Schnyder woods

A 3-*orientation* of a triangulation is an orientiation of inner edges such that each inner vertex has exactly 3 outgoing edges. The outer edges remain undirected.

cw - clockwise
ccw - counterclockwise

Exercise 1. Let $\mathcal{T}$ be a 3-orientation of a triangulation G. Show that

(i) If C is a directed cycle in $\mathcal{T}$ such that for every edge e incident with one vertex in C and contained in the region bounded by C, the edge e is oriented towards a vertex in C, then C is a triangle.
(ii) If $\mathcal{T}$ contains a cw (ccw) cycle C then it also contains a cw (ccw) triangle contained in the region bounded by C.

Exercise 2. Prove that every 3-orientation $\mathcal{T}$ of a triangulation G gives a unique Schnyder wood (up to cyclic shifts of colors RGB) such that the orientation of edges in the $\mathcal{T}$ agrees with the orientation of edges in the Schnyder wood. Give an algorithm producing such a Schnyder wood.