

Solution 1

(a)

$$x = \arg \min_x (x - y)^2 + \lambda|x| \quad (1)$$

After getting the derivatives of x

$$x = y - \frac{\lambda}{2} \quad \text{for } x > 0 \quad (2)$$

$$y - \frac{\lambda}{2} > 0 \quad (3)$$

$$x = y + \frac{\lambda}{2} \quad \text{for } x < 0 \quad (4)$$

$$y + \frac{\lambda}{2} < 0 \quad (5)$$

when $y > \frac{\lambda}{2}$

$$x = y - \frac{\lambda}{2} \quad (6)$$

when $y < -\frac{\lambda}{2}$

$$x = y + \frac{\lambda}{2} \quad (7)$$

when $-\frac{\lambda}{2} \leq y \leq \frac{\lambda}{2}$

$$x = 0 \quad (8)$$



Figure 1: original



Figure 2: output

(b)

Solution 2

Figure 3: original

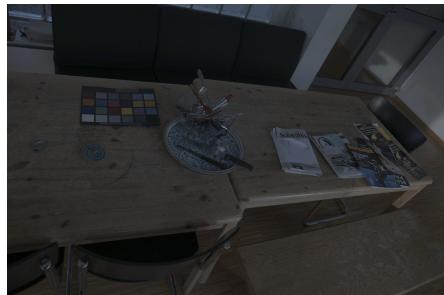


Figure 4: 2a

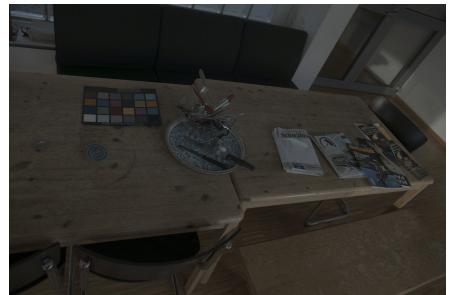


Figure 5: 2b



Figure 6: original

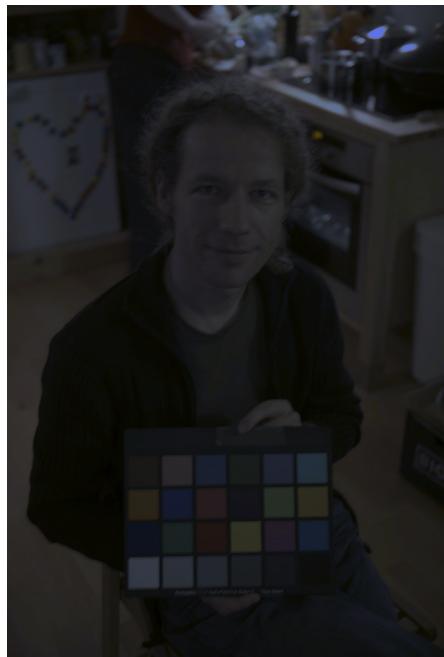


Figure 7: 2a

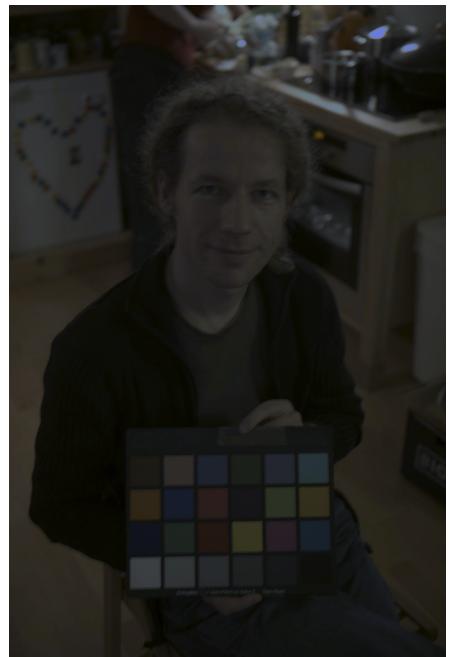


Figure 8: 2b

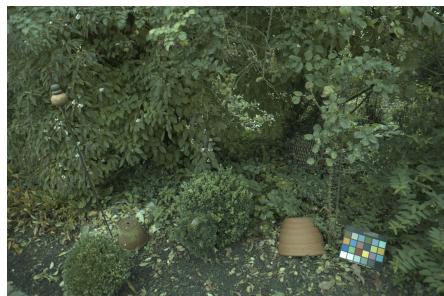


Figure 9: original

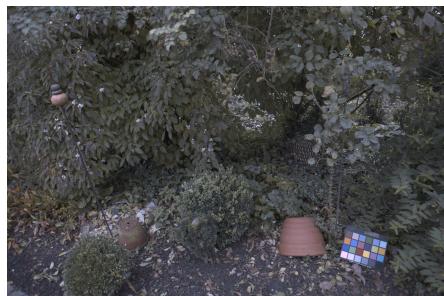


Figure 10: 2a



Figure 11: 2b

Solution 3



Figure 12: a.normal



Figure 13: b.albedo

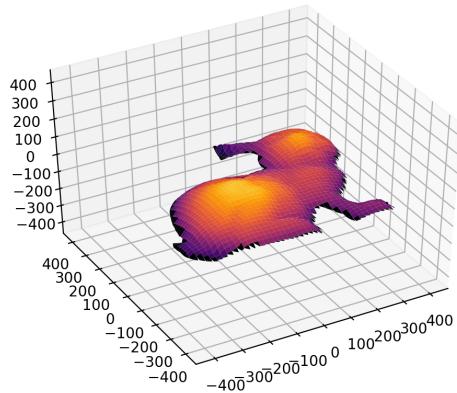
Solution 45

Figure 14: prob4

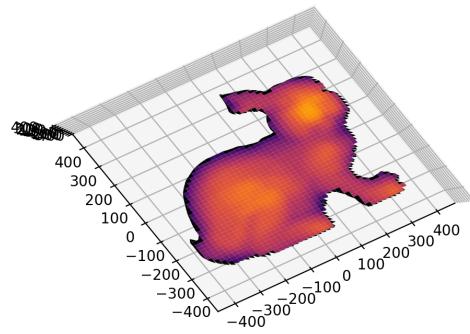


Figure 15: prob5

Information

This problem set took approximately 20 hours of effort.

I discussed this problem set with:

- Mingyu Cao

I also got hints from the following sources: