

HW #6

Problem 6.1

a) $(\neg B \rightarrow F) \wedge ((B \wedge F) \rightarrow \neg I) \wedge ((I \vee \neg B) \rightarrow \neg F)$

b)

| B | F | I | $\neg B$ | $\neg B \rightarrow F$ | $\neg I$ | $B \wedge F \rightarrow \neg I$ | \bar{F} | $I + \bar{B} \rightarrow \bar{F}$ |
|---|---|---|----------|------------------------|----------|---------------------------------|-----------|-----------------------------------|
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |

| B | F | I | $D(B, F, I)$ |
|---|---|---|--------------|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 |

m_4
 m_5
 m_6

c) $m_4 + m_5 + m_6$ minterms.

Sum of products.

$$(B\bar{F}\bar{I}) + (B\bar{F}I) + (BF\bar{I})$$

d) $(B\bar{F}\bar{I} + B\bar{F}I) + BF\bar{I}$

$$B\bar{F}(I + \bar{I}) + BF\bar{I} \quad \text{Distributive law.}$$

$$B\bar{F} + BF\bar{I}$$

$$B(\bar{F} + F\bar{I}) \quad \text{Distributive law}$$

$$B(\bar{F} + \bar{I}) \quad \text{Absorption law.}$$

$$\boxed{B\bar{I} + B\bar{F}}$$

Distributive law.