Exercise Computer graphics – (till November 23, 2006)

Rotations

Exercise 20: In the last lecture we learned about the Generalized Barycentric Coordinates proposed by Loop and Derose.

Locate the position P on the polygon for the following weights l_i. As we have seen in the lecture, each l_i is assigned to its corresponding point P_i.

Also state how you come to your conclusion.

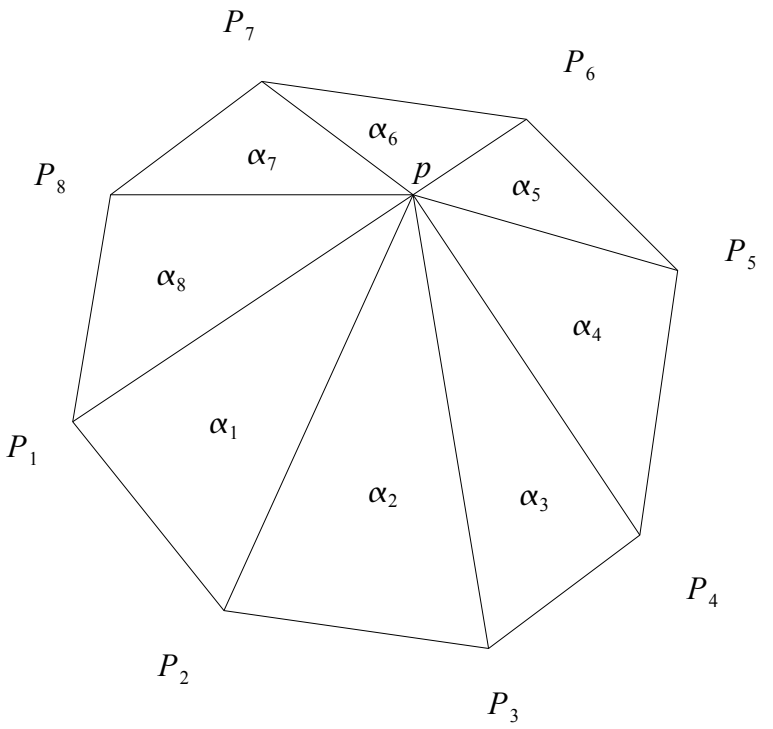
i) $l_3=1$; $l_k = 0$; k != 3
ii) $l_3+l_4=1$; $l_k = 0$; k != 3,4
iii) $l_3=1/3$; $l_4 = 1/3$, $l_k = 0$; k != 3,4
iv) $l_3=l_4=l_5=1/3$; $l_k = 0$; k != 3,4,5
v) $l_3=1/3$; $l_4=2/3$; $l_k = 0$; k != 3,4
vi) $l_1=l_2=...=l_8=1/8$

In vi), only exclude parts of the domain polygon which can not host point P (the more, the better).

vi) $l_3+l_4> 0.5$;

$$\pi_i(p)=\frac{\alpha_1(p)\alpha_2(p)...\alpha_m(p)}{\alpha_{i-1}(p)\alpha_i(p)} \qquad l_i=\frac{\pi_i(p)}{\sum_{k=1}^{m}\pi_k(p)}$$

(In this example: m=8)



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Exercise 21: In a 3D environment, m faces emit light according to an m x m matrix. An element of the matrix (can take values from the interval [0,1]) in line l, column c can be interpreted as the fraction of light, face l emits to face c.

The light sources can be modeled as faces emitting but not reflecting any light. It is known in advance which amount of light is emitted by the light-source faces.

In order to render a realistic scene:

How can we determine the amount of light which enters a face including the original light from the “lamps” and the reflected light from all passively reflecting faces?

To simplify matters we assume that the scene does not contain any faces which emit shadows.