Ged Assignment 07 Questions

$P_1\left(\frac{1}{2}, \frac{1}{2}\right)$: the mid of the illustration

8 squares → Length unit ≒ 1

1 square → $\frac{1}{8}$

$f(x,y)$: color value at position $P(x,y)$: $[0,1]$

$$f\left(\tfrac{1}{2},\tfrac{1}{2}\right) \approx f(x_1,y_1)\cdot(1-x)(1-y) + f(x_2,y_1)\cdot x\cdot(1-y) + f(x_1,y_2)\cdot(1-x)\cdot y + f(x_2,y_2)\cdot x\cdot y$$

$$\approx \underbrace{f(0,0)\cdot 0{,}5\cdot 0{,}5}_{0} + f(1,0)\cdot 0{,}5\cdot 0{,}5 + f(0,1)\cdot 0{,}5\cdot 0{,}5 + \underbrace{f(1,1)\cdot 0{,}5\cdot 0{,}5}_{0}$$

$$\approx 0{,}25\cdot 1 + 0{,}25\cdot 1 = 0{,}5$$

$$\approx 0{,}5$$

$x_1 = y_1 = \frac{4}{8} - \frac{1}{16}$

$x_2 = y_2 = \frac{4}{8} + \frac{1}{16}$

$P_2\left(\frac{4}{8} - \frac{1}{32}, \frac{4}{8} - \frac{1}{32}\right)$: 4 Points around P_2 :

$Q_{11} = \left(\frac{4}{8} - \frac{1}{16}, \frac{4}{8} - \frac{1}{16}\right)$

$Q_{12} = \left(\frac{4}{8} - \frac{1}{16}, \frac{4}{8} + \frac{1}{16}\right)$

$Q_{21} = \left(\frac{4}{8} + \frac{1}{16}, \frac{4}{8} - \frac{1}{16}\right)$

$Q_{22} = \left(\frac{4}{8} + \frac{1}{16}, \frac{4}{8} + \frac{1}{16}\right)$

$R_1 : (x, y_1)$

$$f(R_1) = \frac{\frac{9}{16} - \frac{4}{8} - \frac{1}{32}}{\frac{9}{16} - \frac{7}{16}}\cdot 0 + \frac{\frac{4}{8} - \frac{1}{32} - \frac{7}{16}}{\frac{1}{8}}\cdot 1$$

$$= \frac{\frac{1}{32}}{\frac{1}{8}} = \frac{1}{4}$$

$R_2 : (x, y_2)$

$$f(R_2) = \frac{\frac{9}{16} - \frac{4}{8} - \frac{1}{32}}{\frac{1}{8}}\cdot 1 = \frac{1}{4}$$

$$f(P_2) \approx \frac{\frac{9}{16} - \frac{4}{8} - \frac{1}{32}}{\frac{1}{8}}\cdot\frac{1}{4} + \frac{\frac{4}{8} - \frac{1}{32} - \frac{7}{16}}{\frac{1}{8}}\cdot\frac{1}{4} \approx \frac{\frac{1}{32}}{\frac{1}{8}}\cdot\frac{1}{2} = \underline{\underline{\frac{1}{8}}}$$

2nd. Questions:

Distance-Decreasing:

$C_1 : (0.25, 0, 0)$ $\alpha_1 = 0.5$

$C_{next} = (1, 1, 1, 0)$ $\alpha_{next} = 0$ → no impact

↳ $C_{next} = (0.5, 0, 0)$ $\alpha_{next} = 0,5$

$C_{neu} = 0,5(0,25, 0, 0) + 0.5 \cdot 0.5 \cdot (0.5, 0, 0)$

$= (0,125, 0, 0) + (0.125, 0, 0) = (0.25, 0, 0)$

$\alpha_{neu} = 0,5 + 0,25 = 0.75$

~~$C_{end} = (0.25, 0, 0)$~~ $C_{end} = (0.25, 0, 0, 0.75)$