TURNING TURTLE

Our introduction to LOGO (see page 506) examined its development as an educational aid by Seymour Papert. Many versions of LOGO are now available and here we discuss ways in which the language's turtle graphics can be used to draw complex shapes with the minimum effort.

Abbreviations

Many LOGO commands have abbreviations: here are the ones for commands introduced in this part.

FORWARD	FD
BACK	BK
RIGHT	RT
LEFT	LT
PENUP	PU
PENDOWN	PD
PRINT	PR
FULLSCREEN	FS
TEXTSCREEN	TS
SPLITSCREEN	SS

The first version of LOGO to appear on microcomputers was MIT LOGO; this is now regarded as the 'standard' version and is produced by Terrapin Inc for the Apple and Commodore 64 machines. Logo Computer Systems Inc (LCSI) produces another version for the Apple, Atari and Spectrum computers, and LCSI LOGO for the BBC Micro should soon be available. There are other versions, but these two are the most widely available. Our example programs all use MIT LOGO; where there are differences between MIT and LCSI versions, these will be explained in the 'Flavours' box.

There is only one way to learn LOGO — by experimenting! We will suggest certain things for you to try, but the best thing to do is to solve problems that you have set for yourself.

Once loaded, LOGO is in 'immediate' mode and is ready to receive and obey commands. In most versions, these commands must be entered in upper case letters. Type DRAW and you will see that the screen is divided into two sections (this is called 'splitscreen' mode). The upper section is for the graphics; this takes up most of the display area and in the centre is the 'turtle', represented by a small triangle. The lower section is for text, and at the moment will simply contain the prompt '?'.

The turtle is an object that we can communicate with by giving it commands. Thinking of the turtle as an 'object' will make programming with it easier to understand. The most important things to be considered are the turtle's position, its heading (direction), and whether the 'pen' it carries is down (in which case it will draw a line as it moves) or up (in which case the turtle will move without leaving a trace). Typing DRAW positions the turtle in the centre of the screen, facing straight upwards with the pen down.

Now let's try giving the turtle a command:

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FORWARD 40
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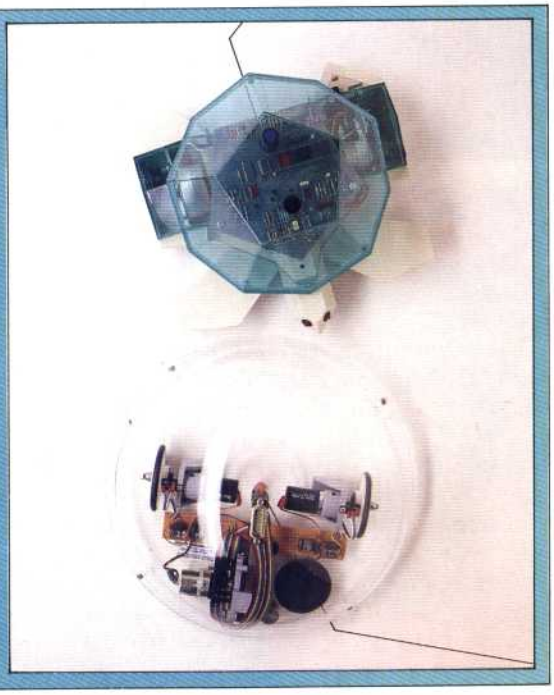
The turtle will move 40 units up the screen, drawing a line as it goes. FORWARD is a turtle command, and the number 40 is its 'input'. Some commands need inputs, while others do not — DRAW, for example, does not require an input.

A second turtle command is BACK. BACK 10 instructs the turtle to move back 10 units. So FORWARD and BACK (each with a number of units as inputs) change the turtle's position on the screen. RIGHT and LEFT, on the other hand, do not change the turtle's position but simply rotate it — that is, they change its heading (direction). These two commands require an angle of between zero

Meet The Turtle

A turtle is a robot drawing tool. It has wheels, controlled by stepper motors, and a retractable pen. It can be instructed to move forward, back, left and right, and can lift or lower its pen. When lowered, the pen produces a drawing on the surface where the turtle is placed. When they were first developed, turtles were dome shaped, like the Edinburgh turtle shown here, and controlled from a computer keyboard. This turtle connects to the computer via a parallel cable and costs about £192. Newer turtles are remote controlled. A radio-controlled version of the Edinburgh turtle is now available for just over £200. And there is a turtle-shaped robot, the Valiant Turtle, also shown, which has an infrared connection to the computer. The Valiant Turtle costs about £229. By extension, the name turtle is also used to refer to the drawing cursor on the computer screen in LOGO. Most screen turtles are simple triangular shapes, although Atari LOGO displays a tiny turtle-shaped cursor



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