

Pensieve header: The Schwartz Lantern.

```
cyl[ $\alpha$ _,  $\beta$ _] := {Cos[2  $\pi$   $\alpha$ ], Sin[2  $\pi$   $\alpha$ ],  $\beta$ };
```

```
dots[ $n$ _,  $m$ _] := dots[ $n$ ,  $m$ ] = Table[
  cyl[ $\frac{i + \text{If}[\text{OddQ}[j], 1/2, 0]}{n}$ ,  $\frac{j}{m}$ ],
  { $i$ , 0,  $n$ }, { $j$ , 0,  $m$ }
]
```

```
dots[3, 4]
```

```
{{{1, 0, 0}, { $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{1}{4}$ }, {1, 0,  $\frac{1}{2}$ }, { $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{3}{4}$ }, {1, 0, 1}},
  {{- $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ , 0}, {-1, 0,  $\frac{1}{4}$ }, {- $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{1}{2}$ }, {-1, 0,  $\frac{3}{4}$ }, {- $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ , 1}},
  {{- $\frac{1}{2}$ , - $\frac{\sqrt{3}}{2}$ , 0}, { $\frac{1}{2}$ , - $\frac{\sqrt{3}}{2}$ ,  $\frac{1}{4}$ }, {- $\frac{1}{2}$ , - $\frac{\sqrt{3}}{2}$ ,  $\frac{1}{2}$ }, { $\frac{1}{2}$ , - $\frac{\sqrt{3}}{2}$ ,  $\frac{3}{4}$ }, {- $\frac{1}{2}$ , - $\frac{\sqrt{3}}{2}$ , 1}},
  {{1, 0, 0}, { $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{1}{4}$ }, {1, 0,  $\frac{1}{2}$ }, { $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{3}{4}$ }, {1, 0, 1}}}
```

```
poly[ $n$ _,  $m$ _] := Module[{vs},
```

```
  vs = dots[ $n$ ,  $m$ ];
```

```
  Flatten[Table[
```

```
    {
```

```
      Polygon[{vs[[ $i$ ,  $j$ ]], vs[[ $i$  + 1,  $j$ ]], vs[[ $i$ ,  $j$  + 1]]}],
```

```
      Polygon[{vs[[ $i$  + 1,  $j$  + 1]], vs[[ $i$  + 1,  $j$ ]], vs[[ $i$ ,  $j$  + 1]]}],
```

```
    },
```

```
    { $i$ , 1,  $n$ }, { $j$ , 1,  $m$ }
  ]]
```

```
]
```

```
]
```

```
poly[3, 4]
```

```
{Polygon[{{1, 0, 0}, {- $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ , 0}, { $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{1}{4}$ }}],
  Polygon[{{-1, 0,  $\frac{1}{4}$ }, {- $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ , 0}, { $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{1}{4}$ }}],
  Polygon[{{ $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{1}{4}$ }, {-1, 0,  $\frac{1}{4}$ }, {1, 0,  $\frac{1}{2}$ }}],
  Polygon[{{- $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{1}{2}$ }, {-1, 0,  $\frac{1}{4}$ }, {1, 0,  $\frac{1}{2}$ }}],
  Polygon[{{1, 0,  $\frac{1}{2}$ }, {- $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{1}{2}$ }, { $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{3}{4}$ }}],
  Polygon[{{-1, 0,  $\frac{3}{4}$ }, {- $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{1}{2}$ }, { $\frac{1}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $\frac{3}{4}$ }}],
```

```

Polygon[{{1/2, sqrt(3)/2, 3/4}, {-1, 0, 3/4}, {1, 0, 1}}],
Polygon[{{-1/2, sqrt(3)/2, 1}, {-1, 0, 3/4}, {1, 0, 1}}],
Polygon[{{-1/2, sqrt(3)/2, 0}, {-1/2, -sqrt(3)/2, 0}, {-1, 0, 1/4}}],
Polygon[{{1/2, -sqrt(3)/2, 1/4}, {-1/2, -sqrt(3)/2, 0}, {-1, 0, 1/4}}],
Polygon[{{-1, 0, 1/4}, {1/2, -sqrt(3)/2, 1/4}, {-1/2, sqrt(3)/2, 1/4}}],
Polygon[{{-1/2, -sqrt(3)/2, 1/2}, {1/2, -sqrt(3)/2, 1/4}, {-1/2, sqrt(3)/2, 1/2}}],
Polygon[{{-1/2, sqrt(3)/2, 1/2}, {-1/2, -sqrt(3)/2, 1/2}, {-1, 0, 3/4}}],
Polygon[{{1/2, -sqrt(3)/2, 3/4}, {-1/2, -sqrt(3)/2, 1/2}, {-1, 0, 3/4}}],
Polygon[{{-1, 0, 3/4}, {1/2, -sqrt(3)/2, 3/4}, {-1/2, sqrt(3)/2, 1}}],
Polygon[{{-1/2, -sqrt(3)/2, 1}, {1/2, -sqrt(3)/2, 3/4}, {-1/2, sqrt(3)/2, 1}}],
Polygon[{{-1/2, -sqrt(3)/2, 0}, {1, 0, 0}, {1/2, -sqrt(3)/2, 1/4}}],
Polygon[{{1/2, sqrt(3)/2, 1/4}, {1, 0, 0}, {1/2, -sqrt(3)/2, 1/4}}],
Polygon[{{1/2, -sqrt(3)/2, 1/4}, {1/2, sqrt(3)/2, 1/4}, {-1/2, -sqrt(3)/2, 1/2}}],
Polygon[{{1, 0, 1/2}, {1/2, sqrt(3)/2, 1/4}, {-1/2, -sqrt(3)/2, 1/2}}],
Polygon[{{-1/2, -sqrt(3)/2, 1/2}, {1, 0, 1/2}, {1/2, -sqrt(3)/2, 3/4}}],
Polygon[{{1/2, sqrt(3)/2, 3/4}, {1, 0, 1/2}, {1/2, -sqrt(3)/2, 3/4}}],
Polygon[{{1/2, -sqrt(3)/2, 3/4}, {1/2, sqrt(3)/2, 3/4}, {-1/2, -sqrt(3)/2, 1}}],
Polygon[{{1, 0, 1}, {1/2, sqrt(3)/2, 3/4}, {-1/2, -sqrt(3)/2, 1}}]

```

Graphics3D[poly[8, 40]]

