CS360 Homework
Mingzhe Fang

A: Amy is truth teller
B: Bob is truth teller
C: Cal is truth teller

Knowledge Base: Amy says "Cal is not honest" → $A \Leftrightarrow \neg C$ ①
Bob says "Amy and Cal never lie" → $B \Leftrightarrow A \wedge C$ ②
Cal says "Bob is correct" → $C \Leftrightarrow B$ ③

① $A \Leftrightarrow \neg C$ means ~~$\neg A \vee \neg C$~~ ④ ~~$C \vee A$~~ ⑤
② $A \Rightarrow \neg C$ → $\neg A \vee \neg C$ ④ $\neg C \Rightarrow A$ → $C \vee A$ ⑤
② $B \Leftrightarrow A \wedge C$ means $B \Rightarrow A \wedge C$ and $A \wedge C \Rightarrow B$
③ → $\neg B \vee (A \wedge C)$ → $\neg(A \wedge C) \vee B$
③ → $(\neg B \vee A) \wedge (\neg B \vee C)$ ⑥ → ~~$(\neg A \vee B) \wedge (\neg C$~~ $\neg A \vee \neg C \vee B$ ⑦
③ $C \Leftrightarrow B$ means $\neg C \vee B$ ⑦ $B \Rightarrow C$ ⑧ $\neg B \vee C$

Knowledge ⇒ CNF
Therefore we can rewrite everything in Conjunction Normative form.

as
$\{\{\neg A, \neg C\}, \{\neg B, A\}, \{\neg B, C\}, \{\neg C, B\}, \{C, A\}, \{\neg A, \neg C, B\}\}$

CNF Resolution Solution.

① $\{\neg A, \neg C\}$
② $\{\neg B, A\}$
③ $\{\neg B, C\}$
④ $\{\neg C, B\}$
⑤ $\{C, A\}$
⑥ $\{\neg A, \neg C, B\}$

Prove by contradiction ⑨ $\{C\}$
④⑨ ⇒ $\{\neg B\}$ ⑩
①② ⇒ $\{A\}$ ⑪
⑥⑩ ⇒ $\{\neg C\}$ ⑫

⑫ contradicts with ⑨. therefore $\neg C$

Therefore Final Solution. $\{\neg C\}, \{A\}, \{\neg B\}$