

# PRELUDE

Mathematics is the art of story-telling. Nobody has ever seen a perfectly round circle or an infinitely long line of zero width. Pure figments of the mathematical imagination. As for imaginary square roots of  $-1$ , ideal points where parallel lines meet, and 6-dimensional space! What fantasies the mind of a mathematician can dream up.

Yet stories, parables, fables, myths and legends can carry profound truths which have a powerful impact on the lives we lead. Mathematical stories are no exception. This gossamer web we spin might be pure fancy. But it's the best tool we have to understand and predict the material universe. And it reaches far beyond.

In this book we will go on a journey to the edge of the rational universe. Our motivation will be that of an explorer. We simply want to know what's out there. Whether any practical can be made of what we find there is not our prime concern. This book is not written for the practitioner in logic or mathematics or computing science.

Having said that let me add that the inspiration for the book came from having to teach this material to embryonic mathematicians and computing scientists in several courses at Macquarie University. I began to realise that, stripped of some of the formal technicalities, much of the material I taught to third year students, to honours students and even to postgraduate students could be made accessible to a wider audience.

Material which had hitherto remained locked up in courses with such intimidating names as Advanced Algebra, Axiomatic Set Theory and Theory of Computation, is too fascinating to leave there. All it needs is a little less emphasis on symbolic formality, and a little more imaginative presentation.

That's not to say that having read this book you'll be on a par with the students who graduate from my courses. I like to think that what I've done is to build a road into a national park that has hitherto only been accessible on foot.

Of course I'm certainly not the first to have attempted to bring deep ideas of logic and mathematics to a wider audience. Lewis Carrol was one of the first in "Alice in Wonderland" — a book which delightfully introduces many ideas from logic. I have also been influenced by Abbott's "Flatland" and the writings of Martin Gardener and Douglas Hofstadter.

This book is not for every body. Is it for you? Here is a check list. If you can answer "yes" to all of them then go ahead and buy this book. Otherwise, there are plenty of other books to choose.

- (1) Are you intrigued by the logical reflexiveness of the sentence "*this sentence is false*"?
- (2) Have you read and enjoyed "Alice In Wonderland"?
- (3) Can you cope with the symbols in the following?

*Let  $P$  denote a computer program and let  $D$  denote some data on which it acts. Suppose we denote the output by  $P(D)$ . So if  $P$  is a program for duplicating data then  $P(D) = DD$ . And if such a program is given its own description to duplicate, the output will be denoted by  $P(P)$ .*