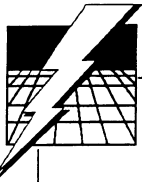


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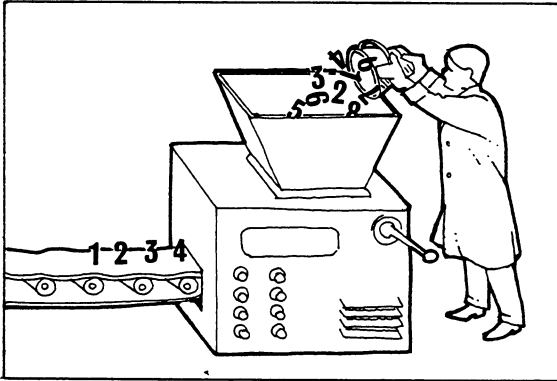


# Introduction

Any machine that works with numbers can be described as a computer. A calculator is a type of computer, and so is a slide rule.

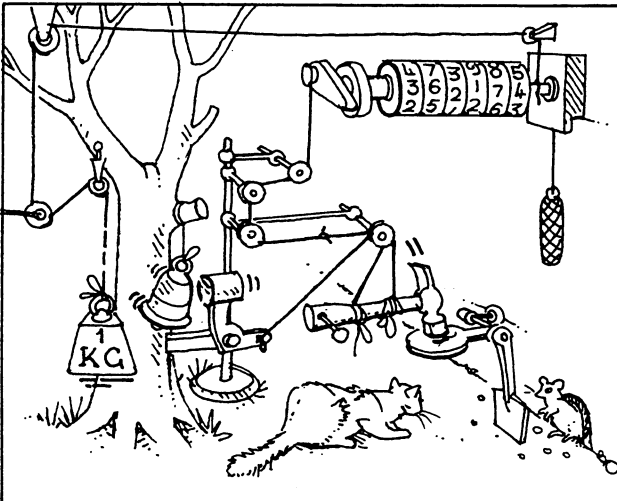
This book is about working with computers.

When you come across an important word for the first time, it will be printed in **bold**. Try to remember these words and what they mean.



## Project 1

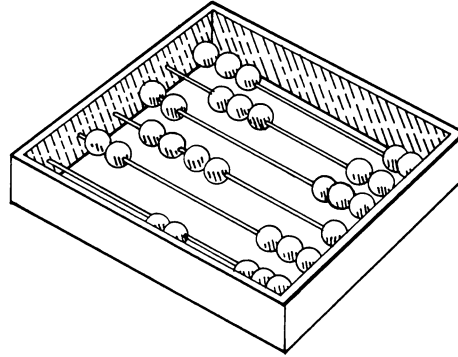
The earliest computers were mechanical. This computer has been designed to help count the mice, but it does not look as though it will work. Design a computer that you think will do better.



One of the earliest computers is the abacus.

## Fact File

- Did you know that the abacus is still used today?

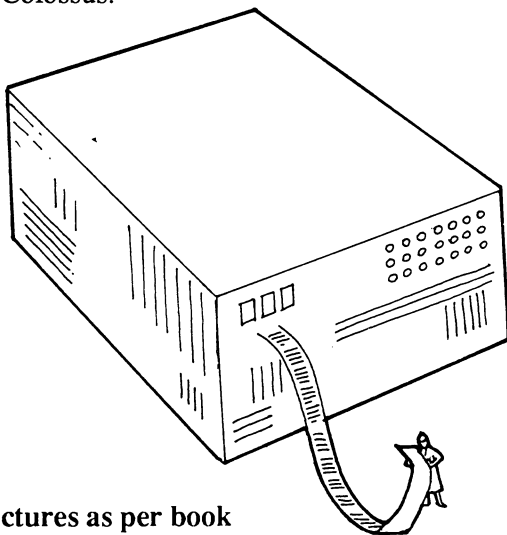


- Some people can work out calculations on an abacus faster than you could on an electronic calculator.

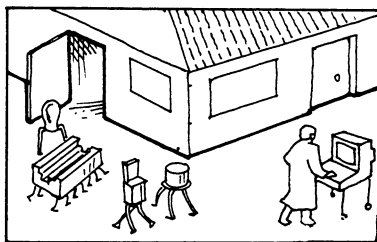
# Introduction

## Fact File

- Did you know that the first electronic computers could carry out 1,000 calculations per second?
- The computers of tomorrow may work using light or super-conductors. They will be a million times faster 1,000,000,000 calculations per second!
- During the Second World War, the computer used to break the German codes was called Colossus. It was the size of a sports hall and used the same amount of electricity as a small town.
- The desktop computers today have the power to perform more complex functions than Colossus.

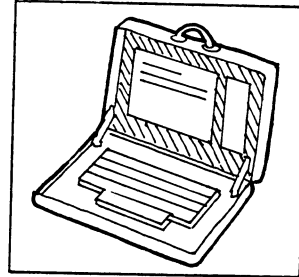


Pictures as per book



This has allowed computers to be made smaller and more cheaply than ever before.

People are able to carry Laptop computers smaller than brief cases with them wherever they go.



Even with all of these advances, the computer still works using a system of mathematics invented over 300 years ago:

## Binary

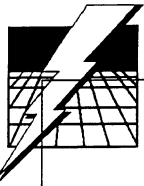
The Binary number system is a way of representing numbers using only two digits 0 and 1. This is especially useful in electronics as it is relatively simple to distinguish between two different states ON or OFF. All numbers and characters (letters and symbols) are represented in Binary computers using Binary code.

The decimal number 78 in Binary is 1001110

The decimal number 79 in Binary is 1001111

The Binary (ASCII code) representation of A is 1000001

**Modern computers use electronics and microelectronics to perform calculations on numbers.**



# Software and Hardware

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## Software

Software is the term used for computer programs. It is usually reserved for commercial programs. Software comes in different forms such as specific purpose software which is designed to perform a single task, for example to control a robot that fits car windscreens. Multipurpose software which can be used to perform different tasks. Programming languages are software where the programmer can program the computer to perform the tasks required.

## Hardware

Hardware is the term used to describe computer machinery such as the computer, printers and disk drives.

## Computer Uses

With the development of improved software as well as reduced prices for hardware the computer has developed into a powerful tool used in virtually every profession.

Some of the most common uses of a computer are:

**Word processors** to enter and process words. Wordprocessing is probably the most common use of computers to produce single letters and form letters, where the same letter is sent to different people with personal details changed.

**Desktop publishers** to produce magazines and books like this one. Desktop publishers allow for text to be manipulated in columns that can be linked from one page to another. The ability to incorporate graphics with wrap-around text and the ability to control font types and styles.

**Spreadsheets** to make financial calculations and predictions. The spreadsheet was the first major use for micro computers. The name spreadsheet comes from the method accountants used to produce budgets and analysing data. This was done on a large sheet of paper that would spread out as the calculations became larger. When a figure was changed or a forecast altered the entire spreadsheet would have to be redone hence the great advantage using a computerised spreadsheet where recalculations were performed automatically.

**Databases** to query and store large amounts of data on different issues. One of the most obvious databases is the Census database. The time taken to sort through and analyse large amounts of data without the use of a computer means that we are now able to perform more detailed and complex queries to gain better insights into what has happened and what is likely to happen. This is particularly important when planning developments.

**Computer Aided Design (CAD)** programs allow detailed 2 and 3 dimensional drawings to be drafted. The latest of these allow for the user to virtually enter and walk through the 3 dimensional design. An extension of this is virtual reality where the computer user has a visor to replace the computer screen and at least visually enters the 3 dimensional computer world.

## Programming Languages

The computer can be programmed to perform different tasks. This is what the majority of this book is concerned with.

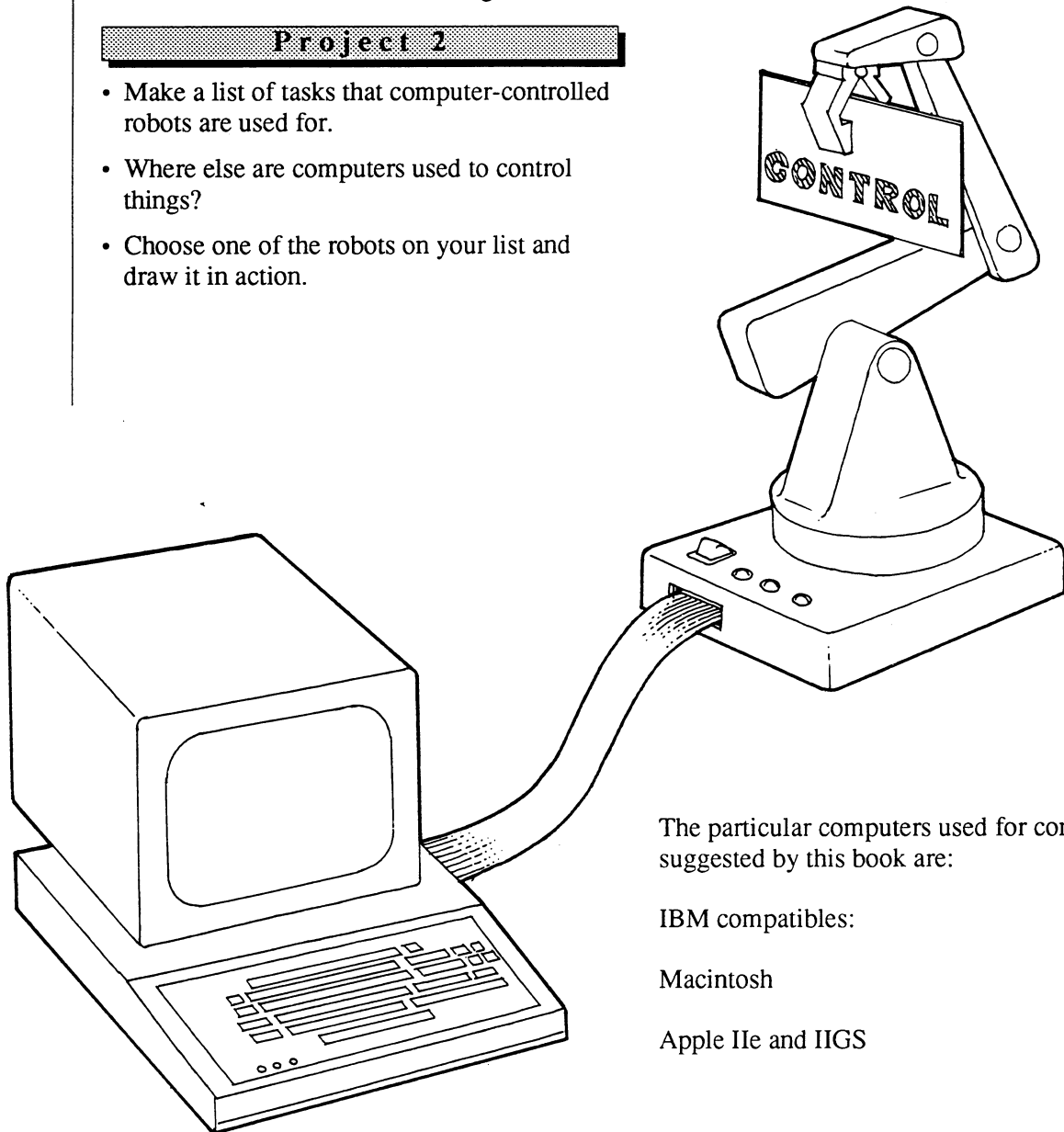
# Software and Hardware

The computer can also be used to **control** things. Control means using the computer to control various functions external to the computer. For example, industrial robots are controlled by computers to carry out tasks that humans would find difficult or dangerous.

## Project 2

- Make a list of tasks that computer-controlled robots are used for.
- Where else are computers used to control things?
- Choose one of the robots on your list and draw it in action.

Many people use either IBM compatible, Macintosh or Apple computers, so throughout the rest of this book we shall be looking at ways of using these computers for control.



The particular computers used for control as suggested by this book are:

IBM compatibles:

Macintosh

Apple IIe and IIGS