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Covering an Orthogonal Polygon with Diagonal Rectangles

A polygon is *orthogonal* if each edge is either vertical or horizontal. A family of rectangles $R_i(1 \leq i \leq m)$ *covers* an orthogonal polygon P if and only if $\cup_i R_i = P$.

We don't allow neither rotation of rectangles.

The problem of covering an orthogonal polygon with rectangles has practical applications and has been researched in many papers.

A rectangle R is *diagonal* (with respect to an orthogonal polygon P) if and only if for at least one of the two diagonals of R, both endpoints of it are vertices of P.

Watanabe [2] proposed the following question: "How many diagonal rectangles are needed to cover an orthogonal polygon with n vertices?" We will answer the question.

Reference: [1] J. C. Culberson and R. A. Reckhow, Covering polygon is hard, *Journal of Algorithms*, **17**, 2-44(1994). [2] Mamoru Watanabe, Rectangle coverings in orthogonal polygons, to appear (British Conference of Combinatorics,1997).