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Packing the Smallest Non layered Set Partition Pattern.

Set partitions of $[n] = \{1, 2, \ldots, n\}$ can be thought of words called restricted growth functions. A *restricted growth function* is a word $w = w_1 w_2 \ldots w_n$ where $w_1 = 1$ and $1 \leq w_i \leq \max\{w_1, w_2, \ldots, w_{i-1}\} + 1$.

For any word w, let the *canonization* of w be w' formed by replacing each copy of the first occurring letter of w by 1, each copy of the second occurring letter of w by 2, etc. We will say that w *contains* a copy u if there is a subsequence w' of w whose canonization is u. Otherwise, w *avoids* u.

The packing density $\delta(w)$ of w of length k is defined to be $\delta(w) := \lim_{n\to\infty} \frac{\mu(w,n)}{\binom{n}{k}}$, where $\mu(w, n)$ is the maximum number of copies of w in any restricted growth function of length n.

A restricted growth function is called layered if it is of the form $11\ldots122\ldots2\ldots jj\ldots j$. The packing densities for the layered restricted growth functions of length are $\delta(123) = 1$, $\delta(122) = \delta(112) = 2\sqrt{3} - 3$, and $\delta(111) = 1$. The only non layered pattern of length three is 121, and its packing density remained an open problem for three years. We show that the packing density for 121 is $\delta(121) = 1/4$. (Received July 26, 2014)