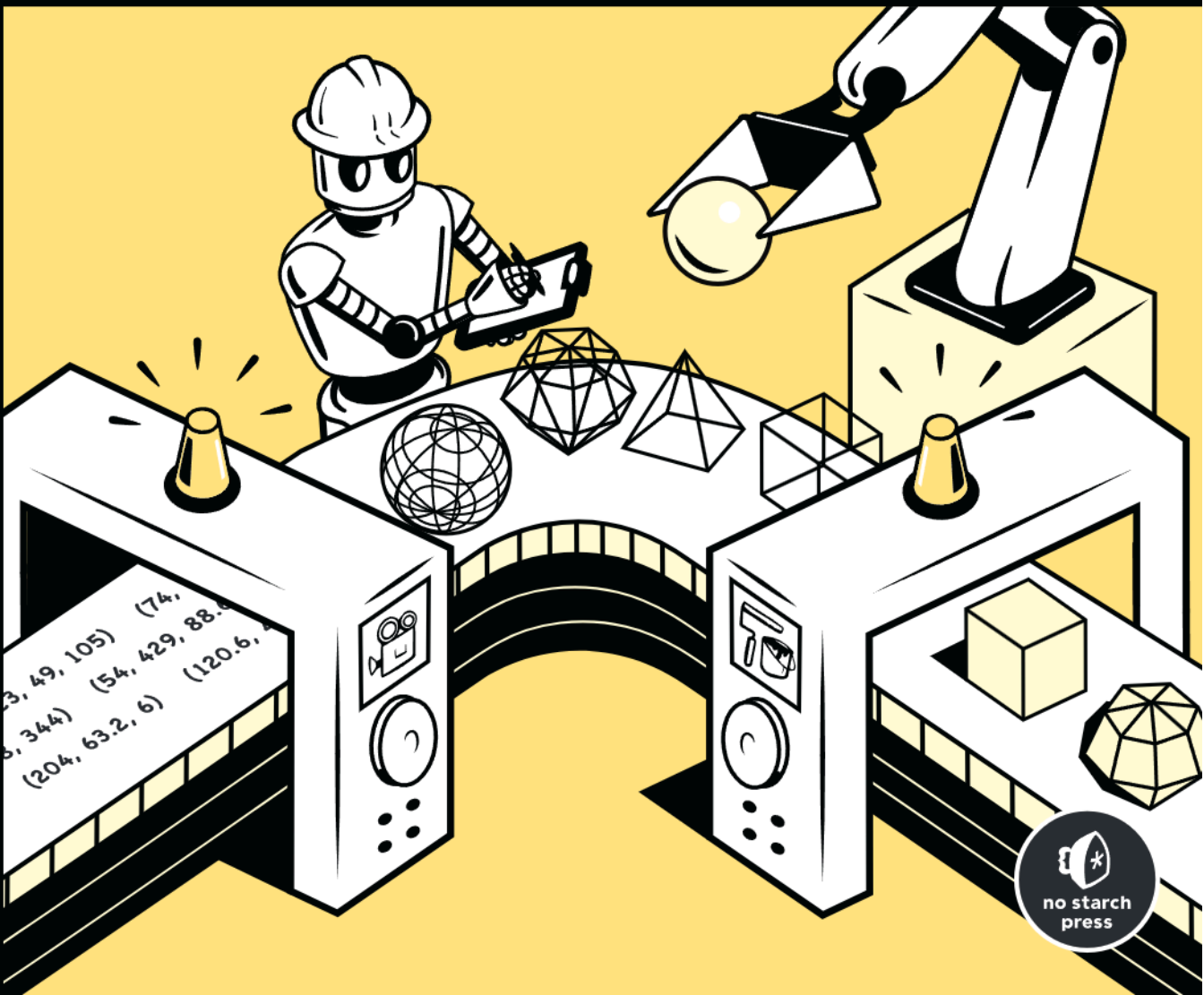


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# COMPUTER GRAPHICS FROM SCRATCH

A PROGRAMMER'S INTRODUCTION  
TO 3D RENDERING

GABRIEL GAMBETTA





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**A Programmer's Introduction to  
3D Rendering**

by Gabriel Gambetta



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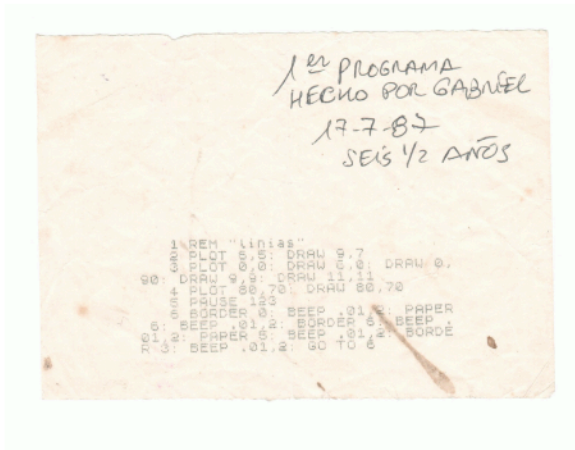
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To my dad (1947-2007), architect and self-taught programmer,  
who got me started on this path.



*My dad, my two-and-a-half-year-old self, and the ZX81.*



*My earliest documented program ever, written at six-and-a-half years old,  
drew some lines on the screen of my ZX Spectrum+.*

## About the Author

Gabriel Gambetta started coding games around the age of 5 on a ZX Spectrum. After studying computer science and working at a respectable local company in his native Uruguay, he started a game development company and ran it for 10 years while teaching computer graphics at his alma mater. More recently, Gambetta has been working at Google Zürich since 2011, except for a stint as an early engineer at London-based multiplayer game tech unicorn Improbable, and a year in Madrid focusing on acting and filmmaking.

## About the Technical Reviewer

Alejandro Segovia Azapian is a software engineer with 14+ years of experience in computer graphics. He has worked for several industry-leading companies in the field of 3D graphics including Autodesk, Electronic Arts, PDI/DreamWorks, and WB Games, across a variety of realtime graphics projects spanning apps, games, game engines, and frameworks. Alejandro currently works in the GPU Software group at a leading consumer electronics company based in Cupertino, California.



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