1. Given $g_1 = f_1 + h_2 * f_2$, $g_2 = h_1 * f_1 + f_2$

g_1, g_2, h_1, h_2 are known.

$$F(g_1) = F(f_1 + h_2 * f_2)$$

$$\Rightarrow G_1 = F_1 + H_2 F_2 \quad -(1)$$

Similarly $G_2 = H_1 F_1 + F_2 \quad -(2)$

from above equations, we can write,

$$F_1 (1 - H_1 H_2) = G_1 - H_2 G_2$$

$$F_2 (1 - H_1 H_2) = G_2 - H_1 G_1$$

If $H_1 H_2 \neq 0$ than $F_1 = \dfrac{G_1 - H_2 G_2}{1 - H_1 H_2}$ and $F_2 = \dfrac{G_2 - H_1 G_1}{1 - H_1 H_2}$

$$f_1 = F^{-1}(F_1) = F^{-1}\left(\frac{G_1 - H_2 G_2}{1 - H_1 H_2}\right)$$

$$f_2 = F^{-1}(F_2) = F^{-1}\left(\frac{G_2 - H_1 G_1}{1 - H_1 H_2}\right)$$

→ We might not be able to recover few of the highest frequency components as H_1 and H_2 are lowpass (blur) filters, as and so the corresponding f_1 and f_2 will blow up.