

Preface

This book is about making pictures via a computer. Making pictures, that is to say making marks on a surface to represent things seen or imagined, is an ancient pursuit. Since the earliest times, techniques for making pictures have been in continuous development, branching out in new directions as new tools became available. Over the past 50 years we have seen just such a branching-out in the use of computers for imaging, overlapping, and often over-topping the techniques inherited from the past. Personal computers and their peripherals are modern tools for an ancient task.

Nearly all the material in this book can be found in one form or another on the Internet. However, there seems to be room for an integrated treatment which is accessible at entry level, practicable with modest equipment, and fairly deep, leading on to further explorations in many directions. It is offered to scientists, engineers, and students with a computer background but no particular knowledge of digital imaging, and to artists, authors, and amateurs wanting a well-founded introduction to digital imaging and a well-integrated reference source. Readers of any level can dip in wherever they feel inclined, and skip whatever they already know.

To this end, the prerequisites are merely possession of current standard equipment and a working knowledge of its use. Standard equipment is taken as: a personal computer with a Microsoft Windows operating system, Microsoft PAINT image editor, and Microsoft QuickBASIC programming language; plus a simple scanner, digital camera, and desk-top printer.

The first half of the book (Parts I–IV) considers the roots of digital imaging, which lie in common knowledge drawn from other fields: the arithmetic of numbers, the geometry of location in space and a plane, the optics of lenses and the eye, the measurement of light, the psycho-physics of perception, and the phenomena of complexity.

The second half of the book (Parts V–VIII) covers practical imaging. Here the primary classification is by bit-depth, and within that by the natural flow from input, through processing and storage, to output and viewing.

Programs are introduced as brief descriptions throughout. In the e-book, source code in Microsoft QuickBASIC for every program can be downloaded. These programs are really a collection of sub-programs which are offered as bare working demonstrations, to be improved, developed, or rewritten to taste. QuickBASIC is free, easily learned, and can be transposed up to more powerful languages by any interested reader.

The References in each chapter are to some fundamental works, and to some current literature, for further pursuit.

Let us honour the cascade of universities, commercial enterprises, and curious persons who have made digital imaging available to all. Special thanks are due to Dr. Claus Ascheron and his team at Springer for bringing this book into being, and for their personal kindness throughout. And may you, gentle reader, enjoy a happy lifetime among the pixels.

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