ORTHOGONAL ART GALLERIES WITH HOLES

YOUNGJU JO

The original art gallery problem (V.Klee,1973) asked for the minimum number of guards sufficient to see every point of the interior of an n-vertex simple polygon. Chvátal (1975) proved that $\lfloor \frac{n}{3} \rfloor$ guards are always sufficient. If all the edges of the given simple polygon are either horizontal or vertical, then such a polygon is called an orthogonal gallery. Kahn, Klawe and Kleitman (1983) proved that $\lfloor \frac{n}{4} \rfloor$ guards are sufficient for such a n-vertex gallery. We are interested in orthogonal gallery with holes, i.e, an orthogonal polygon enclosing some other orthogonal polygons called holes (interior of each hole is empty). In 1982, Shermer conjectured that any orthogonal polygon with n vertices and h holes can be guarded by $\lfloor \frac{n+h}{4} \rfloor$ guards. This conjecture remains open.

The best known result shows that $\lfloor \frac{n+2h}{4} \rfloor$ guards suffice (O'Rourke 1987). In this talk we will discuss the history of these problems and some of the proofs we will outline our approach to proving that $\lfloor \frac{n+\frac{5}{3}h}{4} \rfloor$ guards suffice for our orthogonal gallery with n vertices with h holes. This is joint work with Prof Hemanshu Kaul.