Q1

$f_1 \rightarrow$ outside scene, $f_2 \rightarrow$ Reflection of inside.

$h_1 \rightarrow$ blur kernel acting on f_1 $\quad$ $h_2 \rightarrow$ blur kernel acting on f_2

$$g_1 = f_1 + h_2 * f_2 \quad , \quad g_2 = f_2 + h_1 * f_1$$

Image 1 $\quad$ Image 2

Taking fourier transform of the images.
- {This will convert convolutions to multiplications}.

for image ①,

$$G_1 = F_1 + H_2 F_2$$

for image ②

$$G_2 = F_2 + H_1 F_1$$

By solving these two equations for F_1 & F_2,

$$F_1 = \frac{G_1 - H_2 G_2}{1 - H_1 H_2} \quad \& \quad F_2 = \frac{G_2 - H_1 G_1}{1 - H_1 H_2}$$

we should get the inside reflection & outside scene by taking the inverse fourier transform of these two equations.

Generally, blur filters do not have many different frequencies. most of the frequencies will be small. The fourier transform of such filters is close to 1

Hence if H_1 & $H_2 \rightarrow 1$, $H_1 H_2 \rightarrow 1$, This will create a problem in calculation of F_1, F_2 as the denominator tends to zero. This might also increase the noise in f_1, f_2.

(H_1 & H_2 are low pass filters).