

**MR2355301 (Review)** 68-02 (52B55 68U05 68W40)

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★ **Visibility algorithms in the plane.**

*Cambridge University Press, Cambridge, 2007. xiv+318 pp. \$95.00. ISBN 978-0-521-87574-5*

The book is devoted to visibility algorithms in computational geometry and covers basic visibility algorithms for problems in two dimensions. The book is suitable for students with a background in data structures and algorithms; a computational geometry background is not necessary as the book explains computational geometry concepts, such as plane sweep, as needed. The topics covered are all very visual, easy to understand, and well explained. The algorithms are explained in detail, and often multiple algorithms for the same problem are given. The text builds up to theorems by showing the necessary geometric properties that lead to the theorems. Exercises are mixed into the text to be solved while reading the appropriate sections. Solutions for exercises are not given. The book is very well suited for teaching a course on this topic, or chapters could be used in a more general course, on an advanced undergraduate level or on the graduate level. For researchers the book can serve as a reference source on the topic of visibility algorithms.

The book covers the following topics in 8 chapters over 293 pages. Chapter 1 covers the necessary background, such as visibility, polygons, triangulation, and even asymptotic complexity. Chapter 2 covers point visibility, including algorithms to compute visibility polygons in simple polygons (winding or non-winding), or polygons with holes. Chapter 3 covers weak visibility polygons and shortest path trees. In Chapter 4, LR-visibility polygons (or “streets”) and shortest path trees for these polygons are covered. Chapter 5 presents algorithms to compute visibility graphs, while Chapter 6 covers visibility graph theory which includes recognizing visibility graphs of simple polygons as well as special classes of visibility graphs. Chapter 7 covers min-link paths and their connection to visibility, including algorithms to compute min-link paths, the link center, and minimum nested polygons. Chapter 8 covers path queries and their connection to visibility, including ray shooting, and shortest path queries. The bibliography has 347 entries.

In summary, the book gives a good overview of visibility algorithms in the plane, concentrating on basic algorithms but also covering the state of the art.

Reviewed by *Carola Wenk*

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