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Exercise 10

Exercise 11. 1 - Splatting

1.

$$
\begin{aligned}
splat(p) &= \frac{1}{\sqrt{\pi}} * e^{-\frac{p^2}{2}} \\
splat(1.5) &= \frac{1}{\sqrt{\pi}} * e^{-\frac{1.5^2}{2}} = 0.183166 \\
splat(0.5) &= \frac{1}{\sqrt{\pi}} * e^{-\frac{0.5^2}{2}} = 0.4978956 \\
splat(-0.5) &= \frac{1}{\sqrt{\pi}} * e^{-\frac{-0.5^2}{2}} = 0.4978956 \\
splat(-1.5) &= \frac{1}{\sqrt{\pi}} * e^{-\frac{-1.5^2}{2}} = 0.183166
\end{aligned}
$$

2.

$$
\begin{aligned}
f(x_0) &= 3 \\
f(x_1) &= 6 \\
f(x_2) &= 1 \\
luminance_{x_0} &= 1 \\
luminance_{x_1} &= 0 \\
luminance_{x_2} &= 4 \\
\alpha_{x_0} &= 0.4 \\
\alpha_{x_1} &= 0.8 \\
\alpha_{x_2} &= 0.3
\end{aligned}
$$

$$
\begin{aligned}
x_{0_{splat(1.5)}} = x_{0_{splat(-1.5)}} &= 0.183166 * 1 * 0.4 = 0.0732664 \\
x_{0_{splat(0.5)}} = x_{0_{splat(-0.5)}} &= 0.4978956 * 1 * 0.4 = 0.19915824 \\
x_{1_{splat(1.5)}} = x_{1_{splat(-1.5)}} &= 0.183166 * 0 * 0.8 = 0 \\
x_{1_{splat(0.5)}} = x_{1_{splat(-0.5)}} &= 0.4978956 * 0 * 0.8 = 0 \\
x_{2_{splat(1.5)}} = x_{2_{splat(-1.5)}} &= 0.183166 * 4 * 0.3 = 0.2197992 \\
x_{2_{splat(0.5)}} = x_{2_{splat(-0.5)}} &= 0.4978956 * 4 * 0.3 = 0.59747472
\end{aligned}
$$

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3. due to the fact, that x_1 has 0 luminance it could be omitted but will be included.

$$viewplane(1.5) = x_{0_{splat(-1.5)}} = 0.0732664$$
$$viewplane(2.5) = x_{0_{splat(-0.5)}} = 0.19915824$$
$$viewplane(3.5) = x_{2_{splat(-1.5)}} + x_{0_{splat(0.5)}} = 0.2197992 + 0.19915824 = 0.41895744$$
$$viewplane(4.5) = x_{2_{splat(-0.5)}} + x_{1_{splat(-1.5)}} + x_{0_{splat(1.5)}} = 0.59747472 + 0 + 0.19915824 = 0.79663296$$
$$viewplane(5.5) = x_{2_{splat(0.5)}} + x_{1_{splat(-0.5)}} = 0.59747472 + 0 = 0.59747472$$
$$viewplane(6.5) = x_{2_{splat(1.5)}} + x_{1_{splat(0.5)}} = 0.2197992 + 0 = 0.2197992$$
$$viewplane(7.5) = x_{1_{splat(1.5)}} = 0$$

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Exercise 11. 2 - Meshed Polyhedra Visibility Ordering (MPVO)

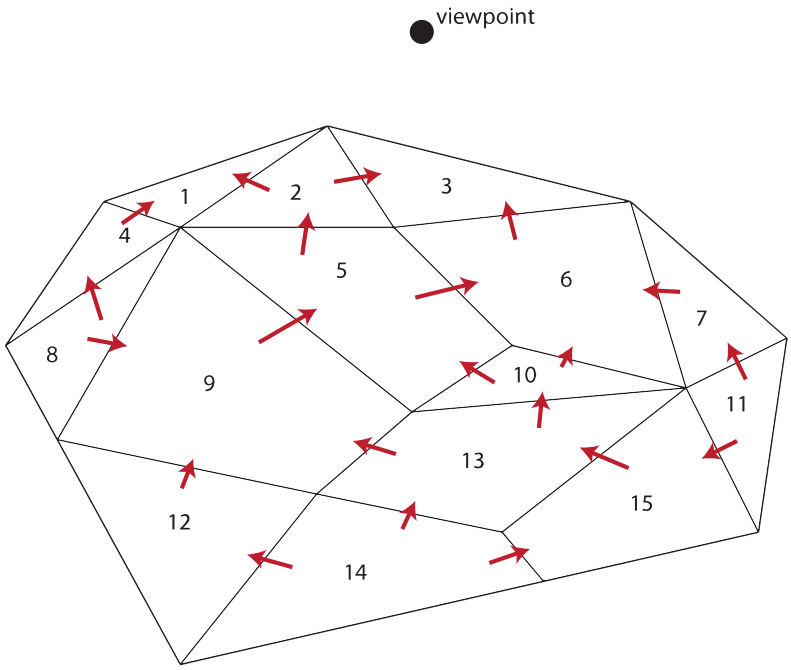

Figure 1: neighborhoodgraph

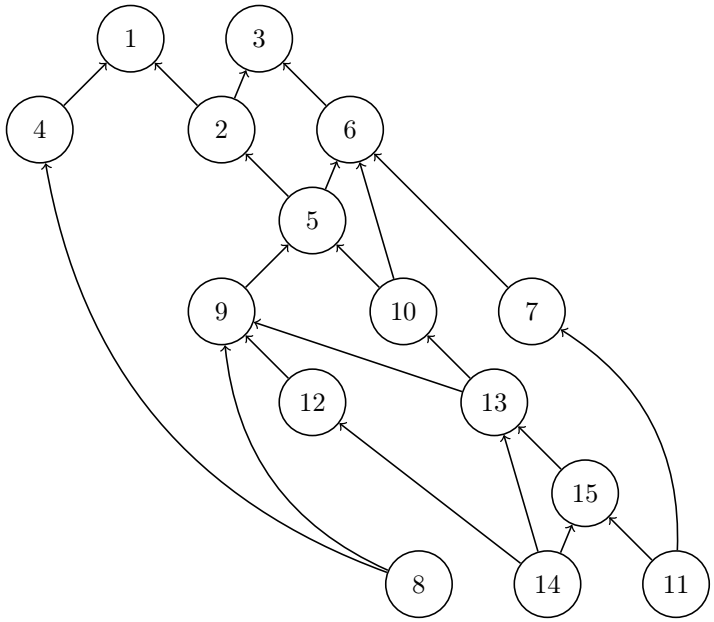

Figure 2: acyclic graph

- Sink cells: 1, 3
- Source cells: 8, 11, 14