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Hayden 0810451069

Basic BASIC: An Introduction to Computer Programming in BASIC Language

A comprehensive guide for beginners and enthusiasts.

OVERVIEW

This manual serves as an introduction to the "Basic BASIC: An Introduction to Computer Programming in BASIC Language" book. It provides an overview of the book's content, its structure, and what readers can expect to learn. The book is designed for individuals new to computer programming, offering a foundational understanding of the BASIC language.

basic basic

AN INTRODUCTION TO COMPUTER PROGRAMMING
IN BASIC LANGUAGE

second edition

JAMES S. COAN

FLIP-1

```
2 FOR Y=1 TO 10
5 LET C=0
10 FOR X=1 TO 50
20 LET F=INT(2*RND(1))
30 IF F=1 THEN 60
40 PRINT "T";
50 GOTO 100
58 REM C COUNTS THE NUMBER OF HEADS
60 LET C=C+1
70 PRINT "H";
100 NEXT X
110 PRINT
120 PRINT "HEADS ";C;"OUT OF 50 FLIPS"
125 NEXT Y
130 END
RUN
FLIP-1
```

```
HTTTTHTTHTTHTTTTTTTTTHTHHHHHTTTTTHTHHHTHHHTTHTT
HEADS 21 OUT OF 50 FLIPS
HTTHTHTTHTTHTTHTTTHHTTTTTTHHHHTTHTTTHHHHTHTTTHH
HEADS 26 OUT OF 50 FLIPS
HTTTTTHTTHTTHTTTTTTTTTHTTHTTHTTHTTHTTTTTTHHHHTHH
HEADS 17 OUT OF 50 FLIPS
TTTTTTTTHTTHTTHTTHTHHHHHTTTHHTTHTTTTTTTHTTHTTHTT
HEADS 21 OUT OF 50 FLIPS
TTHHTTTTTHTHTTHTTTHHHHTTHTTTHHTTTTTTHTHHHTTHTTHT
HEADS 24 OUT OF 50 FLIPS
HTTTHHHHHHTTHTTTTTTHTTTHHHHTTHTTTTTHTTHTTHTTHTH
HEADS 26 OUT OF 50 FLIPS
HTTTTTHTTTTTHTTHTTHTHHHTTHTTTHHHHTTHTTHTTHTTTTT
HEADS 22 OUT OF 50 FLIPS
THTHHHHHTTHTHHHTTHTTHTTTHHHHTTHTTHTTTHHHHTTHTT
HEADS 34 OUT OF 50 FLIPS
HTTHTHTTHTTTTTTHTTHTTHTTHTTHTTHTTHTTHTTHTTHTT
HEADS 24 OUT OF 50 FLIPS
THTTHTTHTTHTTHTTHTTHTTHTTHTTHTTHTTHTTHTTHTTHTT
HEADS 26 OUT OF 50 FLIPS
```

HAYDEN

DONE

Figure 1: Front cover of the "Basic BASIC" book. This image displays the title, author, and a sample BASIC program demonstrating a coin flip simulation, illustrating the practical examples found within the book.

The book is structured to guide readers through the fundamentals of BASIC programming, progressing to more complex topics. Each chapter builds upon previous knowledge, ensuring a clear learning path.

Programming Fundamentals

This section introduces the basic syntax of the BASIC language, including variables, data types, input/output operations, and fundamental arithmetic expressions. It lays the groundwork for writing simple programs.

Control Flow and Logic

Readers will learn about conditional statements (IF-THEN-ELSE) and looping constructs (FOR-NEXT, WHILE-WEND) essential for creating programs that make decisions and perform repetitive tasks. The book provides numerous examples to illustrate these concepts.

Data Structures and Algorithms

The book delves into more advanced topics such as arrays, matrices, and subroutines. It also covers practical algorithms for various applications, including mathematical computations like trigonometry and probability, as well as data manipulation.

Trigonometry

9-1 INTRODUCTION TO SIN(X), COS(X), AND TAN(X)

We choose to define the circular functions in terms of a point (X, Y) in a rectangular coordinate system. Consider the point (X, Y). It is a distance R from the origin. We may find R from X and Y by the *Pythagorean theorem*:

$$R = \sqrt{X^2 + Y^2}$$

It is conventional to use Greek letters for angles. However, since terminals do not provide them, we may use any letters we wish. Let C be the angle whose initial side is the non-negative part of the X-axis and whose terminal side is the ray that has its endpoint at the point (X, Y). See Fig. 9-1.

From Fig. 9-1 we define three circular functions as follows:

$$\cos C = X/R$$

$$\sin C = Y/R$$

$$\tan C = Y/X$$

where cos stands for cosine, sin stands for sine, and tan stands for tangent. In BASIC it is required that the angles be measured in radians. The radian may be defined as the central angle subtended by an arc length equal to the circumference of a circle of radius R. Since the circumference of a circle of radius R is $2\pi R$, we see that

$$2\pi \text{ radians} = 360 \text{ degrees}$$

$$\pi \text{ radians} = 180 \text{ degrees}$$

$$1 \text{ radian} = 180/\pi \text{ degrees}$$

$$\pi/180 \text{ radians} = 1 \text{ degree}$$

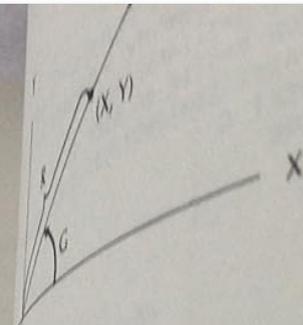


Fig. 9-1

provide the special computer functions in degrees to radians and from radians to degrees. We prepared to make the required conversions. The trigonometric functions are SIN(X), COS(X), and TAN(X) in much the same way that all other trigonometric functions are defined. We are that the argument of the function is in radians. We define three additional circular functions

sec C = 1/cos C
csc C = 1/sin C
cot C = 1/tan C

stands for cosecant, and cot stands for cotangent. These three functions in addition to the sine, cosine, and tangent are the appropriate reciprocal. As always, we have the option of defining a small table of values of sin, cos, and tan in degrees. We stop short of 90 degrees for the tangent of 90 degrees. To write angles in degrees to radians, so we multiply

AND ARCTANGENT

By dropping the perpendicular from (X, Y) to the X-axis, we have formed a right triangle with hypotenuse R, the length of the arc subtended by the angle C is the arc length, and the angle C is the angle subtended by the arc. Redrawing the triangle with the hypotenuse as the radius R, we have formed a right triangle with hypotenuse R, the length of the arc subtended by the angle C is the arc length, and the angle C is the angle subtended by the arc.

Figure 2: An interior page from Chapter 9, focusing on Trigonometry. This demonstrates the book's application of BASIC to solve mathematical problems, providing practical examples and formulas.

```

MATSP1
10 DIM A(2,4),B(2,12),C(10,11)
20 PRINT "MAT A=ZER ** PREVIOUSLY DIMENSIONED AT 28Y4"
30 MAT A=ZER
40 MAT PRINT A
50 PRINT "MAT B=CØN(3,7)"
60 MAT B=CØN(3,7)
70 MAT PRINT B
80 PRINT "MAT C=IDN(4,4)"
90 MAT C=IDN(4,4)
100 MAT PRINT C
110 PRINT "MAT A=CØN(1,6)"
120 MAT A=CØN(1,6)
130 MAT PRINT A
140 END
RUN
MATSP1
MAT A=ZER ** PREVIOUSLY DIMENSIONED AT 28Y4
0 0 0 0
0 0 0 0
MAT B=CØN(3,7)
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
MAT C=IDN(4,4)
1 0 0 0
0 1 0 0
0 0 1 0
0 0 0 1
MAT A=CØN(1,6)
1 1 1 1 1 1
DONE
    
```

SUMMARY

We have introduced the matrix operations—multiplication, addition, subtraction, and scalar multiplication. The special matrices ZER, CØN, and IDN have been specified.

PROBLEMS FOR SEC. 12-3

- 1) Redo program TOTAL using a row vector for the numbers of items and a column vector for the prices. Obtain the total cost with a single MAT statement.
- 2) Have the computer find the product of

$$\begin{bmatrix} 1 & 3 & -2 & -1 \\ 2 & -3 & 1 & -3 \\ -7 & 5 & -1 & 11 \\ 3 & -1 & 1 & -1 \end{bmatrix} \text{ and } \begin{bmatrix} -1 \\ 2 \\ -3 \\ 4 \end{bmatrix}$$

... and $\begin{bmatrix} W \\ X \\ Y \\ Z \end{bmatrix}$

... the values of $W + 3X - 2Y - Z$, $2W - 3X + Y - 3Z$ and $W - X + Y - Z$.

... by $\begin{bmatrix} 5 & 7 & -5 \\ 4 & 5 & 3 \\ 0 & 0 & 0 \end{bmatrix}$

... by $\begin{bmatrix} 5 & 6 & 2 \\ 4 & 1 & 3 \\ 0 & 0 & 0 \end{bmatrix}$

... and $B = \begin{bmatrix} -12 & 28 \\ 3 & -7 \end{bmatrix}$

... and the product $B * A$. What do you conclude?

... $B = \begin{bmatrix} -1 & -2 \\ 5 & 3 \end{bmatrix}$ $C = \begin{bmatrix} 2 & -11 \\ 25 & 31 \end{bmatrix}$

... find $A * [B + C]$ and $A * B + A * C$.

... by $\begin{bmatrix} .08 & -.24 & .2 \\ .52 & .44 & -.2 \\ .12 & .84 & -.2 \end{bmatrix}$

... and $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

... raise a matrix to a power. Let the power be determined by the number 1 through 12 into a row vector and into a column vector. You can avoid typing the data twice by using RESTORE.

Figure 3: An interior page displaying BASIC code for matrix operations. This section illustrates how the book teaches complex data handling and mathematical computations using the BASIC language.

Throughout the book, readers will find numerous programming examples and exercises designed to reinforce learning. These practical applications help solidify understanding and encourage hands-on coding experience.

- **Example Programs:** Ready-to-run BASIC code snippets illustrating concepts.
- **Problem Sets:** Exercises at the end of sections or chapters to test comprehension.
- **Real-world Scenarios:** Applications of BASIC to solve practical problems, from simple calculations to more complex simulations.

SPECIFICATIONS

Title	Basic BASIC: An introduction to computer programming in BASIC language
Author	James S. Coan
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ISBN-13	978-0810451063
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Dimensions	8.9 x 5.9 x 0.8 inches



Figure 4: Side view of the "Basic BASIC" book, illustrating its physical dimensions and page count.

SUPPORT AND FURTHER READING

For inquiries regarding the content of this book or for potential errata, please refer to the publisher's official contact information. While this book provides a solid foundation in BASIC, continuous learning is encouraged through further exploration of programming languages and concepts.

The author, James S. Coan, has also written "Advanced BASIC," which serves as an excellent companion volume for those wishing to extend their knowledge beyond the scope of this introductory text.

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