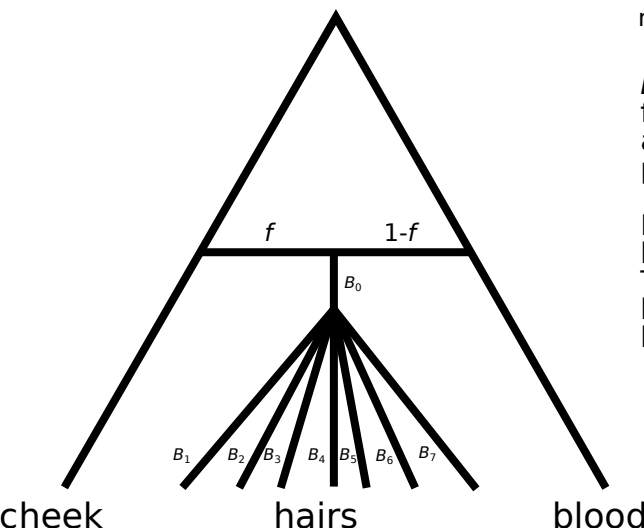model a)

B_1--B_8 are bottlenecks with size N happening independently in each hair. The (single) frequency just before these bottlenecks is a mixture of cheek and blood in proportion f and $1-f$.

cheek   hairs   blood

model b)

B_0 is a bottleneck with size N_1. The frequency just before this bottleneck is a mixture of cheek and blood in proportion f and $1-f$.

B_1--B_8 are bottlenecks with size N_2 happening independently in each hair. The frequency just before these bottlenecks is produced by the bottleneck B_0.

cheek   hairs   blood