

## § 1.2 (cont.)

HW § 1.2 #5

$$e \rightarrow [a \wedge (b \vee p) \wedge r]$$

A, B, and C

1. a ✓
- and
2. b v p ✓
- and
3. r ✓

### 1. Consistency

Consistent: they should not contain any conflicting requirements. Contradiction may not be derived.

Inconsistent: conflicting requirements exist

#### 2. Consistency

System specifications should be consistent, that is, they should not contain conflicting requirements that could be used to derive a contradiction.

Example: Determine whether these system specifications are consistent:

- ① "The diagnostic message is stored in the buffer or it is retransmitted."
- ② "The diagnostic message is not stored in the buffer."
- ③ "If the diagnostic message is stored in the buffer, then it is retransmitted."

$$\begin{array}{l} \textcircled{F} b \vee \textcircled{T} r = T \\ \textcircled{T} b \rightarrow \textcircled{T} r \quad T \rightarrow b = F \quad - \\ \textcircled{F} b \rightarrow \textcircled{T} r \quad T \Rightarrow F \rightarrow T = T \\ \hline \leftarrow \text{Therefore} \quad \text{Consistent!} \end{array}$$

$$\begin{array}{l} ? \quad ? \\ \textcircled{b} \vee \textcircled{r} = T \\ \textcircled{1} \quad T \vee T \\ \textcircled{2} \quad T \vee F \\ \textcircled{3} \quad F \vee T \end{array}$$

⇒

\*\*

Step 1. Assume all of the sentences True.

Step 2. Start from ① single letter ✓

② Λ

$$\textcircled{3} \neg ( \vee ) \\ \neg F = T$$

$$\textcircled{4} \neg ( \rightarrow )$$

$$\begin{array}{l} p \wedge q = T \\ T \quad T \\ \neg ( p \vee q ) = T \\ p \vee q = F \\ p = F, q = F \\ \neg ( p \rightarrow q ) = T \\ F \quad (T \rightarrow F) \end{array}$$

b	r	b v r	¬ b	b → r
T	T	T	F	T
T	F	F	F	F
<u>F</u>	<u>T</u>	<u>T</u> ✓	<u>T</u> ✓	<u>T</u> ✓ ⇐
F	F	F	T	T

$$\textcircled{1}, \textcircled{2}, \textcircled{3} = T$$

Ex.

$\begin{matrix} T \\ \boxed{m} \end{matrix} \longleftrightarrow \begin{matrix} F \\ O \end{matrix} \begin{matrix} F \\ \boxed{T} \end{matrix} \leftarrow \text{contradiction}$

$F O \rightarrow \begin{matrix} \boxed{F} \\ F \end{matrix} \begin{matrix} T \\ \checkmark \end{matrix}$

$T \begin{matrix} \boxed{f} \\ \checkmark \end{matrix} \begin{matrix} I \\ F \end{matrix} = \begin{matrix} \boxed{T} \\ \checkmark \end{matrix}$

$F \begin{matrix} \boxed{m} \\ \checkmark \end{matrix} \rightarrow \begin{matrix} \boxed{I} \\ F \end{matrix} \begin{matrix} T \\ \checkmark \end{matrix}$

$\begin{matrix} \boxed{TI} \\ \checkmark \end{matrix} \rightarrow \begin{matrix} T \\ \checkmark \end{matrix}$

Consistent? Inconsistent?

$\{ ? \} \vee F \Rightarrow T$

?  $\rightarrow F = T$

Page 20 § 1.2.5 Example 7.

$$(\neg p_1 \wedge \neg(\neg p_1) \wedge p_2) \vee \dots$$