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In what ways can we partition a partially ordered set (poset) into linearly ordered subsets (chains)? We will report on recent progress made by our Claremont REU team on a thirty year old conjecture.

In particular, two chains C_1 and C_2 in a finite ranked poset P (a finite poset is ranked if all maximal chains have the same size) are said to be *nested* if $|C_1| \leq |C_2|$ implies that the levels occurring in C_1 are a subset of the levels occurring in C_2 . A thirty-year old conjecture of Griggs gives a sufficient condition—the so-called normalized matching condition, also known as the LYM property—for guaranteeing a decomposition of a poset into pairwise nested chains.

In this talk, we will present our results in support of the conjecture. As a consequence of our main theorem, the conjecture is true for rank 3 posets of width (size of the largest collection of incomparable elements) less than 12. (Received July 26, 2007)