1053-05-303 **John Freeman**, **Tomas Schonbek** and **Wandi Wei*** (wei@math.fau.edu), 777 Glades Road, Boca Raton, FL 33431. *On a Tennis Ball Problem.*

Let $s_i > t_i$ $(1 \leq i \leq n)$ be positive integers, and let $s = s_1 + \ldots + s_n$. The tennis ball problem we are considering here goes as follows. There are s tennis balls, labeled $1, 2, \ldots, s$, to be handled in n turns. At the first turn, t_1 balls are taken out from the ones labeled $1, \ldots, s_1$. At the ith turn $(2 \leq i \leq n)$, t_i balls are taken out from the ones that are left in the previous turn and the ones labeled with $s_1 + \ldots + s_{i-1} + 1, s_1 + \ldots + s_{i-1} + 2, \ldots, s_1 + \ldots + s_{i-1} + s_i$. We call the set of the balls taken-out an $(s_1, \ldots, s_n; t_1, \ldots, t_n)$-set. Our tennis ball problem asks for the number, denoted by $N(s_1, \ldots, s_n;\ t_1, \ldots, t_n)$, of possible $(s_1, \ldots, s_n;\ t_1, \ldots, t_n)$-sets.

We first characterize $(s_1, \ldots, s_n;\ t_1, \ldots, t_n)$-sets in two different ways, and then employ these characterizations to give two formulas for $N(s_1, \ldots, s_n;\ t_1, \ldots, t_n)$. For the case $s_i = 2$ and $t_i = 1$ $(1 \leq i \leq n)$, our formulas are reduced to the known result: the number of such sets is the $(n+1)$st Catalan number. (Received September 07, 2009)