Geometry Seminar
Tuesday, October 25, 2011
Room 512 WWH at 6:00 P.M.

Guarding polyominoes

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We explore the art gallery problem for the special case that the domain (gallery) P is an m-polyomino, a polyform whose cells are m unit squares.

We study the combinatorics of guarding polyominoes in terms of the parameter m, in contrast with the traditional parameter n, the number of vertices of P; in particular, we show that $\lfloor \frac{m+1}{3} \rfloor$ point guards are always sufficient and sometimes necessary to cover an m-polyomino.

When $m \leq 3n/4$, the point guard sufficiency condition yields a strictly lower guard number than $\lfloor \frac{n}{4} \rfloor$, given by the art gallery theorem for orthogonal polygons. When pixels behave themselves like guards (pixel guards), we prove that $\lfloor \frac{3m}{11} \rfloor + 1$ guards are sufficient and sometimes necessary to cover an m-polyomino.

We also study the algorithmic complexity of computing optimal guard sets for polyominoes.

For more information please visit the seminar website at:
http://www.math.nyu.edu/seminars/geometry_seminar.html.