Sean 7543

Shiona

Omil

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From cs.sunysb.edu!skiena Sat Jun 4 15:27:35 0400 1994
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Date: Sat, 4 Jun 1994 15:27:35 -0400
From: skiena@cs.sunysb.edu (Steve Skiena)
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Received: from sbskiena.csdept (sbskiena.cs.sunysb.edu) by cs.sunysb.edu; Sat, 4 Jun 1994 15:2'
To: njas@research.att.com
Subject: Re: it is nice a day to be indoors!
Cc: skiena@cs.sunysb.edu
Status: RO

It is a terrible day to be indoors! I am finishing last minute arrangements for the ACM Symp. on Computational Geometry, which we are hosting at Stony Brook starting Sunday might..

By the way, my favorite sequence which is not in your book begins:

2, 8, 12, 8, 16, 24, 20, 32, 18, 24, 40, 48, 28, 48, 60, 32, 32, 56 ...

and counts the frequency of the ith largest distance in an n*n grid of points, for $i < n$. In our paper:

Frequencies of Large Distances in Integer Lattices (with Venugopal Reddy).
\fIProc. Seventh International Conference on
Graph Theory, Combinatorics, Algorithms, and Applications\fP,
Kalamazoo MI, to appear.
Also, Report 89-18, Department of Computer Science, State University of New York, Stony Brook, June 1989.

We prove that that the frequency of ith largest distance for all $i<n$ in an $n\times n$ integer lattice is

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\[2i\;\;\;\;\mbox{  if}\;\; i\;\; \mbox{is a perfect square}\]
\hfill and\hfill\,
\[ 4 \left( i - \left\lfloor
\frac{ {\left\lfloor 2\sqrt{i} \right\rfloor}^{2}} {4} \right\rfloor\right)
\left(\left\lceil 2\sqrt{i} \right\rceil - i +
\left\lfloor \frac{{\left\lfloor 2\sqrt{i} \right\rfloor}^{2}}{4}\right\rfloor\r
ight)\;\mbox{ otherwise}\]
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The same question can be asked in higher dimensions. For cubic lattices, the sequence starts

4, 24, 36, 48, 48, 144, 32, 60, 192, 108, 144, 72, 240, 288, 192, ...

Steve Skiena