1102-05-219 **Jeremy F Alm*** (alm.academic@gmail.com), 1101 W. College Ave., Jacksonville, IL 62650, and **Jacob Manske**, Verona, WI 53593. *Highly constrained edge-colorings of complete graphs, part I.*

Given a finite set $\mathcal{C}$ of colors, let $\mathcal{T}$ be a set of triangles with edges colored from colors in $\mathcal{C}$, i.e., $\mathcal{T} \subseteq \mathcal{C}^3$ and $\mathcal{T}$ is closed under permutation of coordinates. $\mathcal{T}$ is *realizable* if there is some $N \leq \omega$ such that there exists an edge-coloring of K_N with colors from $\mathcal{C}$ such that

- every triangle appearing in K_N is in $\mathcal{T}$, and
- if uv is colored a and $\langle a, b, c\rangle \in \mathcal{T}$, then there is a vertex w such that uw is colored b and vw is colored c, i.e., "Whatever can happen, must happen".

Let $\mathcal{C} = \{a_1, \dots, a_n\}$, and let $\mathcal{T}_m = \{\langle a_i, a_j, a_k\rangle : |\{i, j, k\}| \neq m\}$, $(m = 1, 2, 3)$. Then

- It is an open problem whether $\mathcal{T}_1$ is realizable for all n. Erdős, Szemerédi, and Trotter once gave a purported proof, but it was wrong.
- If $\mathcal{T}_2$ is realizable on K_N, then there is a projective plane of order $n - 1$.
- If $\mathcal{T} \subseteq \mathcal{T}_3$, then it is decidable whether $\mathcal{T}$ is realizable, realizable over finite sets only, etc.

In Part II, Manske will discuss some recent progress on open problems. (Received July 29, 2014)