

Grate Expectations

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Originally inspired by the process of recording students' scores into a grade sheet, we define an (n, k) -grate to be a binary n -tuple containing k ones, such that there are never two adjacent zeroes. Of interest are the values of n and k , such that the set of (n, k) -grates is non-empty. We developed a formula using binomial coefficients to count the number of grates in terms of the parameters n and k . We later found a pleasing combinatorial proof for this.

Beginning with a sequence of n zeroes, we consider the process of flipping bits (0's turning into 1's) until a grate is created. For a given value of n , we are interested in the expected number of bit-flips needed to obtain a grate. Hence, the title of this talk!

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