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MASTERING PASCAL PROGRAMMING

ERIC HUGGINS

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MACMILLAN
EDUCATION

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detail of part of the mechanism of the calculating machine designed and made by Blaise Pascal, then aged 19, in 1642; the drums were approximately 2 cm in diameter; this was the earliest computing machine on which all four arithmetical operations could be carried out; in the remaining 20 years of his life, Pascal became eminent as mathematician and philosopher; the computing language was named after him. Facsimile courtesy of the Science Museum, London

PREFACE

The use of Pascal has been expanding rapidly during the past few years. The spectrum of users, and potential users, is wide indeed. It now ranges from those who had never previously written computer programs to those who have had considerable computing experience with other languages. Pascal is being used in science and mathematics, in business and commerce, for simulation and games, for process control in real time as well as for Wirth's primary purpose as an introduction to good programming practice. Thus, the potential readership of this book is probably drawn from a broad field with widely differing interests.

My aim has been to meet the needs both of the newcomer to computing and of the reader who has some programming experience but none of Pascal. I have tried to keep the main text virtually 'non-mathematical', though a knowledge of arithmetic and of elementary algebra is essential to any understanding of computers. An optional chapter on mathematical applications of Pascal is introduced at an early stage.

On the assumption that most readers have access, or are hoping to have access, to a small computer or a terminal, the book has been designed to allow early 'hands on' experience. Previous experience with computers is not assumed.

I have tried to structure the book in a way that will encourage selective reading according to individual needs. The Pascal language itself is covered in two separate parts. The first part (Chapters 2-9 inclusive) covers approximately the same ground as the working subset of the language, Pascal-S. To help those whose applications may be business or commercial I have included text files in this first section. After studying this first part most readers should have assimilated enough of the language to be able to write useful programs to suit their particular interests.

The remainder of the language, up to Level 0 of BS 6192:1982, is covered towards the end of the book (Chapters 14-17). Between the two parts there are optional chapters on sorting, top-down design, simulation and graphics. Chapter 18 is an optional chapter on the use of Pascal in real time. The book starts with a chapter on computing fundamentals for those new to the art and ends with a set of practical hints based on practical experience.

Each optional chapter has an opening paragraph, marked with the symbol □, that guides the reader to his next step.

I have taken the view that it is counter-productive to put exercises at the end of every chapter just for the sake of having exercises. Keen pro-

grammers will find plenty of their own problems to program. Most of the exercises either help to give a better understanding of the implementation being used or they are referred to in subsequent chapters.

The use of INPUT in interactive operation is discussed at length, since the authors of different compilers have different interpretations of what constitutes the INPUT file in interactive mode.

All the full programs (and many of the skeleton ones after 'fleshing out') have been tested either on my TRS-80 using the Bourne/Molimerx compiler, version 5.0, or by Texas Instruments Ltd using their Microprocessor Pascal development system, version 3.0. I hope that they are thus bug-free. Since, at the time of writing, neither compiler claims complete conformity with the new British Standard and since transcription errors may have occurred, I should be most grateful to be advised of any errors or discrepancies that are discovered.

Finally I should like to express my sincere thanks to the many people who gave useful help and valid criticism during the preparation of this book. It would be invidious to mention anyone specifically since much of the most helpful criticism came from people whom I do not know even by name. I have thanked those that I do know. If the others should chance to see this book, I hope they will appreciate how much their comments on the original drafts have been taken to heart.

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