# Tutorial 5

## Question 1

For each English sentence on the left, there is a corresponding logical sentence on the right, but *not necessarily the one across from it*. Work out which English sentence corresponds to which propositional logic sentence, and hence determine the meaning (in English) of each proposition symbol.

| English | Propositional Logic |
|---|---|
| There is a Wumpus at (0, 1). | $(C \lor B) \land (\neg C \lor \neg B)$ |
| If the agent is at (0, 1) and there is a Wumpus at (0, 1), then the agent is not alive. | $C \land \neg D$ |
| | $\neg A \lor \neg(B \land D)$ |
| The agent is at (0, 0) and there is no Wumpus at (0, 1). | $D$ |
| The agent is at (0, 0) or (0, 1), but not both. | |

## Question 2

Consider a vocabulary with only four propositions, $A$, $B$, $C$, and $D$. How many models are there for the following sentences?

a. $B \lor C$.

b. $\neg A \lor \neg B \lor \neg C \lor \neg D$.

c. $(A \Rightarrow B) \land A \land \neg B \land C \land D$.

d. $(A \land B) \lor (C \land D)$.

e. $B \Rightarrow (A \land B)$.

## Question 3

According to some political pundits, a person who is radical ($R$) is electable ($E$) if he/she is conservative ($C$), but otherwise is not electable.

a. Which of the following are correct representations of this assertion?

   (i) $(R \land E) \iff C$

   (ii) $R \Rightarrow (E \iff C)$

   (iii) $R \Rightarrow ((C \Rightarrow E) \lor \neg E)$