1) **Given atoms: $\boldsymbol{a}, \boldsymbol{b}$ and $\boldsymbol{c}$; formula $\boldsymbol{f_1} = \boldsymbol{a} \rightarrow \boldsymbol{b}$ and $\boldsymbol{f_2} = \boldsymbol{a} \rightarrow \boldsymbol{b}$; and a world $\boldsymbol{W}$ that $\boldsymbol{W} \vDash \boldsymbol{f_1}$ and $\boldsymbol{W} \vDash \boldsymbol{f_2}$, show whether the world would satisfy formula $\boldsymbol{f_3} = \boldsymbol{a} \rightarrow (\boldsymbol{b} \wedge \boldsymbol{c})$**

2) **What is the shortcoming of min-support? And how it can be resolved?**

3) **Given atoms $\boldsymbol{a}, \boldsymbol{b}$ and $\boldsymbol{c}$ and words, $\boldsymbol{W_1}, \boldsymbol{W_2}$and $\boldsymbol{W_3}$ $\boldsymbol{such\ that}$**

   $W_1 \vDash a \wedge b \wedge c, W_2 \vDash a \vee b \vee c\ , W_3 \vDash\ a \rightarrow (b \wedge c), W_4 \vDash\ a \rightarrow c$

   Which of worlds would satisfy the following formula?

   i. $\boldsymbol{f} = \boldsymbol{b}$.
   ii. $\boldsymbol{f} = \boldsymbol{a} \rightarrow c$
   iii. $\boldsymbol{f} = \boldsymbol{a} \wedge c$
   iv. $\boldsymbol{f} = \neg \boldsymbol{a} \vee c$
   v. $\boldsymbol{f} =\ a \vee b \vee c$

4) **In probabilistic logic, if there are a set of sentences and a set of possible worlds. Assume we want to check for an entailment for a new logical sentence, so explain how linear programing can be utilized.**