

Q-4

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Part (a)

The atomic Propositions are defined as

G: Ross wears green hat

S: Ross wears socks

Y: Ross wears yellow sweater

T: Ross wears tie

B: Ross wears blue hat.

Story in propositional logic is:

$$(1) \quad G \vee S$$

$$(2) \quad (G \wedge Y) \Rightarrow \neg T \equiv \neg(G \wedge Y) \vee \neg T \quad (\because a \Rightarrow b \equiv \neg a \vee b)$$

$$\equiv \neg G \vee \neg Y \vee \neg T$$

$$(3) \quad \neg(Y \vee S) \Rightarrow \neg G \equiv \neg(\neg(Y \vee S)) \vee \neg G \quad (\because a \Rightarrow b \equiv \neg a \vee b)$$

$$\equiv Y \vee S \vee \neg G \quad (\because \neg \neg a \equiv a)$$

$$(4) \quad S \Rightarrow Y \equiv \neg S \vee Y \quad (\because a \Rightarrow b \equiv \neg a \vee b)$$

$$(5) \quad T$$

Thus (1), (2), (3), (4), (5) can be inferred from story.

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Part(B)

Rewriting statements from Part (A)

① GVS

② $\neg G \vee \neg Y \vee \neg T$

③ $YVS \vee \neg G$

④ $\neg S \vee Y$

⑤ T

Will use resolution to deduce what else he wore yesterday.
from ① & ③

GVS ①

$YVS \vee \neg G$ ③

YVS ⑥

$\neg S \vee Y$ ④

$Y \rightarrow ⑦$

\Rightarrow (Thus he wore yellow sweater)

from ⑦ & ②

Y ⑦

$\neg G \vee \neg Y \vee \neg T$ ②

$\neg G \vee \neg T$ ⑧

T ⑤

$\neg G \rightarrow ⑨$

\Rightarrow (Thus he didn't wear green hat)

from ⑨ & ①

$\neg G$ ⑨

GVS ①

$S \rightarrow ⑩$

\Rightarrow (Thus he wore socks)

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Thus (5), (7), (9), (10) defines.

$$T \wedge Y \wedge \neg G \wedge S$$

Thus yesterday along with tie^(T) he wore yellow sweater (Y) and socks (S). But he didn't wear green hat (G).