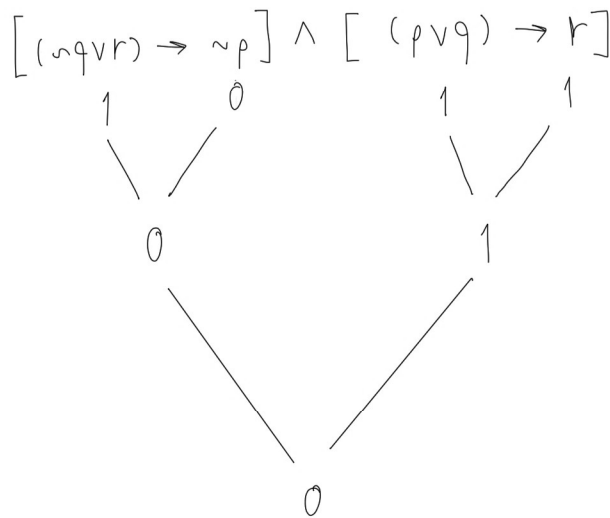


Quiz 8

① กำหนด $F(p, q, r) = [(\neg q \vee r) \rightarrow \neg p] \wedge [(p \vee q) \rightarrow r]$

1.1 ให้เขียนกราฟต้นไม้ค่าของ $F(1, 0, 1)$



1.2 ให้แสดงตารางค่าความจริงของประพจน์ $F(p, q, r)$

| p | q | r | $\neg q \vee r$ | $\neg p$ | $(\neg q \vee r) \rightarrow \neg p$ | $p \vee q$ | $(p \vee q) \rightarrow r$ | $[(\neg q \vee r) \rightarrow \neg p] \wedge [(p \vee q) \rightarrow r]$ |
|---|---|---|-----------------|----------|--------------------------------------|------------|----------------------------|--|
| 0 | 0 | 0 | TRUE | TRUE | TRUE | FALSE | TRUE | TRUE |
| 0 | 0 | 1 | TRUE | TRUE | TRUE | FALSE | TRUE | TRUE |
| 0 | 1 | 0 | TRUE | TRUE | TRUE | TRUE | FALSE | FALSE |
| 0 | 1 | 1 | TRUE | TRUE | TRUE | TRUE | TRUE | TRUE |
| 1 | 0 | 0 | FALSE | FALSE | TRUE | TRUE | FALSE | FALSE |
| 1 | 0 | 1 | TRUE | FALSE | FALSE | TRUE | TRUE | FALSE |
| 1 | 1 | 0 | FALSE | FALSE | TRUE | TRUE | FALSE | FALSE |
| 1 | 1 | 1 | TRUE | FALSE | FALSE | TRUE | TRUE | FALSE |

② ตรวจสอบว่า

$$[p \wedge ((q \wedge p) \rightarrow r) \wedge \sim r] \longrightarrow \sim q$$

เป็นทавтоโลยีหรือไม่

$$\begin{array}{l|l} : a \rightarrow b = \sim b \vee r & : \sim(a \wedge b) = \sim a \vee \sim b \\ : \sim(a \vee b) = \sim a \wedge \sim b & : a \vee (a \wedge b) = (a \vee a) \wedge (a \vee b) \end{array}$$

$$p \wedge ((q \wedge p) \rightarrow r) \wedge \sim r = p \wedge (\sim q \vee \sim p \vee r) \wedge \sim r$$

$$(p \wedge ((q \wedge p) \rightarrow r) \wedge \sim r) \rightarrow \sim q = \sim p \vee (q \wedge p \wedge \sim r) \vee r \vee \sim q$$

$$= \sim p \vee \sim q \vee (q \wedge p \wedge \sim r) \vee r$$

$$= \sim(p \wedge q) \vee (q \wedge p \wedge \sim r) \vee r$$

$$= \sim(p \wedge q) \vee [((q \wedge p) \vee r) \wedge (\sim r \vee r)]$$

$$= \sim(p \wedge q) \vee ((q \wedge p) \vee r \wedge T)$$

$$= T \vee r$$

$$= T$$

เป็นทавтоโลยี