(4) an arc label specifies a variable extension of a predicate to which the arc is connected;
(5) a marking is a mapping that assigns to each predicate formal sums of $n$-tuples of individual symbols, also called tuples.

The graphical representation of a PrT net is obtained by representing a predicate by a circle, a transition by a box, an element of $F \cap (S \times T)$ by a directed arc from a circle to a box, and an element of $F \cap (T \times S)$ by a directed arc from a box to a circle.

For the analysis of the PrT net model we have employed the $S$-invariant method.[3] The $S$-invariants are obtained from the projection of the entries of the incidence matrix $C$ of the net. The projection along the $j$th position of the tuple ($|\,|_j$) introduces a kind of partial cardinal number, by ignoring information at position $j$ in the tuple. As a consequence every solution of $|C|^T|i| = 0$ whose entries do not contain individual variables determines a family of $S$-invariants.

# Book Reviews

CHARLES F. GOLDFARB
*The SGML Handbook*
Oxford University Press, 1990. 664 pp.
ISBN 0 19 853737 9. £50.00.

This book is the result of some twenty years work by the author and others on the development of the Standard Generalized Markup Language, which had led to the publication of ISO 8879, the SGML standard. The main elements of the book are: the up-to-date amended full-text of ISO 8879, a detailed structured overview of SGML and additional tutorial and reference material on SGML. The text of the standard has been extensively annotated by the author.

Charles Goldfarb is regarded as the inventor of the SGML language and was also the technical leader of the team which developed it into an international standard. He was also the leader of the initial research project at IBM which developed GML, on which SGML is based. He is the leading authority on SGML, and this book gives the reader some of his thoughts on the standard.

The book is divided at the highest level into four parts and four appendices. Part one, 'Tutorials', consists of the three tutorial annexes from ISO 8879 and a new tutorial based on the LINK feature. Part two, 'A Structured Overview of SGML', comprises the definitions contained in ISO 8879, explained and ordered to give the reader the key ideas. Part three, 'ISO 8879 Annotated', is the full ISO text with extensive annotations. Part four, 'ISO 8879 Annexes', is purely the full ISO annexes. Appendix A, 'A Brief History of the Development of SGML', covers mark-up concepts, GML, and the progression through to the publication of the standard. Appendix B, 'Recommendations for a Possible Revision of ISO 8879', is the SGML committee document N1035, which details the changes agreed by the developers, should the standard be reviewed. Appendix C, 'About the ISO 8879 Text', describes how this document was used in preparing the book. Appendix D gives details of relevant contacts where additional information on SGML and ISO 8879 may be obtained.

The book has a section at the beginning entitled 'How to Use This Book', which acts in the same way as a READ.ME file which is received with a piece of software. This explains the typographical conventions and also the linking system which allows the book to function as a paper hypertext. This is becoming commonplace with books on this type of subject. In this case it is justified due to the fact that the text of the standard is presented alongside the annotations. The links are necessarily complicated, directing the reader to both page and section number, but moving between pages soon becomes routine. The two ribbon page markers are a very welcome addition.

It is suggested that the book is for those people who wish to understand, use and implement the standard. The book is really too detailed for those people who wish to just learn about the standard, such as students and researchers – there are other publications which are more suitable for this purpose. It certainly, however, fulfils its role as an essential aid for practitioners wishing to develop applications. Its cover price reflects the fact this is an important book in this field. It is a substantial volume which is well produced. Although of some interest to others, practitioners alone will be able to justify its purchase.

CHRISTOPHER HANKINS
*London*

TIMOTHY WEGNER AND MARK PETERSON
*Fractal Creations*
Pitman, London, 1991.
£31.50.

Today, many publishers are seeking authors who can supply an interesting manuscript, and also provide some form of add-on value to convince potential purchasers that the package is value for money. *Fractal Creations* certainly has a useful component of add-on value in the form of a colour poster, a pair of anaglyph 3D glasses, and a 5.25″ disk of fractal programs. The poster is a minor feature and shows 10 examples of fractals rendered with false colours, together with some advertising for the Waite Group Press.

But what about the book? Well, this is a cross between a traditional book and a reference manual. The first chapter is a primer on fractals; the second chapter provides advice on how to control the FRACTINT software environment; and the third chapter supplies extra detail on the individual fractal programs.

The literary style of the first chapter is in a popular vein, with the authors attempting to convince the reader that fractals are a fundamental feature of our universe. Personally, I found some of their descriptions rather loose, for according to Wegner and Peterson virtually everything is a fractal from an atom to a galaxy. I wish that they had given a formal description of a fractal set and then suggested that features of our universe exhibit fractal-like properties. Perhaps this is the price that must be paid for popular writing versus a rigid technical style.

Nevertheless, within the space of 41 pages the reader is rapidly introduced to fractals, chaos, dynamic systems, complex numbers, orbits, the Mandelbrot and Julia sets and attractors. The second chapter, which is just over 100 pages, describes the FRACTINT software environment, and really one should be seated at a computer when reading this, as it provides a thorough guided tour of the software environment. In the last chapter a further 100 pages or so provide useful background information on over 70 fractals with names like Newton's Basin and Popcorn Fractals.

Unfortunately, I was on holiday in France when I started reading *Fractal Creations* and had to wait for my return to the UK before I could investigate the software. I must admit that I was highly sceptical of getting any of the software to work as it claimed to work with CGA, EGA, VGA, SVGA and Hercules graphics adaptors. Turning to the back of the book I broke the envelope's seal storing the disk and accepted the printed warning that I agreed to abide by the accompanying software licence conditions. I also noted the warning that 'colour cycling' can induce hypnotic states.

The entire package was quickly loaded on to my humble Amstrad computer and within minutes I was exploring the Mandelbrot and Julia sets. The book's claim of using high-speed display algorithms is certainly true; several minutes is all that is needed to obtain some excellent pictures, with some in 3D. Although I have not had time to investigate every fractal type supplied, those that I have tested work as claimed, and so far the software has not failed me.

I am sure that I will return to the FRACTINT software in the future and explore other features; in the meantime, I can recommend the book to anyone who is still fascinated by fractals and would like to replace their home-grown algorithms by a well-written integrated software environment.

JOHN VINCE
*Sussex*



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