{t-1}} P(x_t|x_{t-1}) P(x_{t-1}|e_{1:t-1}) \)
4. \( P(X_t, e_{1:t}) = \sum_{x_{t-1}} P(e_t, x_t|x_{t-1}) P(x_{t-1}, e_{1:t-1}) \)
Question 7

- Draw a sensible Bayes’ net over the variables:
  - (S)tudy
  - Get a (P)erfect score
  - Exam seems (E)asy to you
  - (U)nderstand the material
  - Prof. chooses easy (Q)uestions
  - Go to (L)ecture

Question 8

- Three doors, two have $0, one has $300
- Even chances of the $300 behind each are \(\frac{1}{4}, \frac{1}{2}, \frac{1}{4}\).

VPI of being told which door has the $300:

\[
\frac{300}{4} - \frac{0}{2} = \frac{150}{2} - \frac{0}{2} = \frac{150}{2} = 75
\]

VPI of being told what’s behind door 1:

\[
\frac{300}{4} - \frac{0}{2} = \frac{150}{2} - \frac{0}{2} = \frac{150}{2} = 75
\]