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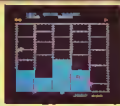
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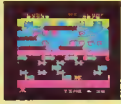
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# acorn programs

## Now a monthly publication

**T**HIS ISSUE of Acorn Programs has some major changes. The magazine is now monthly, so you will not have to wait so long for your next copy, which will appear in November and our constantly expanding editorial section has grown even further to reflect every aspect of the BBC and Electron software scene.

This month Clive Williamson has assessed the present batch of low-cost business programs — page 16 — Eric Deason surveys the educational market on page 21, we interview Charles Mair, author of a best-selling word processor on page 26, and Chris Naylor considers the new BBC/Acorn contract on page 19. You will still find our usual software reviews and programming advice, but do not miss our exciting competition — page 29 — or the special offer program on page 46.

Your program listings have not been forgotten and we are launching a new beginners' section for those who are new to computing. We hope you will continue to send us your excellent contributions. Each disc or cassette should be accompanied by your name and address and a brief description of the program. All entries must also be accompanied by the coupon on page 42.

As usual, our listings have been made for working copies of the programs, and all will run on the BBC B, including those written for the Electron.

*The Editor*

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DEALER ENQUIRIES WELCOME

# Acorn wins new BBC contract

THE CONTRACT with Acorn Computers for the BBC computer has been extended for another four years. The agreement runs from September 1, 1984.

The deal was signed despite a number of approaches from other manufacturers, including Sinclair Research, which was disappointed at not winning the original contract.

The decision was taken on the basis that it would ensure continuity, although it is reported that there will be enhancements and improvements to the Model B.

Bill Cotton, managing director and chairman of BBC Enterprises, said: "Following the enormous success we have had with Acorn in the last three years with the BBC microcomputer I am delighted that we have a further agreement."

Chris Curry, managing di-

rector of Acorn, said he thought the BBC micro was the centre of an expanding system which would be capable of meeting the needs of a wide range of users. He pinpointed three areas for possible expansion — hardware, software and overseas sales.

The BBC Computer Literacy Project, which is based on the BBC B, is in its third year. The Corporation plans to have more new series, as well as producing books and software and repeating old se-

ries. More than 350,000 BBC microcomputers have now been sold.

"Much of the success of the BBC microcomputer is due to the combination of the BBC's pioneering excellence in programme production and broadcasting technology and Acorn skills in computer design. In the next four years we intend to work out natural extensions to this relationship which will take it into new areas of technology" Curry said.



THE QUEEN inspects an Acorn computer at the Women's Institute Life and Leisure exhibition at Olympia, London. Acorn was the only computer exhibitor at the show and set up 29 BBC micros and Electrons to show visitors the capabilities of the machines.

Almost all the stand demonstrators were women, as part of the Acorn campaign to raise women's awareness of computers and technology. The event was reported to be a great success, with more than 100 visitors regularly at the Acorn stand.

# O level students are put to the test

ACORNSOFT has released a series of O level and CSE revision programs for the BBC and the Electron. Based on current O level syllabuses, the courses are designed to help students study for their examinations at home.

The four programs — two maths, one English language and one biology — have up to 150 pages of tutorial, with a 10-question revision test at the end of each section. A mock examination completes each program.

The maths and English programs were compiled by a group of teachers at University College School in London, and the biology program was compiled by the educational publishing house Hodder and Stoughton. The programs are available on cassette and cost £12.65 each.

In a less serious vein, Acornsoft has also released five new arcade and adventure games for the BBC and converted six of its most popular existing titles for the Electron. The new Electron conversions comprise three favourite arcade games — **Hopper**, **Freefall** and **Aradians** — as well as **Sphinx Adventure**, and two home interest programs, **Desk Diary** and **Picture Maker**. Each cassette retails at £9.20.

# Electron expansion

NEW ADD-ONS are appearing for the Electron with increasing frequency.

First Byte has launched a printer interface to complement the company's earlier joystick interface. Available from W H Smith and other dealers, the printer interface costs £34.95 including VAT.

Broadway Electronics has produced a sideways ROM card which plugs into the Electron expansion port. The device enables users to plug in up to four chips which were compatible only with the BBC previously. Word processing, accounts, spreadsheet and other programs turn the Electron into a low-cost business machine. The Mushroom sideways ROM card costs £29.95.

# Teachers' favourite

A RECENT survey has revealed that almost three-quarters of schools and colleges in Britain use a BBC B. That is far ahead of the next most important machine, the Research Machines 480-Z with machines in 19 percent of schools and colleges and the Sinclair Spectrum with 14 percent.

The survey also predicted that the BBC B will account for almost two-thirds of pur-

chases of new educational computers this year.

Chris Curry, managing director of Acorn Computer group, said: "Its results clearly demonstrate that the BBC micro is the most important computer in education and one which is proving to be as valuable a tool in universities and colleges as it is in primary and secondary schools."

In higher education the fig-

ures showed that 84 percent of institutions chose the BBC while the figures for primary and secondary were 73 percent and 78 percent.

The results showed also that there is strong support for the machine among teachers. Of those who own a computer at home, 46 percent chose the BBC.

The survey was carried out by *Educational Computing* in February this year.

# Adaptor seeks gold

ACORN HAS launched a new videodata interface which links the BBC micro to Prestel and Telecom Gold, British Telecoms electronic mail service.

Costing £113.85, the Pres-

tel adaptor connects directly with the telephone network, turning the computer into a two-way terminal. Users can access the database of consumer and business information published by Prestel,

as well as its teleshopping facilities, and the Micronet 800 teleshopping and Viewfax information services.

They can also send and receive electronic mail via Telecom Gold. The adaptor includes an autodial facility and can handle telephone numbers stored by the com-

pany typewriter and systems manufacturer to be supplying Telecom Gold with its equipment. The company is offering its Busy word processor with an optional modem which links to the telephone socket.

The system allows companies to send letters, to any other system, which uses a similar mailbox.

The cost of Busy-Telecom Gold systems starts at £3,536 for single disc drive, 128K memory, screen, keyboard, dot matrix printer and software.

## Network speeds the results



A NETWORKED BBC microcomputer system was a novel feature of the British Grand Prix race meeting at Brands Hatch.

The computers and software, supplied by Acorn, were designed to improve the distribution of information about the race, drivers, teams, and the organisation of the event. A BBC micro in the pit area issued news, via an Econet system, to strategically placed monitors for the benefit of the press, officials and VIPs. It was the first time such a system had been used at a Formula One event.

BBC television commentator Murray Walker said the system proved invaluable. "I

was getting up-to-the-minute information faster than ever before. Also during the race we had a television monitor failure and I was able to use the information on the Acorn system to fill in the background."

The adaptor is available by mail order only from Vector Marketing, London Road, Denington Estate, Weltonborough, Northamptonshire NN8 2RL.

Imperial/Triumph Adler is claiming to be the first Euro-

## Cedric to reveal the beauty of gas

THE BRITISH GAS energy study is attracting great interest from schools and organisations throughout the country. By the beginning of July, 2,000 entries had been

received and that was a long time before the closing date.

The study, entitled Energy Study U.K., is a competition for secondary schools which is intended to help students improve their understanding of energy use and saving. Teams will calculate and analyse energy use in their own and neighbours' homes, compare the effects of various energy-saving methods and produce a program for energy-saving in the community.

To a large extent the competition is based on a specially-written British Gas program called Cedric, which runs on the BBC B as well as other popular home micros.

Many teachers are said to have been so impressed with Cedric that they are to use it to teach children the capabilities of computers.

The closing date for the competition is December 28, after which there will be regional awards ceremonies near February and the national finals will take place in May. Regional winners will receive £200 for the school and team members will receive £10 each. The national winners receive £1,000 for the school and £20 each.

### BBC B TOP TEN

Title	Company
1 Aviator	Acornsoft
2 Fortress	Pace Software
3 Micro Olympics	Database Publications
4 Overdrive	Superior Software
5 Ghoul	Micropower
6 Jet Power Jack	Micropower
7 Lords of Time	Level 9
8 Stock Car	Micropower
9 JCB Digger	Acornsoft
10 Spitfire Command	Superior Software

## Soviet campaign

SOVIET schoolchildren could soon be using BBC micros and Electrons in the classroom.

Following the announcement by the Soviet authorities to equip eight million pupils with computers in the 1985 five-year plan, the Acorn distribution company 3SL is mounting a series of promotional visits to the Soviet Union. It is also spending £50,000 in an attempt to

secure a contract for the BBC micro and technical training and assistance.

Until recently, the West has maintained an embargo on computer exports to the Soviet bloc because of U.S. fears that computers could be used for military purposes. Now the embargo has been lifted for small micros.

The lifting of the embargo has created a large new export market which several

companies, including Sinclair Research and Apple, as well as Acorn, are vying with keen interest.

A spokesman for 3SL commented: "Chances are good for the BBC but you have to remember that the Soviet market is not the same as ours. Everything tends to be slow and complicated, so it could be a long time before any serious deal is finally concluded."

# BBC/ELECTRON PROFESSIONAL SOFTWARE

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BBC/ELECTRON

Tape £8 00 Disc £10 00

Hours of fun and learning for children aged five to nine years. Animated graphics will encourage children to enjoy counting, maths, spelling and telling the time. The tape includes six programs: MATH1, MATH2, CUBECOUNT, SHAPES, SPELL and CLOCK.

An excellent mixture of games. Personal Software - Autumn 1983.

## EDUCATIONAL 2

BBC/ELECTRON

Tape £8 00 Disc £10 00

Although similar to Educational 1 this tape is more advanced and aimed at seven to 12 year olds. The tape includes MATH1, MATH2, AREA, MEMORY, CUBECOUNT and SPELL.

## FUN WITH NUMBERS

BBC/ELECTRON

Tape £8 00 Disc £10 00

These programs will teach and test basic counting, addition and subtraction to four to seven year olds. The tape includes COUNTING, ADDING and an arcade type game to exercise addition and subtraction. With sound and visual effects.

## FUN WITH WORDS

BBC/ELECTRON

Tape £8 00 Disc £10 00

Start your fun with alphabet puzzle, continue your play with VOWELS, learn the difference between THERE and THEIR, have games with SUFFIXES and reward yourself with a game of HANGMAN.

Very good indeed. A&B Computing - Jan/Feb 1984.

## JIGSAW AND SLIDING PUZZLES

BBC/ELECTRON

Tape £7 95 Disc £9 95

There are two jigsaw and four sliding puzzles on a 3x3 and 4x4 grid. Each program starts off at an easy level to ensure initial success but gradually becomes harder (it helps children to develop spatial imagination and solving problems). The tapes include: OBLONG, JIGSAW, HOUSE, NUMBERS, CLOWN and LETTERS!

## GAMES & UTILITIES

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BBC

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This package is good value. Acorn User - Nov 1983.

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# User groups

In future issues, we plan to publish details of BBC micro and Electron user groups all over the country.

If you would like your group to be included, please fill in the coupon below.

Name of group \_\_\_\_\_

Organiser(s), name and address \_\_\_\_\_  
\_\_\_\_\_

Meetings, time and place \_\_\_\_\_

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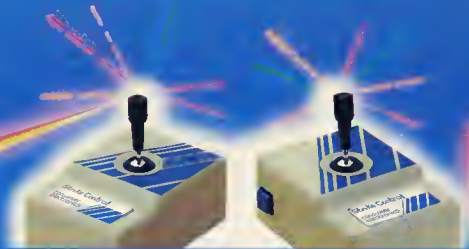
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## Uneasy blend of arcade and adventure games

MAKE SURE you have plenty of free time before you embark on an adventure called **Gisburne's Castle**, the first game for the BBC B and Electron from Software Communications.

A cross between an arcade game and a graphics adventure, **Gisburne's Castle** features the intrepid Robin Hood, rallying forth on a mission to rescue Maid Marion, who is held captive in his heavily-defended castle by the treacherous Guy of Gisburne.

Controlling Robin with either keys or a joystick, you start in the heart of Sherwood Forest and attempt to find your way to the castle via forest, glade, moor, log cabin and various other locations. At each one you will be assailed by large birds and what are presumably meant to be the Sheriff of Nottingham's men, armed with some strange weapon which appears to be firing bricks at our hero.

Whatever the missile, it detracts from Robin's strength at every hit. If his energy runs out the game is over but Robin can defend himself by firing at the enemy with his bow and arrow, scoring points as he does so. Having cleared a screen of all pests, he can proceed to the next location or stop to examine and possibly pick up a variety of useful objects such as food to restore his depleted energy, quivers full of arrows, keys, a rope and even an anachronistic stick of dynamite.

Dealing with the enemy, determining the route to the castle, and deciding which objects — only three are allowed at a time — will prove the most valuable requires a considerable amount of ingenuity, and there are some important lessons to be learned by trial and error. For instance, it is a good idea to finish shooting before you be-

gin sleuthing. Ambitious and carefully-produced, **Gisburne's Castle** is an absorbing game, marred only by its somewhat uneasy blend between arcade and adventure themes.

In the shooting sequences the action is slowed by the time it takes for each of Robin's victims to disintegrate before dissolving completely, and even after you have the

bang of ambushing the enemy and eliminating them speedily, you may find that a succession of repetitively similar screens at the start will discourage you from persevering until some interesting object or new location appears.

**Gisburne's Castle** is produced by Software Communications, 8 The Avenue, Eastbourne, and costs £7.95.



## Much more than child's play

A GAME featuring the Mr Men may seem to be intended for young children but **Hi Bouncer** for the BBC B needs the nimble fingers of the mature keyboard expert.

Excellent picture-book graphics and a cheerful tune lend a great deal of charm to the game, which consists of a series of screens providing Mr Bounce with various challenges. On screen one he has to secure Mr Tall's scarf by landing on it feet first, having previously avoided bumping into any of the other characters.

On screen two, where Mr Lazy is building a house, Mr Bounce has to somersault on to a seesaw; screen three has him jumping to catch fruit on a tree, and on screen four he must leap to the clouds to prevent a snowman melting; it is best not to ask how this works.

You can play the game with a joystick or with keys to

move Mr Bounce left, right and into the air. There is a 'slow' button to control the size of Mr Bounce's jumps and without it the action is difficult to master, with Mr Bounce careering into the scenery every time he hits an obstacle.

Your three lives on any particular screen may soon be lost, in which case you will have to start again.

Appealing to look at and

## Graphics redeem banality of zapping

AMONG a range of new games for the BBC B from Superior Software is **Star Striker**, a straightforward zapping game which is redeemed from banality only by its attractive graphics.

In spite of the war-like theme, **Star Striker** manages to do so many variations, with the aliens fluttering like brilliantly-coloured butterflies, splitting into two when hit, or bursting with a little shower of stars. Fairly easy at the start, the action becomes more demanding as the game progresses, providing players of all skill levels with a reasonable amount of entertainment.

**Star Striker** is available from Superior Software, Regent Street, Skinner Lane, Leeds LS7 1AX and costs £7.95.

full of amusing details, **Hi Bouncer** fails to be truly addictive and certainly seems too difficult for younger people who would most appreciate the portrayal of the familiar characters.

**Hi Bouncer** is produced by H & H Software for Mirrorsoft, Holborn Circus, London EC1P 1DQ and costs £6.95 for the cassette, £9.95 for the disc.

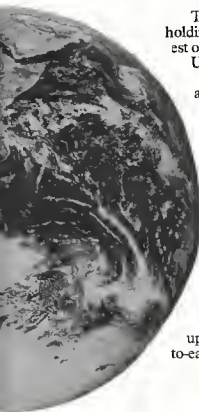
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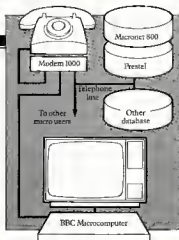
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# Olympics fails to win gold

SPORT and athletics are becoming an increasingly popular theme for computer games and it is scarcely surprising that the Olympics should provide the focus for at least one recent release.

Database Publications billed its **Micro Olympics**, available for the BBC B and the Electron, as the first software program to carry paid advertising, an ingenious way of combining both profit and extra realism in a topical and carefully-produced game.

Excellent graphics and true-to-life action are the great asset of the program. Players can choose to compete against the greatest athletes of the day in a range of events such as running from 100 to 1,500 metres, long jumping, throwing the discus or the javelin.

World records are the target to beat and the simulation of the athletes' movements is accurate and lively. Waving crowds, action replays and tongue-in-cheek news flashes, like the one reporting that the

discus throwing has collapsed from spinning round too fast, as well as those famous advertisements, all add to the fun.

Where the program suffers, however, is on playability. The fact that each category of events, whether running, jumping — including pole vaulting and high jump — or throwing, has to be loaded separately is a cumbersome arrangement.

The method of competing is also a little wearisome. In the running events, for example, the player chooses two keys to represent the left and right feet and then

punches them alternately to achieve some semblance of a running motion — scarcely a test of skill and agility. The same method applies to the throwing events, where the player chooses an angle and then runs like mad as before.

Micro Olympics will, however, make an impression on the strength of its visual appeal and topicality, if not addictiveness. The game is produced by Database Publications, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY and costs £5.95 for cassette, £7.95 for disc.



# Bouncing game is exciting

RECOGNISABLE instantly to anyone who has ever played **Jumping Jack** on a Spectrum, **Bouncing Bill** for the BBC B involves negotiating a series of sliding horizontal walls to reach a basket of plums at the top.

The plums are apparently there only to give rise to a ghastly joke — your mission is to rescue these damsels in distress says the instruction screen — and the walls are unusual in that they have moving gaps.

The idea of **Bouncing Bill** is extremely simple and the graphics are rudimentary, yet the game manages to seize the attention. You must judge your leaps accurately so as not to hit your head on the next level or crash through a gap beneath you — both of which will knock you out for a few vital moments — and even when you think you are doing well, you may suddenly find yourself right back at the bottom again.

**Bouncing Bill** is available from Oak Software, 71 Woodlands Road, Hertford, Herts. It costs £4.

# Board theme lacks appeal

TWO new releases for the BBC B from Virgin Games can claim to be a little out of the ordinary, although neither is entirely successful in what it sets out to do. **Brainstorm** is billed as a game of skill and logic for two players. For some reason the authors have chosen to give what is basically a board game transferred to the screen a thoroughly unprepossessing theme; one player must try to defend his brain against a laser attack by the other player, while attempting in turn to destroy the opponent's brain.

At the start the players choose between three board layouts, each with a set pat-

tern of electro-prisms with an unknown deflection factor. The players must move their electro-prisms about the screen and attempt to fire their lasers in such a way as to wipe out the enemy brain. A number of rules govern where prisms may or may not be placed and players can vary the level of difficulty by choosing the length of time laser beams remain visible.

If you have the patience to work out the slightly obscure instructions, and if you enjoy taxing your mind, **Brainstorm** can provide a few absorbing moments but apart from the random deflection factor — and eyestrain from prolonged scrutiny of the

screen — it is difficult to see what the game offers which could not be supplied equally well by an old-fashioned games board.

**Sea Adventure** has the player adrift in the South Seas trying to return home to England via pirate ships, desert islands, sea creatures and other maritime encounters. Colourful graphics illustrate the various incidents and do much to enliven the adventure but the action is a little restricted, with a choice of directions being the option offered most frequently.

The authors boast that the use of the function keys to issue commands such as North, South, Pick up object,

Use object and so on make the player's task simpler. In fact, in the case of the direction commands, pressing N or S, as is the convention in so many adventure games, is simpler than checking the inset to see which function key represents which direction.

Having proceeded in one direction, you may reach a dead end and have to retrace your steps and this can become wearisome after a time, although the scenery as represented by the graphics may encourage you to persevere.

**Brainstorm** and **Sea Adventure** are produced by Virgin Games, 61-63 Portobello Road, London W11 3DD and cost £7.95 each.

# Caesar has successfully invaded the BBC B

ALREADY FAMILIAR to Commodore 64 and Spectrum owners, **Caesar the Cat** has now made an appearance on the BBC B, with very little difference to its previous incarnations. The most distinctive feature is the appealing cartoon-style graphics.

The title screen has our moggie hero drawing the credits with its tail and, on the next screen, he can be seen padding along the shelves of the larder while a horde of mice nibble away at

the various items of food to be found there.

The player's aim is to guide **Caesar** on his patrol, pouncing on the mice and taking them out through a door whenever it manages to catch one. Points are scored for each mouse despatched in that way but meanwhile they are also lost in proportion to the amount of food the mice put away.

After clearing one screen occupied by black mice, worth 300 points each, the player goes to a more difficult

level where the mice are blue and worth 500 points. The child-like graphics might lead you to think that it is an easy game but it requires a fair degree of skill and feline patience.

The mice have a habit of disappearing as soon as **Caesar** is on the same shelf, and when he leaps from one shelf to another in an attempt to catch them, he must be careful not to knock over any

steins of crockery — disturbing the red crockery, in particular, puts an end to the game. Attractive to look at and entertaining to play, it is a thoughtfully-produced game with the only disadvantage being the time it takes to start again after losing a round.

**Caesar the Cat** is produced by Mirrosoft, Holboro Circus, London EC1P 1DQ and costs £6.95.

## Supreme puzzle

IF YOUR TASTE runs to infuriating puzzles which test the brain cells rather than furious arcade action which challenges the reflexes, **Gatecrasher** for the BBC B and Electron could be the game to keep you awake late into the night.

The aim is to drop 20 barrels through a maze in nine boxes at the bottom. As a barrel descends through the maze, it passes through a series of gates, altering the direction of each as it does so. If a barrel drops into a box which has already been filled, both barrels are lost.

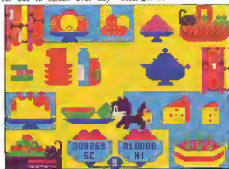
By studying the maze carefully and by scrolling it up or down to see if a more convenient course is presented, you must try to fill each of the boxes. If you are desperate, as you may well find on occasion, you can press E for earthquake.

There are seven levels to the game, including two where you not only fill the boxes but do so in a numbered sequence.

You need 15,000 points to reach level seven and if you manage to complete that you will be given a chance to crack a secret code. To make sure you give the game your full attention, Quicksilver is

offering a prize of £200 to whoever breaks the code and has the highest score; entries must be received before December 3.

**Gatecrasher** is available from Quicksilver, Palmerston Park House, 13 Palmerston Road, Southampton SO1 1LL and costs £6.95.



## Classic still on top

CLASSIC ADVENTURE for the BBC B and the Electron is aptly named. First written in Fortran in the 1970s, the game is the archetypal adventure program, condensed from its original 200K to the BBC 52K.

A text-only adventure, the game features all the elements which have since be-

come the familiar staple ingredients of many other adventure programs. Starting from a wellhouse somewhere in the forest, the player must set off to find the fabulous treasure hidden in the Colossal Caves. Useful objects such as a lamp, an axe and food, and less obviously useful ones like an Eastern flute

or a black rod with a rusty star on the end of it — are strewn about as you wind your way through valley, stream or large domed hall.

Despite its venerable age, **Classic Adventure** shows no signs of tiring and should still please purists who like their adventures unadulterated by graphics. The storyline is eventful enough to make you want to keep playing and the style of the descriptions is agreeably poetic. Be warned, however, that as you follow winding paths and streams, keeping track of the changes of direction you have made will not necessarily produce an accurate map.

**Classic Adventure** is available from Melbourne House, Church Yard, Tring, Herts HP23 5LU and costs £6.95.

More software page 15

I can't go that way

Y

Y

You are standing at the end of a road before a small brick building. Around you is a forest. A small stream flows out of the building and down a gully

E

E

You are inside a building, a well house for a large spring

Here can be seen:

A bottle of water.

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## Fast action with lively graphics

IF YOU LIKE fast action accompanied by colourful graphics and a lively tune, **Mr Wiz** for the BBC B should fit the bill.

Your aim is to guide a wizard round a garden to eat as many cherries as he can while avoiding the strolchions of a swarm of gremlins which are in hot pursuit.

Mr Wiz can fend off the gremlins by throwing his crystal ball at them, if he can turn to face them in time; or he can lead them under one of the apples scattered about the garden in the hope that they will fall on them and squash them.

There are 10 points to be earned for every bunch of

cherries the wizard eats and a bonus 1,000 for eating the magic mushroom in the middle of the maze.

Nimble reflexes are required to keep out of the way of the gremlins and the fact that the crystal ball takes a short time to recharge after it has been thrown only adds to the player's difficulties. Although you have only 100 lives, you may find that until you have become accustomed to the ways of the gremlins the game is over very quickly.

Examined closely, **Mr Wiz** is just another variation on the familiar Pac-man theme but it is a well-produced and challenging game which is likely to hook even the jaded keyboard expert.

**Mr Wiz** is produced by Superior Software, Regent Street, Skinner Lane, Leeds LS7 1AX and costs £7.95.



## Pinball wizard's delight

KANSAS City Systems has hardly gone to town with the packaging of its **Pinball Arcade** but behind a forbiddingly plain insert lies a well-designed and thoughtfully produced program.

The game allows you to play a straightforward computer version of the classic pinball machine game, or if you are disenchanted with that, to build a pinball board of any design you wish. The choices are almost unending — you can take the computer board and play with that or you can start from scratch and put in the bouncers, slots, numbers and other elements displayed at the side of the screen. You simply move them round with the cursor keys, pressing the space bar to pick up or fix in place.

As well as designing the layout of the board, you can alter the scoring of each element, or to speed the bounce or change the angle of the

table, and when you have finished you can save any table you have designed to tape.

The simulation of the pinball game is excellent, with the ball bouncing off the obstacles at a realistic angle and the flippers doing their job very much like the real three-dimensional variety. Only the option of shaking the whole machine to alter the course of the ball is missing but purists would not allow that anyway.

Although there seems to be no reason to play with a computer version rather than a real pinball machine, except perhaps for the rarity of the genuine article nowadays, **Pinball Arcade** manages to be a thoroughly entertaining program, thus more than justifying its existence.

It is available from Kansas City Systems, Unit 3, Sutton Springs Wood, Chesterfield and costs £10.35.



## Drumming up endless possibilities

QUICKSILVA has aimed **Drum-Kit**, a programmable rhythm synthesiser for the BBC B, at the serious musician, but if you are strictly amateur or even almost tone deaf, you should find the program fun, educational and easy to use.

The program puts the user in control of four instruments — a base drum, a snare drum, a whistling electro and sticks, which produce a hip beat. Each is represented by a row of 16 buttons or keys which the player can turn on or off. If an instrument key at any particular beat is on white it will play; if it is on red it will remain silent.

The method for entering the beat is simple; you use the cursor keys to move an arrow to the required key and press return. Keys are numbered and there is a 'clear' button to cancel a whole row.

The possibilities of the program are almost endless; besides combining the different instruments you can also put accents on certain beats, alter the volume of any or all of the instruments, change the tempo, and vary the number of bars or beats to the bar. There is even a facility for playing along by pressing the 'Tap' key.

Lack of volume is the main limitation to the program for anyone intending to use it in earnest and professional musicians are likely to prefer one of the more sophisticated synthesizers available on the market.

Nevertheless, this is a thoughtfully designed and reasonably priced program offering ample instruction and entertainment. An excellent, clearly explained manual is not the least of its assets.

**Drum-Kit** is available from Quicksilva, Palmerston Park House, 12 Palmerston Road, Southampton SO1 1LL. It costs £9.95.

**M**ANY PEOPLE who buy the BBC micro do so with the intention of making it help them in a business in some way. Others, having bought one, realise that beyond programming and games playing, it can help with ordinary tasks in the home, like writing letters or keeping information.

Either way, the BBC Model B is well-suited to prolonged use of packages like word processors, databases and spreadsheets by virtue of its full-sized keyboard, multiplicity of screen modes and its variety of display outputs to domestic TVs or monitors.

A printer is essential for business use and one or more disc drives could be added to the system, although they are by no means vital, as many of the business programs available for the BBC micro will work with cassettes as well.

A small set-up could be used to word process letters, cope with accounts and invoicing or predict the cashflow in a business, and can also help a club secretary to do mailshots to members.

Software which extends the use of a BBC micro into the small business or self-employed environment falls roughly into five categories — word processors, spreadsheets, accounting, databases and, finally, software to perform such operations as invoicing, stock control and order processing. The tendency now is for several of those programs to be linked, making the whole system more versatile.

Software is supplied for the BBC micro in three forms — on cassette, on

# Getting down to business

## Clive Williamson examines BBC software for the home and office

puter Concepts was the first and is still the most popular at £46. It was written with the inexperienced user in mind and works from a simple selection of menu options. The Acornsoft **View** is more complex to use and more expensive at £59.80 but is capable of rather more advanced operations.

A feature found on professional word processing systems is the ability to link with external data such as names and addresses to produce standard letters from a single text file but until now neither of the aforementioned programs has been able to do that. Fortunately, things are changing and the new **Database** program from Acornsoft can create special files of data to give **View** owners a simple standard letters facility. Prices are £11.90 for the cassette version and £15.35 for the disc. Other manufacturers are also working on software for this useful function.

A database is a means of storing large amounts of information so that it can be retrieved quickly, having been edited, sorted or searched for specific data. Maintaining a large database usually

in the file who lives in Surrey. An example of a database of this type is **Mailist** by Gemini Marketing which sells for £19.95 on cassette or £23.95 on disc and is extremely useful for clubs or companies needing to do simple mailshots. A similar program is included in the Acornsoft **Desk Diary**, which is a combination of planning diary and address book on one cassette for £9.95.

A more complex form of database permits the users to set up or configure the format of their own data storage. Data such as catalogues, recipes, personnel or medical records, or product information can be held in files created to the user's requirements. Databases of this type are best run with one or more disc drives, which can allow much larger files to be created than with cassettes.

The **Clare Database** is for disc use only, as is a very versatile program, and is good value at £25, while the already-mentioned Acornsoft Database costs £15.35 for the disc version and can be used in conjunction with **View**.

Even more advanced databases are available now in ROM form. The powerful Gemini **Datagem** program is two ROMs mounted on their own printed circuit board and at more than £100 it is also beyond most people's pockets. It is aimed squarely at business and educational users of the BBC micro, hence the high price tag.

More reasonably priced is the **Starbase** ROM marketed by GCC of Cambridge for £69. It has some very pleasant features, including the ability to manipulate information in the database to generate customised printed reports and, like **Database**, it has a large storage capacity which is limited only by the type of disc drive in use. **Starbase** can have only one Mode 7 screenful per record, while the individual records in **Datagem** can be much bigger.

The database structure is also at the heart of many packages which can be used to handle the day-to-day running of a small business and there are two suites of this type of software available for the BBC micro. One is by Acornsoft — its **Mirle** modular business software

## 'The tendency now is for several of those programs to be linked'

disc or as a plug-in ROM chip. The latter has the advantage that a long program can be installed permanently in the micro, taking up none of the machine memory until it is called-up. It then works as a language in its own right, replacing Basic. A simple 'll' command is all that is needed to make one of these chips run in-situ, with no delay while the program is loaded. While they are more efficient, programs in ROM tend to be expensive items; discs are often much cheaper and cassettes cheaper still.

The single most useful piece of software which can transform a micro from a programmable toy into a professional tool is a word processor. Several are available for the BBC machine and most are ROM-based. **Wordwise** from Com-

puter Concepts is a good deal of time, so this form of information storage is really useful in business terms only if the data can be made available to a number of people, or if the searching and sorting for specific references make the system cost-effective. Those factors sometimes make a database unsuitable for the home environment, as it can be quicker to write the information on file cards and refer to it by hand.

The simplest database is something like a mailing list, which holds a number of names and addresses and can print them out on a series of sticky labels. Data can be added or deleted from the file of information and usually can be sorted into some kind of order — e.g., numerically or alphabetically — or selected in some way — e.g., everyone



range — which is disc-based and enables the user to buy one module at a time.

The full list is invoicing, order processing, accounts receivable, accounts payable, stock control, purchasing and mailing system. Each £24.95 program can be linked to others in the range, so that information from one updates files in the others automatically. A second range is available from Gemini — its integrated accounting programs for the 32K BBC micro. These modules are £99.95 each and the titles are stock control, invoicing and sales ledger, purchase ledger, nominal ledger and payroll.

If you are considering spending a large amount on software of this kind, it is advisable to study its specifications well and, if possible, see it running first to make sure that it really does the things you want it to do.

A spreadsheet is a program for performing masses of inter-related calculations, making it ideal for tasks such as cashflow analysis or financial modelling, scientific tables and accounting. Once a sheet has been defined, its contents can be saved, usually on to tape or disc, or printed-out to provide a permanent record of the results.

The spreadsheet is a large two-dimensional matrix or grid of cells held in the computer memory, every cell on the sheet having its own grid reference. Each vertical column is identified by one or more letters of the alphabet, while each horizontal row is given a number. Each cell may contain text, a numerical value or a formula which

enables calculations to be carried-out using the contents of other cells.

The formulae are not visible in the cells but the results they produce are. There is always some way of moving the cursor from cell to cell, so that each location can be inspected or edited and it is at that stage that the formulae become visible.

The overall size of a spreadsheet is dependent on the amount of memory available in the computer but is typically 100 cells wide by 200 down. The screen acts as a window which can be moved to see different areas of the grid. The factor limiting the amount of data which can be held by the spreadsheet is the memory remaining after the sheet

My favourite here is the Gemini offering, which has a pleasant, colourful Mode 7 presentation and gives most of the essential spreadsheet facilities. It is slow, though, being a Basic program, whereas the more workmanlike Vn-Calc responds very quickly to commands as it is written in machine code.

More ambitious spreadsheet programs are the BBC Soft **UltraCalc** and **Viewsheet** by Acornsoft, both plug-in ROMs, which are modelled on professional packages and have a big range of features. At around £80, **UltraCalc** is the more expensive of the two, having marginally better mathematical functions and facilities for setting-up complex sheets and easily-remembered

## 'Vu-Calc responds very quickly as it is written in machine code'

has been defined by the software and for that reason those sheets available as plug-in ROMs are capable of supporting a larger matrix and can therefore perform much more complex calculations.

Two inexpensive spreadsheets are available for the BBC micro which are suitable for disc or cassette use — **Vu-Calc** by Pston and **Spreadsheet Analysis**, another Gemini product. Both are fairly easy to master and the latter can be used with a second program — **Graph Plot** — to generate pie-charts and bar-graph displays from the calculated results.

mnemonics for its commands, but a works only in Mode 7.

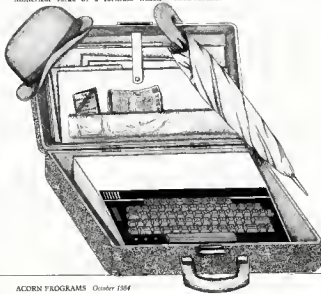
**Viewsheet**, on the other hand, makes full use of the BBC micro function keys and can operate in any of the BBC screen modes, including the 80-column modes 0 and 3. Selling for £59.80, **Viewsheet** has the added advantages that it can be set up to display different areas of a large sheet on screen at the same time and it can also generate an output which can be used directly by word processors such as **View** and **Wordwise** when writing reports.

Many of the programs essential to running a small business are now included free with the Z-80 second processor for the BBC model B which is complete with word processor, spreadsheet with graphics output, database and an accounting program. Also in the bundle of software is a program for customising your own databases, as well as two versions of Basic, plus **CIS-Cobol**, a business-orientated language.

All the programs run under **CP/M**, the operating system used by many of the major commercial packages available for big-league business micros, and the Z-80 processor has been developed by Acorn as a way of running those existing packages on the BBC.

The whole processor/software bundle costs £299, which sounds expensive but is incredible value considering the value of the free software. The only snag is that you must have disc drives.

Whether you buy a word processor chip, a simple database or an expensive set of linked programs to help in a small business, the BBC micro can assist with an enormous range of tasks in the home or a small-scale business environment.



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# Real pleasure in BBC deal

In the first of a new series, Chris Naylor considers the new Acorn contract

SAY what you will, from a journalist's point of view it made good copy. It had drama, intrigue — and millions of pounds were at stake. The existence of certain computer companies might have depended on the outcome. That is why representatives of magazines and newspapers waited with bated breath for one of the hottest contracts in the microworld, the lucrative, make or break contract with the BBC.

In late 1981 the BBC signed a contract with Acorn Computers, under the terms of which Acorn was allowed to refer to its machine as the BBC computer. In return for the privilege, Acorn paid the BBC a fee on each such machine sold. At the same time the BBC developed and screened *The Computer Programme*, the first programme in its computer literacy series, and the big star of the show was the new BBC machine.

At the time, Acorn was reasonably successful financially but it was by no means in the big league of computer firms. Neither was it at all certain that the BBC contract would place it in the big league. Initial estimates in 1981 suggested that the demand for the BBC micro might be some 12,000 machines a year — according to the BBC — or, more optimistically, 17,000 a year, according to Acorn.

The cheapest Model A cost £299 and who, in 1981, could reckon on many people wanting to part with almost £300 for what was, after all, only a computer? For that kind of money it was possible to buy a dishwasher and, say what you like, at least everyone knows what a dishwasher does.

Now, in 1984, more than 350,000 machines have been sold. Production is running at 25,000 machines per month, twice the estimated initial annual production — and Acorn has been floated on the Unlisted Securities Market with a value on it of £150 million, putting it firmly in the big league in the U.K. computer world alongside such firms as ICL, Britain's biggest mainframe computer company.

Despite its 20-year existence, the

value of ICL, prior to its recent merger with Standard Telephone and Cables, was probably little more than twice that of Acorn, which demonstrates clearly that the growth of Acorn has been phenomenal in anybody's terms.

Tom Hohenberg, Acorn marketing manager, admits that the BBC contract helped Acorn enormously: "There is no way," he says, "that we could have sold so many machines without the BBC name," which is a fair and generous comment.

Less generous have been the comments from firms which have not benefited from the BBC connection. At various times several micro makers announced their intention to be in the running when the BBC contract was due for renewal, including Dragon, Computers and, of course, Sinclair Research.

At last the waiting is over. The contract was placed. The BBC was "pleased to announce that a contract has been signed extending the agreement with Acorn Computers for the manufacture and distribution of the BBC microcomputer for a further four

## 'The contract with Acorn is worth more to the BBC than the *Radio Times*'

year period from September 1, 1984."

The one fact which appears to be generally overlooked, though, is that when the BBC used the word "pleased" in making its announcement it was not just being polite — it must have been grinning from ear to ear with pleasure. For there was never any real doubt that the contract would go again to Acorn and the real reason for that is, as much as anything, the pleasure the deal gives, not to Acorn, but to the BBC.

Commonly, other firms tend to look at the BBC contract "as a licence to print money," says Hohenberg. "They talk as if the BBC bought the machines but they do not." Acorn gets the benefit of the BBC name and the enormous publicity derived from every screening of *The Computer Programme*. The BBC



SIGNING THE AGREEMENT: From left to right: Hermann Hauser, Chris Curry, Bryan Parkin, managing director BBC Enterprises, and Bill Cotton, chairman.

receives its fee from Acorn without having to do anything. Neither party will indicate the terms of the deal but nobody is denying that the BBC must have collected some £6 million from its licence fee on Acorn machines.

To put that in perspective, one of the BBC's money-spinners is *Radio Times*, a magazine which falls into the best-seller class. In the year to April 1983 profit from *Radio Times* was £5.6 million on a turnover of £45.2 million.

That means that the contract with Acorn is worth more to the BBC than *Radio Times* and, to receive the Acorn money, the BBC does not have to go to the trouble of publishing a magazine. All it has to do is to receive the cheques.

Look at it another way. The licensing of the BBC name and similar commercial enterprises is handled by BBC

Enterprises Ltd. So it is BBC Enterprises Ltd which receives the cheques. In the year to April, 1983 the turnover of BBC Enterprises Ltd was £26.1 million, with no profit recorded. Take away the Acorn contribution and it becomes apparent that, were it not for the contract with Acorn, BBC Enterprises Ltd could have run into the red.

Has the BBC contract been a licence to print money? Probably it has, but not only for Acorn — it has been money for the BBC, too. With a deal like that, who in their right mind could have thought that the BBC would want to go elsewhere?

It was with real pleasure, not the simulated kind, that the BBC announced the renewal of the contract and who can blame it?

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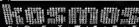
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# Micro fails to make the grade

**B**AD MARKS for maths programs said a headline in the *Acorn Programs* June issue. The report concerned the fact that the Mathematical Association, one of Britain's professional organisations for teachers, had found some fairly serious errors in BBC software supplied free to schools by the Government. That headline was echoed in a number of periodicals, there being undercurrents of glee in almost all the reports.

My first reaction was glee, too. The glee did not, however, indicate a feeling of superiority that I could have done better. Rather it was a kind of I told you so reaction, one of relief almost that not even Government-sponsored, high-cost learning software can hit the mark.

I have been involved in educational software development and in writing about learning with micros for a number of years. The former activity has led me to two major conclusions. The first is that, defining an educational program on the basis of the kind of product which is now swamping the market, we need something like one million learning software packages before we can reckon to have covered the needs of home and school learners between the ages of five and 16 — in Britain those ages mark the limits of compulsory formal schooling.

That mind-boggling total is neither a misprint nor the result of miscounting on my part. I must point out that I have gone through the calculation in print and in public a number of times and never had it queried. In essence, the



## Schools software could do better says Eric Deeson

recalling the fact that no single child at secondary level covers all the syllabuses offered in any school. Most schools allow a choice of four or five options subjects from 20 or more.

A factor of about 10 now enters the calculation to cover at least in part the need to allow for the differing abilities and backgrounds of children and the different approaches teachers may want. A concept such as adding vectors, for instance, would need different approaches for less able and high-flying children, and for physics and mathematics syllabuses.

It would need different approaches for someone meeting the subject for the

learning but the giants of the past — the Apples and TRS-80s — will no doubt be replaced by new undreamed-of systems before the end of the decade.

I shall labour the point of those million programs. Clearly the work will never be completed, if indeed we ever set ourselves that task of meeting all formal learning objectives to age 16 by way of micro software. Certainly many people are looking forward rather to intelligent systems which know how to teach and can draw on the proper subset of human knowledge for a given learner at a given moment.

Certainly, too, others are looking to multi-purpose software systems into which teachers can breathe some undefined essence of fact and fancy the night before 3C pupils sit down with their micros and turn to Program 1047d. Yet others look to the logical endpoint of the information revolution and prepare to welcome the day when our masters throw factual examinations out of the window.

Who knows which of those will arrive to save us the task of preparing a million learning programs? Certain it is, though, that literally hundreds of software houses are desperately publishing so-called educational programs as if their lives depended on it, as indeed they may do, whether they were conceived in teachers' midnight-oil garrets or in the plush boardrooms of long-established book publishers.

The second claim is that there is no such thing as a perfect learning program. The glee which welcomed the Mathematical Association report on the costly Government-backed software was surely a sigh of relief that company X, faced with a poor review, could now sue that not even flagship programs were perfect.

Yet can there be such a thing as a perfect learning program? Can anyone conceive a package of software which can be used with ease by any suitable learner, without problems for the supervising parent or teacher, and which deals with the topic in question without error, without chance of boredom, without being too fast or too slow?

I do not think the answer to those questions can be in the affirmative, but in saying that I at once throw down the gauntlet to those hundreds of software houses. Can they send us one of their programs and claim that it is perfect in meeting its stated aims and objectives

*continued on page 22*

## 'Most teachers know little about the wide field of computers in society'

argument is that a learning program is one which covers a single topic or skill in such a way that the user can spend perhaps an hour or two with it, without getting bored, and end with new understanding and consolidated knowledge. Such a program, properly supported as required by print materials, is as valid for use at home as at school.

The formal school career of a typical British youngster comprises some 10,000 hours in the classroom. If, on average, he picks up one topic or skill each hour, we would need 10,000 programs to provide for those learning objectives.

We can double the figure at once by

first time and for someone else looking at it in the light of last-minute revision requirements. It would need different approaches depending on whether the learner knew little geometry or had a clear concept of vectors as mathematical entities. The home learner might require something other than would a youngster at school with a teacher to hand, and so on.

That brings us to 200,000 learning programs. It is simple to step from there to the million mark by recalling the number of different hardware systems in use. The Acorns, Commodores and Sunlars are at the moment the main machines involved in home and school

with learners in a stated category, and in being a model of communication as defined by current learning psychology thinking?

I remind myself of a secondary school chemistry textbook which after 40 years and dozens of editions contained an unreported error until a few years ago; and of a sixth-form physics textbook, also with sales past the million mark, with six mistakes in the latest edition.

I think of learning software for the BBC micro with screen after screen of undiluted text — all in capital letters and without full stops; and other programs which do not utilise colour and sound in any really communicative way, plus others again which respond "No, that is wrong," after every single incorrect response.

While micro technology is far from the state at which a system could conceivably model the approaches and behaviour patterns of a real teacher — compassion and patience, flexibility and humour, real-life links and references to related concepts in other topics — one must wonder at the view of education held by so many writers of learning programs.

Even though most primary schools have at least one micro and secondary schools have on average four or five, computers do not affect by one jot the classroom work of the vast majority of teachers and pupils. If that is news to you, ask a sample child or two. If it amazes you, stop and think about the logistics of sharing hardware at the rate of one micro/display/backing store per 250 children — nine classes — in the light of the teacher's busy day, the

staircases which fill most schools and the rarity of classroom power points.

If your child spends two hours on a learning program or two on your home BBC, he or she will probably learn more with the new technology than in a year at school.

So in what ways are micros, in theory, used in our schools? One can break down educational computing into several distinct categories. Computer awareness is often called information technology in school prospectuses and timetables. Its aim is to maximise children's familiarity with computers in the world as a whole — their use, their uses, their abuses. Many schools include at least a few hours of such work in various kinds of general course followed by all pupils. Not only is a computer not needed in that kind of work — a school macro on the teacher's desk can interfere with the kind of learning for life which is to take place.

The reasons are that most teachers know little about the wide field of computers in society and that so far there is almost no relevant software in aid the demonstration of principles. Another message to software houses: let us have some good computer awareness simulations — booking systems, police-style databases, banking software. Almost all we have so far is the Tecmedia *Edfax*, a DIY teletext simulator.

In computer studies, the computer is the apparatus used in formal examination-based computer science teaching. In the last few years the number of candidates for examinations like CSE and GCE — the main British public examinations at around age 16 — have grown enormously and have flung the



subject well and truly into the top 10.

It is almost possible to teach courses like that without a micro in the classroom; some schools still do so, with success. Yet computer power of some kind is essential and it fulfils two needs. The first is computer awareness as I defined it — and where the teacher's needs are as desperate as I said; the second is for the pupils to learn the elements of programming where the need is for good sample software.

That "good sample software" has to show originality of purpose, a thoughtful use of coding techniques at different levels, and structure from the purists' entirely valid point of view.

Again, such software does not exist, though it is the area which uses most computer time in all secondary schools and that is the area in which the use of the home micro can do most good.

Computer-assisted learning is the field I had in mind when talking about one million programs. The computer joins chalkboard, textbook and projector as one of the many resources available to maximise the effectiveness of teaching in almost all subject areas at all levels. Many teachers do not use textbooks — they do not like them and/or they cannot afford them; many more do not use projectors — they fear electrical equipment and/or they cannot afford the software; and the vast majority do not use computers for the same kinds of reason.

If we want micros to be able to help every subject-based classroom need, that is where we want those million programs, and that is where all those software publishers are concentrating their dreams of riches.

Of the 200,000 programs we need for the BBC, we have now perhaps a thousand or even two. The spread is poor, however, there being dozens of packages helping with the rote learning of multiplication tables and dozens more inferring to drill the hapless youngster in simple French vocabulary.

They are the programs which are

**Ampalsoft**, 31 Woodbridge Road, Derby Green, Blackwater, Cambridgeshire, Surrey — a new entrant to the field with some interesting potential, so far too early to assess

**AVC Software**, PO Box 415, Harborne, Birmingham B11 9TT — a number of Electron and BBC programs, mainly drills for the 8-13 age range but also a popular simple version of turtle Logo.

**Beebopsoft**, PO Box 109, High Wycombe, Bucks — *Paintbox*, *Masterfile* and other valuable interest utilities.

**Bourse Educational Software**, Bourse House, The Hundred, Romsey, Hampshire SO5 8BY — a prolific publisher with some good products.

**Chalksoft**, 57 Willowes Road, Worcester WR3 7QF — a good and growing range, though rather uneven in quality.

**Clwyd Technics**, 48 Anielope Estate, Rhydymwyn, near Mold, Clwyd CH7 5JH — *Edward*, a text-processing package designed for school use.

**Computer Concepts**, 16 Wayside, Chipperfield, Herts WD4 9J — *Wordwise* and other fine utilities.

**Goleen**, 77 Quilins, Brecknell, Berkshire RG12 4QG — another new company with some interesting-sounding products

**Griffin Software**, Esking Road, Alport, Middlesex HA2 1HJ — a good list of educational programs, mainly at secondary level.

**Heliconus Computers**, 22 Bedford Square, London WC1B 3HH — several invaluable packages, particularly in secondary mathematics.

**Koomee Software**, 1 Pilgrims Close, Harington, Dunstable, Beds LU5 6LX — a newcomer to the scene with rather heavy foreign language drills.

**Longman Software**, Burnt Mill, Harlow, Essex CM20 2JE — a major publisher, long in the field but only now beginning to hit the mark.

**MUSE**, PO Box 43, Hall HU1 2HD — the world's biggest range of educational software, with much for the BBC — all levels, many subjects.

**Shiva Software**, 64 Walsh Row, Nazareth, Cheadre CW5 5ES — a highly-specified range of learning programs, mainly for younger children.

**Tecmedia**, 5 Granby Street, Loughborough, Leics LE11 3DU — *EdFax*, a superb model teletext system, good for school newspapers and so on.

**4MAT Educational Software**, Linden Lea, Rock Park, Barnstaple, Devon — some novel educational games.

appearing, however, and the ones we shall be reviewing. They are the programs parents have to select for their unfortunate offspring, because they are the only ones which reach the software shelves. I hope we shall be able to say something different to two years.

In administration I see the computer as helping run a school in just the same way as it helps run the day-to-day and year-to-year work of any other complex business. That field can clearly be of no interest to parents but we shall be reviewing products as they appear from school management point of view.

Here the concern of published software is school accounts, calendar organisation, time-tabling options system development and such. It is a field where much is still to be done but where, as yet, the interest of schools is not particularly high because they have insufficient hardware.

Having said that educational administration software is not of interest to home users, I must observe one category where one could argue that that is not the case. I am thinking of text-processing software *used outside the school office and staffroom and outside the commerce, business and office practice departments.* Some teachers claim that every child should learn to use a computer as a text processor, to im-

prove the preparation of stories, compositions and essays in all contexts.

Computer Concepts' **Wordwise** is the front-runner, being as pleasant to use for a child's history essay as for any other task. In fact, it is not so good in office practice departments.

You may have seen **Edword**, published by Clwyd Technics specially for the schools market in which it has a number of clear advantages. I would still reckon that home users should stay with **Wordwise**, even if most of the home-work is homework.

Data capture and process control is an area where educational software is almost restricted to school rather than home use. The concern is interfacing the BBC with specialist equipment in the science laboratory, the craft/design/technology workshop, the audio-visual studio and the gymnasium. While interfacing and robotics are, of course, areas of great interest to the home hobbyist, their educational benefits are not often direct other than to help the young explorer gain experience and expertise in certain skills.

For example, we can use a home computer to think of linking a micro to meters, oscilloscopes, recording devices, lathes, greenhouse environmental control systems, projectors and fencing hit-registers. Such applications are all specific to

group work in specialist subject departments.

There are more uses. Some may fit approximately into one or other of my five main categories. Others are important but difficult to classify. We may think of the crucial work of school computing clubs which can keep teachers and caretakers on their toes from 7.30 a.m. to 8 p.m. Or of pure gaming — not the same as educational gaming — in those clubs, in awareness classes and for raising cash on Open Days and during parent/teacher association gatherings; and of the embryonic businesses which use school equipment, electricity and expertise to break into the ever-expanding software and add-on market.

In this context of preparing to review educational software, those areas are likely not to figure largely. I offer a list, with little comment, of the major publishers in the field. The products of most can be brought from retail outlets but mail order is safe with them all. Note that many also have products for other micros than the Electron and BBC, so you will need to state clearly what you want when you order.

• Eric Dawson heads the computing department in a Birmingham sixth-form college, is editor of the magazine *Computers in Schools* and wrote *The BBC Micro in Education*, published by Stone.

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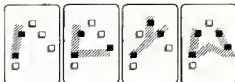
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THE BEST IDEA SINCE THE HUMAN HAND

ONE of the best-selling pieces of software for the BBC micro is not, as you might expect, an arcade game or even an educational program but a word processing chip called **Wordwise**. Since it appeared in November 1982, the £46 ROM has sold roughly 35,000 copies, a feat many far more modestly-priced programs would envy. It has also founded the fortunes of Computer Concepts, a flourishing little company known as the specialist in ROM-based software for the BBC micro.

The man behind both the business and the program is Charles Moir, a retiring 24-year-old without any formal training in programming. Because of the pressures of running his business, Wordwise has so far remained his only major attempt at software authorship.

Moir left public school at Oundle with one A level in physics, having dropped out of both his mathematics and chemistry courses. To add to his meagre qualifications, Moir had a keen interest in electronics and only the vaguest idea of what he wanted to do in life. To pass the time, he worked for a period in his father's acoustical engineering firm.

Moir's future began to take shape in 1979 when he bought a Nascom 1 in kit form for £125. "It had to be programmed in machine code, so I learned the hard way," Moir says. Soon afterwards, he graduated to an Atom and began to think about Wordwise.

"A word processor seemed the obvious choice," he explains. "Also, I knew people who worked at Acorn and had a fair idea of what the BBC micro would be like before anyone had seen it. That gave us a great advantage."

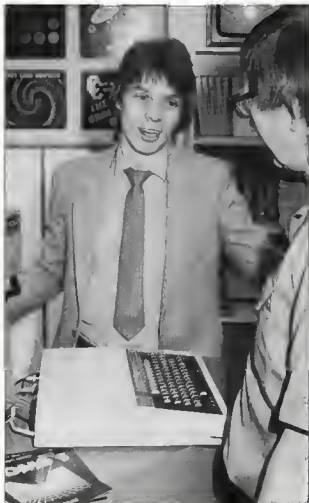
It took Moir nearly nine months to write the program, although he says it could easily have been done in three. "I'm very lazy," he says, "and much as I like programming, it can be incredibly tedious at times."

From the start, Moir decided to make his word processor ROM-based, rather than produce it on a disc or cassette, for two reasons. "One was to make the most of the exceptional capacity of the BBC to take extra ROM chips, 16 with an expansion board, and four without," he says. "The other was that a ROM would not use any of the limited memory store of the machine." The program was based mainly on the word processor then available for the TXED research machine, considered a standard in educational circles.

"There was nothing particularly complicated about writing the program," Moir says, "apart from making

# Wise words of a top programmer

**Nicole Segre talks to Charles Moir, author of a best-selling ROM**



sure at the start that it would not go over-size. Where I did spend a good deal of effort, however, was in making the program user-friendly. I wanted anyone to be able to use it, even if they had never seen a computer in their lives."

There is no doubt that the user-friendliness and simplicity of Wordwise has been the major factor in its success. Unlike the TXED word processor, which Moir describes as having "horrible combinations of all kinds of keys", Wordwise is menu-driven to perform simple operations such as save, load, insert, and search and replace, and the manual is praised frequently as a model of clarity.

"Of all the word processors, including WordStar, the most popular CPM-based business processor, or View from Acornsoft, ours is the one which appeals most to the non-professional," Moir says. Confirmation of this can be seen in the fact that Wordwise is still selling at a steady rate of about 7,000-8,000 copies each week.

The success of Wordwise enabled Moir to look forwards into new products. Among them are one or two games, notably **Android Attack**, but early this year Moir sold all the company's games to GTM Computers. "Games are becoming very competitive," Moir says. "You have to sell 100 many of them to make the effort worthwhile, especially if prices are to fall, as I am sure they are. I would prefer not to be involved in that side of the market."

Since the first timid advertisements appeared for Wordwise, Computer Concepts has released nine ROM-based programs, putting the company way ahead in its field. "There are only about four or five other ROMs for the BBC on the market," Moir says, "and none is as good as ours."

The range of products includes **Gremila**, a utility to help debugging machine code programs; **Disc Doctor**, which adds a variety of new facilities to disc drive operations; and a graphics extension ROM putting complex designs within the reach of even inexperienced programmers.

"Acorn has always promised that it would be producing a graphics ROM but so far it has not done so," Moir says. "That is one of the great things about Acorn; it takes it ages to produce anything, even though it employs something like 260 people, so we can always be ahead."

Moir thinks the real future now lies with communications ROMs. He has already produced **Communicator** and **Termi R**, connecting the BBC micro



to other computers, including main frames, and turning it into a terminal. Although the ROMs can link into electronic mail systems, they do not connect to Prestel or other videotex systems, but Moir regards that as the next step.

"There is no mass market yet," he says, "but if British Telecom manages to get its prices right, communications may well be the consumer boom of the future."

He thinks that Telecom Gold, rather than Prestel, will be the real winner. "Prestel is satisfactory for information but Telecom Gold, which is aimed purely at businessmen, is an inexpensive way of providing an electronic mail system to a world-wide network. A ROM enabling people to link into the system could have huge potential."

Moir runs Computer Concepts from his home, until recently a large, lawning house at Chipperfield, and now an even bigger house at Hemel Hempstead. The firm comprises Moir and six helpers, as well as several outside programmers. Most of them are local schoolboys whom Moir has instructed in what he wants, or people who have submitted their work out of the blue. Two of them, he says, are "absolute naturals", who are managing to earn considerable amounts of money from programming while still working for their A levels.

Besides programming talent, Moir feels that several other factors are important to contributing to the success of the company. One is that it has established itself as a supplier of ROM software long before anyone else. As a result, it has acquired the greatest experience in obtaining, duplicating and packaging chips, and has also developed a distinctive house style.

Most of all, Moir says, Computer Concepts prides itself on its manuals, which aim to make every product accessible to the most uninitiated customer.

"We should have a full-time manual

writer," Moir says, "but so far we have just made the programmer explain his program and then all of us, including various friends and my Mum, have read his notes and made comments until we think we have the right combination. The difficulty is in getting the manual to seem neither too simple, which would seem patronising, nor too complicated."

The only fly in the ointment at present is the rising price of the chips on which the company's existence depends. Moir attributes the present chip shortage to the huge numbers of personal computers being built by IBM, which he thinks is using more than a fair share of the world's supply of chips. He is paying three times what each chip cost only a few months ago and if prices rise further, he would have to increase the prices of his ROMs, a prospect he does not relish.

In other respects, he says, the future is rosy, even though he cannot look more than two years ahead. "This business moves so fast; who knows where we will be in five years time?" he asks. One thing, however, seems likely and that is that although all the software he has produced so far has been for the BBC, he will probably soon start looking at other machines.

"The BBC is so excellent a computer," he says, "but in its present form, its days are numbered. It will soon seem dated compared to some of the newer products on the market."

Moir is particularly attracted to the QL, even though he thinks its launch was a little hasty. Also, he says the amount of software accompanying the machine makes it scarcely worth producing more. "There may, however, be scope for a ROM-based language," he thinks.

In the meantime, he is busy working on a full BBC Basic compiler and a Lingo interpreter, another product promised by Acorn which so far has not materialised.

Moir works at all kinds of strange times, as well as during normal office hours, and as a result finds little time for programming of his own.

"When you have just finished a program," he says, "you think you never want to look at another but eventually the urge returns. Nowadays, I have the chance to write only the odd routine or part of a program, but I would really love to be able to do another major one of my own."

If he does and if it proves as successful as Wordwise, Charles Moir and Computer Concepts together can scarcely go wrong.

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# CAN YOU CRACK THE CODE?

WHETHER you own an Electron or a BBC, there is a super prize to be won in our special competition to celebrate the launch of *Acorn Programs* as a monthly publication.

The first correct entry from an Electron owner wins the recently released PLUS-1 expansion unit. Worth £59.90 in the shops, the PLUS-1 adds a centronics-compatible printer interface, a joystick port, and two slots for the new cartridge software from Acornsoft.

If you own a BBC B, you could win a DFS disc interface from Acorn, allowing you to connect a wide range of disc drives to your computer. Acorn Computers will even arrange to have the interface fitted for you, bringing the value of the prize to about £90.

All you have to do is to find the secret message in the program listed here.

Unfortunately the gremlins have struck again and line 70 is missing. As luck would have it, the program will not work without the line. What we would like you to do is to write line 70 and tell us the encrypted message. You must answer three questions. They are:

What is the missing line 70?

What are the four possible positive numbers which will break the code?

What is the encrypted message?

Once you think you have the answers, send them on a postcard to: Acorn Programs Competition, ECC Publications, 2 Newington Green Road, London N1 4AQ.

COMPETITION

```
10 MODE 6
20 VDU28,0,5,39,0
30 y=0
40 INPUT "ENTER CODE BREAKER
NUMBER", num
50 FOR x = 1 TO 14
60 READ data

80 PRINTTAB (x.y+1); MID$(converts$,1,x)
90 NEXT
100 DATA 16575, 17085, 20145, 20910,
19890
110 DATA 8160, 20400, 20910, 20145, 18105
120 DATA 20910, 16575, 19635, 21165
```



```

10 REM *****ELECTIVE
20 REN C BORIS E
30 REN E By B, Rear E
40 REN *****
50 REN *****ENVELOPE*****
60 ENVELOPE1,1,-10,-37,-39,24
,13,46,43,106,64,64,135,0
70 ENVELOPE2,1,0,2,4,10,20,20
,100,10,0,10,120,120
80 ENVELOPE3,2,-10,-40,0,4,3,
,9,126,-1,10,-5,126,0
90 ENVELOPE4,130,120,-56,20,-
,31,100,-23,42,0,0,-1,126,0
100 REM *****EELINE*CHARACTER
*****
110 VDU23,224,1,7,15,61,78,151
,162,162
120 VDU23,225,64,224,240,180,2
50,233,69,69
130 VDU23,226,112,240,240,240,
,48,112,0,0
140 VDU23,227,5,2,2,2,2,2,124,
,1
150 VDU23,228,0,0,78,241,225,1
,7,77,76
160 VDU23,229,0,0,0,128,192,12
,0,0,0
170 VDU23,230,1,2,60,249,243,1
27,72,144
180 VDU23,231,0,128,0,128,192,
,128,0,0
190 VDU23,232,0,0,0,1,3,1,0,0
200 VDU23,233,0,0,114,143,135,
,294,16,76
210 VDU23,234,0,1,0,1,3,1,0,0
220 VDU23,235,128,64,34,159,20
,7,254,18,9
230 VDU23,236,0,4,6,8,60,215,24
,7,259,255
240 REN *****CONTROL*PROGRAM
*****
250 ON ERROR IF ERR=17 RUN ELSE
E MODE7:REPORT:PRINT at line "1
ERR:GOTO 350
260 MDEL:VDU23:8202:0:0:0:1:PR
OC:INST
270 MDEL:VDU23:8202:0:0:0:1:WF
X:1
280 PROC IN1:PROCSCREEN
290 REPEAT
300 SOUND4,-5,105,1
310 PROCSPIDER:PROCSPIDER:PROC
FLY:PROCMAIL
320 ECK=ECK+1:IE ECK:=INT(200/
,8)2:3 THEN ECK=0:PROCEEDRY
330 UNTIL REE=0
340 IE REE=1 THEN VDU4:SDYD 28
,ELSE NOSET
350 A=44.0
360 END
370 PEM *****DEFINE*PROCEDURE
*****
380 DEEPROCIN1
390 SFX=100:SEY=0:PSZ=800:THZ=
,810
400 VE=0:EXY=0:EXY=0:SRK=15:BF
,0
410 FLC=0:ECX=1:SDX=110:ERSY=1
,80
420 FCY=0:SNX=0:SNY=0:SRZ=0:SR
,EX=0
430 ENDFPROC
440 DEEPROCIN2
450 PSZ=800:THZ=810:DX=0:FXZ=0
,EXY=0
460 SFY=0:FLA=0:ECX=1:SDX=110:
,SNX=0
470 SNY=0:SRZ=0
480 ENDFPROC
490 DEEPROCSCREEN
500 COLUR:154:ELSI:COLUR=8
510 PRIN1:AB(10,0)"ENERGY" :ENR
520 PRINTTAB(11,0)"FLY" :1:UCR
530 PRINTTAB(6,2)STRINGS4:20,"
,1
540 COLUR:2:PRIN1:TAB(10,29)STR(
,NG:120,CHR(236))
550 VDU5:BCOLO,0:NDVES70,800:V
,DU224,225
560 MOVE380,780:BCOLO,0:VDU224
,225,9,224,225,9,224,225

```

```

570 BCOLO,7:MOVE&32,940:DRAN&3
,2,800
580 ENDFPROC
590 DEEPROCSPIDER
600 IF INVE(-=1) AND THZ=920
THEN GOTO 610 ELSE GOTO 620
610 BCOLO,6:PROCSPID:PSZ:PSX=0
:THZ:THZ=20:BCOLO,60
620 IE INVE(-=90) AND THZ=150
THEN GOTO 630 ELSE EDR N=0 TO 30
:NEAL:DDI0 640
630 GOTO 6:PROCSPID:PSZ:PSX=2
:0:THZ=THZ-20
640 BCOLO,0:PROCSPID:BCOLO,7:PR
OC:THREADR
650 IE PSZ(FYX=20) AND PSX:FYX=
20 THEN GOTO 660 ELSE 670
660 IF FYX=70 AND FXZ=80 THE
N PROCAUGHTLEY
670 IF THZ<170 AND SNX=520 AND
SNY=660 THEN PROCAUGHTINAIL
680 ENDFPROC
690 DEEPROCSPID
700 MOVE570,PSX:VDU224,225
710 ENDFPROC
720 DEEPROCTHREAR
730 MOVE&32,PSX:DRAN&32,THZ=10
740 ENDFPROC
750 DEEPRODELY
760 IF SRX=0 THEN EDR W=0 TO 1
:3:NEXTN
770 IE DS>0 THEN 800 ELSE ON R
ND:121 GOTO 790,790
780 FXZ=0:FYX=800:(510)+400:(BF
X+21:0X=1:ELZ=252:SEY=252:GOTO80
0
790 FXZ=1120:FYX=800:(510)+800-
(80X=2)+0X=2:FLY=228:SFY=228
800 BCOLO,6:MOVEEXX,EXY:VDU4:
,FLX=1
810 IE DS=1 THEN FXZ=FXZ+20:SE
ELSE EXY=EXY-20:EXY
820 FLZ=FLZ+2:IF FLZ>82:THE
N FLZ=82
830 IF DS=1 AND EXX=1120 OR DS
=2 AND FXZ=0 THEN DS=0:GOTO840
840 MOVEEXX,EXY:BCOLO,1:VDU4:
,FLX=1
850 IE EXY=180 AND FXZ=690 AND
FSZ:EVY THEN PROCBAD
860 ENDFPROC
870 DEEPROCAUGHTLEY
880 SOUND0,-10,4,2:BCOLO,6:MOV
,SEY:FYX:VDU4:FLZ=1
890 DS=0:FXZ=0:LNK=ENL=5:PROCE
,NERBY:PROCSDRE+FLY:EXY=1
900 IF FCY=10 THEN FCY=0:PROCS
,DNLS
910 ENDFPROC
920 DEEPROCBAD
930 SOUND1,820:BCOLO,6:VDU4:

```

# BORIS spide

**B**ORIS THE SPIDER needs flies and snails to keep alive and it is your job to see that he gets them. Lower him on his thread to catch the flies, worth more points the lower they are, and the snails, worth 500 points each. You get bonus points after catch-



# THE Spider

```

,8,227
940 MOVE632,FY3,GC0L0,6,DRAM65
2,TRK=20;MOVEFK3,FY3;VDFL3,FL3#
1
950 FOR DE3=PBX TO 120 STEP-10
960 BZX=BX+1
970 BOLDND=0;11,-15,SOX,2;SOUND
#0+12,-15,FK,2
980 MOVE70,0E3+GC0L0,6,VDU224
,225
990 MOVE570,DE3-10;GC0L0,RND15

```

```

N SNEX=0
1710 GC0L0,6;MOVENS,120;VDU224
,227
1320 SNX=SNX+20;IF SNX=1200 THF
N SNX=0;SNX=0;ENDPROC
1330 GC0L0,1;MOVENS,120;VDU224
,6;GC0L0,4;RND27
1340 ENDPROC
1350 DEFPROC GAUGHTS=SNAIL
1360 GC0L0,6;MOVENS,120;VDU224
,8,227
1370 GC0L0,7;MOVE500,150;PRINT
0 0 0
1380 SOUND1,3,60,10;FOR M=0 TO
100;NEXT M
1390 GC0L0,6;MOVE500,150;PRINT
5 0 0
1400 SCX=SCX+500;PROCSCORE=ENX+
10;ECX=0;PROCENERGY=SNL=0;SNL=8
1410 ENDPROC
1420 DEFPROC NEWGAME
1430 #F1;P;
1440 SOUND1,4,100,130;VDU4
1450 FOR Q=0;PRINTTAB12,12;"MGA
ME OVER"
1460 COLQR3;PRINTTAB14,14;"You
reared--15CL
1470 FOR M=0 TO 1000;NEXT N
1480 COLQR4;PRINTTAB10,16;"And
thar gas? /y/n)
1490 RE#=IN#CX10
1500 IF RE#="Y" OR RE#="y" THEN
REX=1;GOTO 1530
1510 IF RE#="N" OR RE#="n" THEN
REX=2;GOTO 1530
1520 GOTO 1490
1530 ENDPROC
1540 DEFPROC INST
1550 VDU19,3,2,0,0,0;COLQR3
1560 PRINTTAB16,13;"B O R I S"
1570 COLQR1;PRINTTAB16,21;"By
G.Rear"
1580 COLQR2;PRINTTAB11,4;"You
must keep Boris the spider alive
by feeding 'i
1590 PRINT"his on the flies and
snail";TAB11,6;"which pees by,

```

ing 10 flies, but be careful — if a fly hits the spider's thread, or if Boris runs out of energy due to lack of nourishment, he crashes to the ground.  
**Boris the Spider** was written for the BBC B by Simon Rear of Immingham, South Humberside.

```

1 VDU224,225
1000 NEXT DE3;MOVE570,DE3;GC0L0
,6;VDU224,225;VDU4;COLQR3
1010 PRINTTAB15,29;"S P L A T
"
1020 ER5=ERSX+192;VDU5;GC0L0,6
;MOVE ER5,990;VDU224,225
1030 SOUND0,-10,6,40;FORW=0;TO35
00;NEXT
1040 IF ER5L=764 PROCNEWGAME;EN
DFPROC ELSE PROCINST
1050 VDU4;COLQR2;PRINTTAB10,29
157R;IN#8(20,CHR#236)
1060 VDU5;GC0L0,6;MOVE70,60;V
DU224,225;GC0L0,6;MOVE632,940;DR
AM632,150
1070 GC0L0,7;MOVE632,940;DRAM63
2,TRK=10
1080 ENS=103;PROCENERGY
1090 ENDPROC
1100 DEFPROC SCORE
1110 SCX=SCX+INT 14000/FY3;C0L0
UR4
1120 VDU4;PRINTTAB15,01;SCX;VD
U5
1130 ENDPROC
1140 DEFPROC ENERGY
1150 VDU4;COLQR4
1160 ENX=ENX-3;PRINTTAB17,01;"
";TAB17,0;ENX;
1170 IF ENX=0 THEN PRINTTAB17,
01;"0";VDU5;PROCDEAF;ELSE VDU5
1180 ENDPROC
1190 DEFPROC BONUS
1200 MOVE100,500;GC0L0,11;PRINT
"BNUS";MOVE750,500;PRINT"BNUS
"
1210 SCX=SCX+ENX*2;PROCSCORE=EN
X*103;PROCENERGY
1220 SOUND1,2,30,100
1230 FOR I=0 TO 700;NEXT I
1240 MOVE100,500;GC0L0,6;PRINT
"BNUS";MOVE750,500;PRINT"BNUS"
"
1250 SPX=SNX+5;IF SNX=55 THEN S
KX=55
1270 DEFPROC SNAIL
1280 IF SNX=1 GOTO 1300
1290 IF RND1401=5 SPX=1;SOUND2,
1,10,1;ELSE ENDFROC
1300 SNX=SNX+1;IF SNX=11 THF

```

```

1600 COLQR3;PRINTTAB11,01;"Boris
w will loose one of his three 11
vee if e fly
1610 PRINT"his his thread or h
e rune out of energy due to lect
of flies."
1620 COLQR1;PRINTTAB11,12;"left
or eating ten flies you score bo
nus points "i
1630 PRINT"depending on how muc
h energy you have left, you then
go onto the "i
1640 PRINT"next stage wher
the flies are faster and Bor
is le"e"
1650 PRINT" energy decrease ad
re rapidly."
1660 COLQR2;PRINTTAB12,18;"To
move Boris--";TAB17,18;"Up the
thread - 0 "i
1670 PRINTTAB115,20;"down the t
hread - 2 "
1680 COLQR3;PRINTTAB12,22;"See
"
1690 PRINTTAB110,23;"score point
s the lower the fly"
1700 PROCEDURE
1710 FOR WAIT=0 TO 2000;NEXT
1720 COLQR3;PRINTTAB18,26;"HIT
THE SPACE BAR TO BEGIN"
1730 REPEAT UNTIL IN#5(0)=1
1740 CLRVDU20
1750 ENDPROC
1760 DEFPROC TUNE
1770 FOR S=0 TO 18;READ N,0
1780 SOUND S,-10,N+10,5;SOUND 2
,-10,N+10,0;NEXT
1790 DATA 01,4,81,4,89,4,81,4,1
91,4,101,4,93,4,93,4,99,4,81,4,9
9,8,73,8,89,8
1800 DATA 01,8,73,4,69,4,73,4,9
1,4,81,4
1810 ENDPROC

```



```

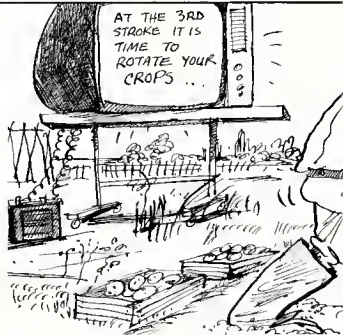
10 REM ** LUSITABLE PLANNER **
20 REM ** A UTILITY PROGRAM F
ON THE ACORN ELECTRON **
30 REM ** C) Steve W. Lucas
June 1984 **
40 REM ** MEET TWO LINES DISA
PLE ESCAPE AND BREAK AND RIDDLE
NOT BE TYPED IN UNTIL YOU ARE SU
RE THAT YOU HAVE FULLY DEBAGED
IT **
50 #F2229,1
60 #EY10 OLDIN RUN H
70 #DCE#V09,0,4,0,0,0,23,1
,0,0,0,0
80 PRINT TAB(10); "Vegetable P
anner"
90 PRINT TAB(10); "a n(3);Lv
a n(3)raa"
100 PRINT TAB(10); "C- Steve
W. Lucas 1984"
110 TIME=0:REPEAT UNTIL TIME>200
#MODE#1:COLD,1:#MOVE#100:DRAN#40
,100:#PLOT#5,250,400
120 MOVE#50,100:#PLOT#5,50,400:1
DGLD,2:#MOVE#50,400:#MOVE#50,400:#
LOT#5,650,100:#MOVE#50,100:#PLOT#5
,750,400
130 GOTO 1,3,5,0,0
140 SCOLD,3:#MOVE#50,100:#MOVE#50
,140:#PLOT#5,950,100:#PLOT#5,950,
400
150 SCOLD,2:#DRAW#250,400:#DRAN#
250,100:#DRAN#50,100
160 COLD#1:#PRINT#(2,17); "PL
OT A", "PLOT B", "PLOT C", "PLOT D"
170 COLD# 3:#PRINT#(14,0) "CA
OF ROTATION" : COLD#2:#PRINT "Mo.e
vegetablee must not be grown on
thesee land for two consecutiv
e years and need to be rotated."
180 COLD#3:#PRINT "PLOT A j- p
eas, beans eL"
190 PRINT "PLOT B - root vegL
ables"
200 PRINT "PLOT C - brassicae"
210 PRINT "PLOT D - plants wh
ch should be left inthe case bed"
220 COLD#2:#PRINT#(0,21); "Fr
ess "Space Bar
Lo continue"
230 REPEAT UNTIL GET=#3:#MODE#1
#DUI#9,0,4,0,0,0,25,1,0,0,0,0
240 REPEAT:#PROC#111#
250 #PRINT Do you want :
"A. to look up a particLular veg
eLable"
260 PRINT"B. To list the veg
eLables to be sown in a given
month."
270 PRINT"C. To list the plan
ts available for a given pl
ot."D. To list the vegetablee
ready for harvesting in a
given month."
280 #REPEAT:#A#GET#1:UNTIL #A#="A
OR#A#="B" OR#A#="C" OR#A#="D"
290 #FAR#="A" THEN#PROC#10#vegEable#
300 #FAR#="C" THEN#PROC#10#
310 #FAR#="B" THEN#PROC#10#CarthL#
320 #FAR#="D" THEN#PROC#10#veat
330 UNTIL EA#0#
340 DATA ASPARAGUS,C,4,D,45
350 DATA BANNER BEANS,S,456,A,7
79
360 DATA DWARF BEANS,S,3456,A,0
789
370 DATA FRENCH BEANS,S,3456,A,
6789
380 DATA DROAD BEANS,S,7412,A,"
078
390 DATA MICHIGANES,C,4,D,789
400 DATA BICE TROT, S,3456,0,0,0,
410 DATA BRUSSELS SPROUTS,S,21
3,C,89ARC12
420 DATA CARDOGE (SUMMER),S,21
C,67899
430 DATA CARDOGE (AUTUMN),S,45
C,8C12
440 DATA CARPAGE (SPRING),L,D,

```

# VEGETABLE PLAN

F	S	S	M	T	W	T	F
🍅	🍅	🍅	🍅	🍅	🍅	🍅	🍅
🍅	🍅	🍅	🍅	🍅	🍅	🍅	🍅
🍅	🍅	🍅	🍅	🍅	🍅	🍅	🍅
🍅	🍅	🍅	🍅	🍅	🍅	🍅	🍅
🍅	🍅	🍅	🍅	🍅	🍅	🍅	🍅
🍅	🍅	🍅	🍅	🍅	🍅	🍅	🍅

- C, 456
- 450 DATA CARROTS, S, 23456, B, 678
- 9A
- 460 DATA CAULIFLOWER, B, 12345, C, 12345678
- 470 DATA BROCCOLI, S, 123, C, 1234
- S
- 480 DATA CELERY, S, 34, A, 9ARC123
- 490 DATA CHICORY, S, 45, A, 8C12
- 500 DATA CUCUMBER, S, 234, A, 898
- 510 DATA ENDIVE, S, 56789, A, 9ARC
- 520 DATA FALG, S, 45, C, 8C1234
- 530 DATA LEEF, S, 123, A, 89ARC123
- 540 DATA LETTUCE, S, 3456, A, 3456
- 789AB
- 550 DATA MALLOW, S, 456, A, 789
- 560 DATA ONIONS, SA, 1234, B, 9A
- 570 DATA SHALLOTS, A, 4, 9, 9A
- 580 DATA SPAIN ONIONS, S, 23456
- 78, 0, 6789ABC
- 590 DATA PARSNIPS, S, 23, B, ABC
- 600 DATA PEAS, S, 3456, A, 56789A
- 610 DATA POTATOES, T, 24, B, 6789A
- 620 DATA RADISH, S, 3456789, A, 45
- 6789A
- 630 DATA SPINACH, S, 23456789, A, 6789AB
- 640 DATA SWEET CORN, S, 45, A, 89
- 650 DATA TOMATOES, S, 34, A, 89AB
- 660 DATA TREESLES, S, 4567, B, 9ARC12
- 670 DATA T, S, F, F, F
- 680 DEFPROC#111#
- 690 PRINT#(10); "VEGETABLE PLA
- NER #GEN#OFF#C
- 700 DEFPROC#vegEable#
- 710 #PROC#111#
- 720 INPUT "ENTER THE NAME OF
- THE VEGETABLE ", veg#
- 730 CLS:#R#=#A3:=1:#RESTORE#REPE
- AT







# WINNER

74n D3=DS+1;READ D3,C3,D3,E3,F3

750 UNTIL LEF1+(veg3,5)=LEFT3;  
D3, C3, D3, E3, F3  
760 IF LEFT3+(veg3,5)=LEFT3+(D3,  
E3) THEN PROC1=0 ELSE PRINT "Sorr  
y that vegetable is not availabl  
e";ENDPROC

770 ENDPROC  
780 DEFPROC1=0  
790 CLS:PROC1=1  
800 PRINT "0"  
810 PRINT "Plant in plot "I3"  
820 IFE3="R" THEN PRINT "needs ri  
ch freshly manured/fertilized  
soil." ELSE IFE3="B" THEN PRINT "shou  
ld be planted in soil manured fo  
r a previous crop."  
830 IFE3="C" THEN PRINT "heat plo  
nted in soil manured for a

previous crop. Likes a dressing  
of lime."  
840 IFE3="D" THEN PRINT "Should n  
ot be rotated, but left in its  
own bed."  
850 PRINT "Grown from s-";I1  
E3="B" THEN PRINT "Seed";ELSE IFE3="C"  
 THEN PRINT "Cross";ELSE IFE3="D" T  
HEN PRINT "Offset";ELSE IFE3="E" T  
HEN PRINT "Seed or Setc"  
860 IFE3="T" THEN PRINT "tubers";E  
LSE IFE3="A" THEN PRINT "sets"  
870 PRINT "Sow / plant in"  
880 FORK=1 TO LEN(D3);K=MID(D3  
,K,1)  
890 IFE3="1" THEN PRINT "Don ELS  
EIFE3="2" THEN PRINT "Feb " ELSE IFE3  
="3" THEN PRINT "Mar " ELSE IFE3="4" T

**G**ARDENERS should find  
**V**egetable Planner by Steve  
Lucas of Cheside Hulme,  
Cheshire a useful guide to vegetable  
growing. On the first screen, a chart  
shows you which plants should be  
grouped in a plot and rotated every  
year. You can then choose to look for  
any particular vegetable and find out  
when to plant it, where, and in what  
type of soil; or you can enter a month  
and discover which vegetables are to be  
sown or harvested at that time.

The program lists more than 30 types  
of vegetable and you can, of course,  
alter the data to suit your needs. Vegeta  
ble Planner will run on both the Elec  
tron and BBC B.



HEAPRINT Apr "ELSE IFE3="5" THEN P  
RINT "May " ELSE IFE3="6" THEN PRINT  
an "ELSE IFE3="7" THEN PRINT "Jul "  
LSE IFE3="8" THEN PRINT "Aug " ELSE I  
FE3="9" THEN PRINT "Sep "  
900 IFE3="A" THEN PRINT "Oct " ELS  
EIFE3="B" THEN PRINT "Nov " ELSE IFE  
3="C" THEN PRINT "Dec "  
910 NEXT  
920 PRINT "Press (SPACE BAR)  
to continue";+X15,0  
930 REPEAT UNTIL GET=32  
940 CLS:ENDPROC  
950 DEF PROC2=0  
960 D3=0  
970 CLS:PROC1=1  
980 INPUT "Enter the month as  
a number";month  
990 IFAnth=10 THEN month>12 THEN PR  
NT "don't be silly";GOTO1350  
1000 IFAnth=10 THEN month<10 STR+  
month  
1010 IFAnth=10 THEN month="A" EL  
SE IFAnth=11 THEN month="B" ELSE I  
FAnth=12 THEN month="C"  
1020 RESTORE  
1030 CLS:VDU14:PRINT "Press SHI  
FT when screen is full."  
1040 REPEAT  
1050 READ D3,C3,D3,E3,F3  
1060 FOR J=1 TO LEN(D3):JFNID3=J  
,J,1:month# THEN D3=1:PROC2=0  
1070 NEXT  
1080 UNTIL D3="X"  
1090 IF D3=0 THEN PRINT "There a  
re no weeds to eat this month."  
1100 PROC2=0  
1110 VDU15  
1120 ENDPROC  
1130 DEFPROC2=0  
1140 PRINT "sow s-";I3  
1150 ENDPROC  
1160 DEFPROC3=0  
1170 IFE3="B",  
1180 PRINT "Press (SPACE BAR)  
when ready."  
1190 REPEAT UNTIL GET=32: CLS: I  
NDPROC  
1200 DEFPROC4=0  
1210 CLS:PROC1=1  
1220 PRINT "Which plot do you  
want to manure?" "A, possi  
bly manure"  
1230 PRINT "B, root vegetables"  
1240 PRINT "C, brassicas" "D,  
others"  
1250 REPEAT:GET:UNTIL D3="A"  
OR D3="B" OR D3="C" OR D3="D"  
1260 RESTORE:CLS:PROC1=1  
1270 PRINT "Plot "I3"  
1280 REPEAT:READ D3,C3,D3,E3,F3  
1290 IF E3=0 THEN PRINT D3  
1300 UNTIL D3="X"  
1310 PROC2=0  
1320 ENDPROC  
1330 DEFPROC5=0  
1340 CLS:PROC1=1  
1350 INPUT "Enter the month as  
a number";month  
1360 IFAnth=10 THEN month>12 THEN PR  
INT "don't be silly";GOTO1350  
1370 IFAnth=10 THEN month<10 STR+  
month  
1380 IFAnth=10 THEN month="A" EL  
SE IFAnth=11 THEN month="B" ELSE I  
FAnth=12 THEN month="C"  
1390 RESTORE:CLS:VDU14:PRINT "Ma  
nure on screen is full press (SHI  
FT)"  
1400 REPEAT:READ D3,C3,D3,E3,F3  
1410 FOR J=1 TO LEN(D3):JFNID3=J  
,J,1:month# THEN D3=1:PROC5=0  
1420 NEXT  
1430 UNTIL D3="X"  
1440 PROC2=0  
1450 VDU15  
1460 ENDPROC  
1470 DEFPROC6=0  
1480 PRINT "Harvest s-";I3  
1490 ENDPROC

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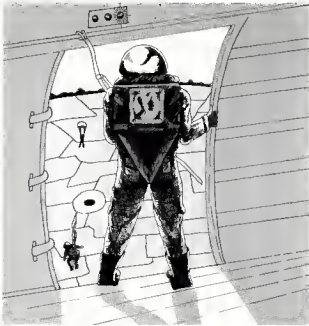
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# SKY DIVER



**U**NABLE to find employment elsewhere, you have decided to join the army, where you have the good fortune to join an elite parachute regiment. Having finished your training, the moment has arrived for you to jump from an aircraft.

Can you touch down on the red landing pad below? Each time you do so, you score 10 points, but if you miss you will be killed. Fortunately, you have three lives and there is a 100-point bonus for clearing the first level. You will also gain an extra life if you reach 10,000 points.

Manoeuvre your parachute with Z and X to move left and right and press the space bar to jump from the aircraft.

**Sky Diver** was written for the BBC by Stephen Murray of Leek Wootton, Warwickshire

```

4R1:PRINTAB115,61" *1MANH
AN-1:COLOUR2:PRINTAB133,111MAN
COLOUR1:PRINTAB(1,27)" *
430 PRINTAB11,1" *
440 IF MAN=0 THEN COLOUR2:PRINT
TAB115,61" *PRESS SPACE" *REPEATUN
TILSET=32:PRINTAB115,61" *
450 IF MAN=0 THEN IF SCORE=HIGH
M HIGH=SCORE:PRINTAB(11,1)HIGH
460 IF MAN=0 THEN SCORE=0:LEVEL
L=1:MAN=3:PRINTAB133,111MAN:PRI
NTAB(1,11)SCORE" *1:PRINTAB1
11,11HIGH:PRINTAB(23,11)LEVEL"
*
470 IF MAN=0 PROCDOVEHMAN
480 PROCDOVEHMAN
490 ENDFPROC
500 DEFPROCINST
510 VDU10:FOR A=0TO1:PRINTCHR#
129:CHR#41" *THE PARA
S'INET
520 VDU10:PRINTCHR#131"
*By S.Murray
530 VDU10:PRINTCHR#130"Unable
to find employment elsewhere you
"CHR#130"are forced to join the
army and and up" CHR#130"to the
PARAS division, after passing all
"CHR#130"your training the Dio n
oment comes ahan
540 VDU10:PRINTCHR#130"you sea
t parachute to earth. You can " C
HR#130"land only on the red land
ing pad and if" CHR#130"you sea
it a life is lost. You have 3" CH
R#130"lives and must guide youra
air to the"
550 PRINTCHR#130"pad using the
"Z"X" and "SPACE" keys for CHR#130
"left and right respectively. Pul
se any "CHR#130"score and #e you f
all with a bonus of 100" CHR#130
"for clearing a level. An extra l
ife is "
560 PRINTCHR#130"obtained for
scoring 10,000 points." CHR#131
"GOOD LUCK" * * *
570 VDU10,10:PRINTCHR#133:CHR#
133"PRESS <SPACE> TO PLAY..."RE
PEATUNTILSET=32:ENDFPROC

```

```

10 REM *****
20 REM **THE PARAS**
30 REM **MURRAY BY **
40 REM **STEPHEN MURRAY**
50 REM *** AGED 13 ***
60 REM *****
70 REM *****
80 RND=7:VDU23:R2021010101
90 PROCINST
100 RND1
110 SCORE=0:HIGH=1000:MAN=3:LE
VEL=1
120 VDU23:R2021010101
130 VDU19,128,132,01
140 VDU19,135,130101:COLOUR133
1:PRINTTAB10,301"
*1:COLOUR1:COLOUR132
150 VDU23,240,60,126,285,66,90
:60,24,36
160 VDU23,241,0,0,0,0,255,25
:5,225
170 VDU23,243,243,126,90,57,21
:37,20,165
180 SCOL0,2:MOVE0,950:DRAN1279
:950
190 COLOUR2:PRINTTAB10,01"SCOR
HIGH LEVEL MEN"
200 PRINTAB11,11)SCORE" *1:
PRINTTAB11,11)HIGH:PRINTAB123,
11)LEVEL:PRINTAB(33,1)MAN
210 PROCDOVEHMAN
220 DEFPROCDOVEHMAN
230 COLOUR1
240 Z=RND1391:PRINTTAB12,271CH
R#241
250 X=15:Y=3
260 REPEAT
270 IF INKEY(-Y) AND X>0 THEN
X=X-1
280 IF INKEY(-X) AND X<39 THEN
M=X+1
290 PRINTTABIX,Y:CHR#240:FOR=
1TO100:NEXT:PRINTTAB(2,Y)" *
300 Y=Y+1:SCORE=SCORE+10:COLOU
R2:PRINTTAB11,11)SCORE:IF SCORE=
10000 THEN MAN=MAN-1:PRINTAB133
,11)MAN
310 COLOUR1
320 UNTILY>26
330 IF X=2 THEN PROCDOVEH
340 IF X<2 THEN PROCDOVEH
350 ENDFPROC
360 DEFPROCDOVEHMAN
370 FORI=100TO250 STEP5:GOUND
1,0,15,1:BOUND0,-15,7,1:NEXT:SC
RE=SCORE+100:COLOUR2:LEVEL=L:LEVEL
+1:PRINTTAB11,11)SCORE:PRINTAB(
23,11)LEVEL:PRINTTAB(15,61)LEVEL
"1:LEVEL:COLOUR1:FOR=1TO1000:NE
XT:PRINTTAB115,61" *1:PR
INTTAB12,271" *
330 IF SCORE=10000 THEN MAN=MA
N-1:COLOUR2:PRINTTAB(33,11)MAN:CO
LOUR1
390 PROCDOVEHMAN
400 ENDFPROC
410 DEFPROCGRAB
420 SELND0,-15,4,10:PRINTTABIX
,Y:CHR#243:COLOUR2:PRINTTAB115,6
1"DEAD" *1:FOR=1TO1000:NEXT:COLO

```

# One-Armed

**YOU HAVE** to earn the money to play the fruit machine in this educational gambling game written by Roland Waddilove of Widnes, Cheshire.

Feed 10 pence into the slot machine and see if it produces three fruit of the same kind. If it does, you win a 50 pence jackpot but if you lose and run out of money, you must answer a few

simple mathematics questions to obtain some more. You can choose how many questions you want to answer, in several categories — adding, subtracting, division and multiplication. If your times tables are a little rusty, you can even consult whatever table you like.

**One-armed Bandit** was written for the Election and will also run on the BBC B

```

100N ERROR GOTO 100
200EN ** One Armed Bandit
**
300EN ** By R.A.Waddilove
**
4000DE &
500PROGInstructions
600PROGset up
70000000 CLS
80000000 PRINT " What would you like
to do?"
90000000 PRINT " Press 0 to answer
some questions," " Press 1
to lose at your tables," " Pr
ess 2 to play the one armed ba
ndit."
10000000
11000000 REPEAT keys=DEFB
12000000 UNTIL key="0" OR key="1"
OR
13000000
14000000 IF key="0" THEN PROCquest
**
15000000 IF key="1" THEN PROCtablea
16000000 IF key="2" THEN PROC2 s P
ROCEandst : NDBE 5 : VDU17,0,4:0
*
17000000 UNTIL FALSE
18000000 DE
19000000 END
200
21000000 DEF PROCset_up
22000000 IN read (3)
23000000 PROCfruit_graph ca
24000000 PROCenvelopes
25000000 PROCinput_age
26000000 money=0
27000000 VDU17,0,4:0
28000000 ENDPROC
29000000 DEF PROCenvelopes
30000000 ENVELOPE1,1,4,2,1,20,10,5,1
26,0,0,-126,126,126
31000000 ENVELOPE2,1,1,0,0,100,50,5
0,126,0,0,-126,126,126
32000000 ENVELOPE3,1,4,0,-4,20,1,1,1
26,0,0,-126,126,126
33000000 ENDPROC
34000000 DEF PROCInstructions
35000000 CLS:VDU17,0,4:0:19,1,3:0
0)
36000000 PRINT TAB(12)"ONE ARMED BAN
DIT"
37000000 PRINT " This is a simple
slot machine which takes 10 p
a . If you get three fruit" t
he see then you win the jackpot
"50p."
38000000 PRINT " If you get two f
ruit the same then" you get an
free go . To play the al
ot machine you need money , y
ou can earn this by answering"
39000000 PRINT " a few simple mathe
matics questions . " You can choos
e how many you answer" and the
type of question . "
40000000 PRINT " ( Don't forget to
press return when )" " you h
ave typed in your answer . )"
41000000 PRINT TAB(6)"press the apa
ce bar to start"

```



# Med Bandit



```

420$REPEAT UNTIL GET$=" "
430ENDPROC
440DEF PROCinput_age
450$REPEAT CLS
460VDU7
470$PRINT " How old are you ,
, ? " " Please type in your a
ge ."
480$INPUT age%
490IF age%<5 OR age%>100 THEN
$PRINT " 5 to 100 year olds only
"$PROCpause(300)
500UNTIL age%>4 AND age%<101
510ENDPROC
520DEF PROCbandit
530$IF money>10 THEN
540$PRINT " *** Not
enough money"
" Answer: none"
" question"
IFPROCpause(500) : ENDPR
OC
540VDU23,1,0;0;0;0;
550$PROCdraw_splash
560$REPEAT
570$PROCwait_keypress
580$PROCspin_wheels
590$PROCsee_if_won
600UNTIL money%>10
610$PROCwait_keypress
620$PROCuse_money
630$PROCwait_keypress
640VDU23,1,1;0;0;0;
650ENDPROC
660DEF PROCtablea
670VDU9,0,1;0;
680$REPEAT CLS
690$INPUT TAB(10)"Which table
would I like to see ",
TAB(10)" you
like to see ",
TAB(
"
700$RND(1,1,1,5
710CLS
720$PRINT table;" Table"
730FOR t:=1 TO 12
740$PRINT t;" = ",table[t] -
"
750$PRINT;tablea;table
760NEXT
770$PRINT TAB(8)"Would you lik
e to"
" another ?"
" answer"
" yes or no"
TAB(
810$REPEAT key$=GET$
790UNTIL key$="Y" OR key$="N"
800UNTIL key$="N"
810VDU7 : CLS : VDU19,0,4;0;
820ENDPROC
830DEF PROCquestion
840$PROCchoose_type
850question=0
860$REPEAT CLS
870question=question+1
880$PRINT " Question is ",quest
ion
890IF type$="" THEN
" right_answer=RND
(age%)+1
" number2=
RND(age%)+1
" number1=number2+right_answer
900IF type$="" THEN
" number1=RND(age%
)+age%+age%+1
" number2=
RND(age%)+age%+1
" right_answer=number1+number2
910IF type$="" THEN
" number1=RND(age%
)+age%+age%+1
" number2=
RND(age%)+age%+1
" right_answer=number1+number2
920IF type$="" THEN
" number1=RND(age%
)+age%+age%+1
" number2=
RND(age%)+age%+1
" right_answer=number1+number2
930$PRINT
" number1;type$;number2
2)
940$INPUT " = ",your_answer
950$IF your_answer=right_answer
THEN PROCright
ELSE PROCw
rong
960$PRINT " Another question ?
"
" yes or no"
970$REPEAT key$=GET$
980UNTIL key$="Y" OR key$="N"
990UNTIL key$="N"
1000ENDPROC
1010DEF PROCright
1020money=money+$
1030$IF type$="" OR type$=" "
THEN
" money=money+$
1040$PRINT " Correct. "
1050$PRINT " You now have ",money
"
" pence. "
1060VDU7
1070ENDPROC
1080DEF PROCwrong
1090$RND(1,-15,0,5
1100$PRINT " your answer", " is wro
ng. "
"
"
1110$PRINT " The answer is ",ri
ght_answer;","
1120ENDPROC
1130DEF PROCchoose_type
1140CLS
1150$PRINT " What type of quest
ion would you like ?"
1160$PRINT
" 1. Addition (+)
" worth 5p"
" 2. Subtraction
(-) worth 5p"
" 3. Mul
tiplication (*) worth 10p"
" 4. Division (/)
" worth
10p"
1170$PRINT " Press key 1,2,3 or 4
."
1180$REPEAT key$=GET$
1190UNTIL key$="0" AND key$="5"
1200IF key$="1" THEN type$=" +
"
"
"
1210IF key$="2" THEN type$=" -
"
"
"
1220IF key$="3" THEN type$=" *
"
"
"
1230IF key$="4" THEN type$=" /
"
"
"
1240VDU7 : CLS
1250ENDPROC
1260DEF PROCfrustr_graphics
1270;screen=CRR#18+CRR#0+CRR#2
1280;yl=CRR#CHRR#18+CRR#0+CRR#3
1290;scr=CRR#18+CRR#0+CRR#1
1300;actup=CRR#CRR#CRR#CRR#11
1310;actdown=CRR#CRR#CRR#CRR#1
0
1320REM ++ blank ++
1330VDU23,255,255,255,255,255,2

```

```

02,200,230,230
134001ans#CHR#10+CHR#0+CHR#7+C
140235+CHR#235+backdown#CHR#33
+CHR#255+backup#
130OREN ** cherries **
130V0DU23,201,0,0,0,28,63,126,1
24,1
1370V0DU23,252,0,128,128,184,252
+190,128,64
1380V0DU23,253,30,63,111,95,94,1
10,60,0
1370V0DU23,254,56,124,118,122,12
2,62,28,0
1400cherry#blank#gr#red#CHR#2
51+CHR#232+backdown#red#CHR#25
3+CHR#256+backup#
141UREN ** melon **
1420V0DU23,239,0,32,1,0,0,0,0,0
1430V0DU23,240,0,0,192,76,48,24,
24,24
1440V0DU23,241,0,0,0,0,0,0,31,0
1450V0DU23,242,24,24,24,48,96,19
0,120,0

```

```

1460V0DU23,252,0,0,128,128,176,2
48,252,204
1470V0DU23,233,107,107,107,107,5
3,63,14,0
1480V0DU23,234,230,230,230,206,2
52,246,112,0
1490apple#bl#nk#gr#red#CHR#23
1+CHR#232+backdown#CHR#233+CHR#
234+backup#

```

```

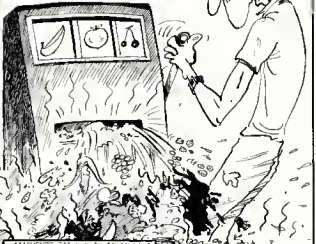
1500V0DU23,231,0,0,0,14,31,53,
43
1660V0DU23,232,0,0,128,128,176,2
48,252,204
1670V0DU23,233,107,107,107,107,5
3,63,14,0
1680V0DU23,234,230,230,230,206,2
52,246,112,0
1690apple#bl#nk#gr#red#CHR#23
1+CHR#232+backdown#CHR#233+CHR#
234+backup#

```

```

1700V0DU23,235,0,3,7,10,27,55,50
+111
1720V0DU23,234,0,128,178,248,252
256,238,186
1730V0DU23,237,107,107,107,63,63
31,15,0
1740V0DU23,238,182,186,166,204,2
16,240,224,0
1750orange#bl#nk#red#CHR#232
+CHR#234+backdown#CHR#237+CHR#
30+backup#
1760ENDPROC
1770DEF PROCwait_keypress
1780SOUND1,-15,100,5
1790COLOR0;COLOR128
1800PRINT TAB11,11" press up
key"
1810REPEAT UNTIL DELIA="
1820PRINT TAB14,11"
"
1830COLOR132
1840ENDPROC
1850DEF PROCspin_reel
1860COLOR3 + money#money-10
1870V0DU23,235,0,128,128,176,2
1880V0DU23
1890FOR n=1 TO 3
1900SOUND1,-15,100,1
1910reel(n)#RND(5)
1920MOVE n#12+192,736
1930IF reel(n)=1 THEN PRINTpear
#apple#orange#melon#cherry#

```



```

1440V0DU23,245,0,0,0,30,16,16,16,1
6,16
1470V0DU23,244,0,0,0,128,64,32,3
2,32
1480V0DU23,245,16,16,16,16,16,31
0,0
1490V0DU23,246,32,32,32,64,128,0
0,0
1500V0DU23,247,0,0,0,14,15,13,15
15
1510V0DU23,248,0,0,0,0,128,64,19
2,64
1520V0DU23,249,15,15,15,11,15,0,
0,0
1530V0DU23,250,192,64,192,128,0,
0,0,0
1540action#bl#nk#gr#green#CHR#23
9+CHR#244+backdown#CHR#241+CHR#
242+backup#yellow#CHR#243+CHR#
244+backdown#CHR#245+CHR#246+ba
ckdown#red#CHR#247+CHR#248+backd
own#CHR#249+CHR#250+backup#
1550REN ** pear **
1560V0DU23,224,0,0,0,0,0,0,1,31
108,160
1570V0DU23,225,0,2,4,56,120,232,
208,160
1580V0DU23,227,63,116,110,108,11
4,113,31,0
1590V0DU23,228,192,224,224,224,2
24,172,0,0
1600V0DU23,228,0,0,0,0,0,0,16,32,
4
1610V0DU23,229,0,9,17,17,2,4,0,0
1620V0DU23,229,0,0,0,0,0,0,32,0

```

```

2310COLOR132;PRINT TAB118,23)"
"
2320FOR n=10 TO 26
2330PRINT TAB119,n)" "
2340NEXT n
2350COLORBARS+COLOR128
2360PRINT TAB119,910;"TAB(5,20
)"
"TAB(6,21)"
"
2370COLOR132;COLORB
2380PRINT TAB12,151;"free go if"
2390PRINT TAB13,161;"2 the acer"
2400COLORBARS
2410PRINT TAB13,251;"costa 10p a
go"
2420COLORBARS;PRINT TAB14,261;"you
have 1money"p"
2430ENDPROC
2440DEF PROCmoney
2450COLOR128;COLORB
2460PRINT TAB11,11"not enough
money"
2470V0DU7
2480PROCpause(300)
2490COLOR132;COLORB
2500PRINT TAB(5,4) "quarters"
2510PRINT TAB(4,3) "coppers"
2520PROCpause(300)
2530ENDPROC
2540DEF PROCpause(time)
2550TIME=0
2560REPEAT UNTIL TIME>time
2570ENDPROC

```

# MR DOO

```

0 REM *****
1 REM XX XX
2 REM XX MR. DOO XX
3 REM XX XX
4 REM XX By XX
5 REM XX XX
6 REM XX R. Hackett XX
7 REM XX XX
8 REM XXXXXXXXXXXXX
9 HEX 220,0
10 MODE 7:VBI 231820210101
11 PRINTTAB15,21CHR#11461"1
12 PRINTTAB15,31CHR#11501"1
13 PRINTTAB15,51CHR#11341"HE
14 PRINTTAB11,71CHR#11341"EA
15 PRINTTAB11,91CHR#11341"TH
16 PRINTTAB17,111CHR#11291"G
17 PRINTTAB17,121CHR#11291"G
18 PRINTTAB9,141CHR#11301"2
19 PRINTTAB9,161CHR#1311"X
20 H=0
21 PRINTTAB14,221CHR#11021"G
22 A=-BET#1E A# THEN 23 E
23 LSE 22
24 CLR:GOTO13:GOTO#EX 21,5

```

```

25 PRINTTAB20,11CHR#11111"CH
26 PRINTTAB10,31CHR#11411"CH
27 PRINTTAB125,11CHR#11411"CH
28 IF C=1 THEN 67
29 PRINTTAB31,51CHR#11511"6
30 PRINTTAB131,61CHR#11471"1
31 PRINTTAB131,71CHR#11461"2
32 A=0;B=0
33 REPEAT

```

```

34 GOTO 1
35 PRINTTAB1A,B1CHR#11461"1"
36 UNTIL A=30
37 A=5:B=9
38 REPEAT
39 A=A+1
40 PRINTTAB1A,B1CHR#11461"/
41 UNTIL A=32
42 A=37:B=9
43 REPEAT
44 B=B+1
45 PRINTTAB1A,B1CHR#11461"1"
46 UNTIL B=22
47 A=33:B=22
48 A REPEAT
49 PRINTTAB1A,B1CHR#11461"/"
50 A=A-1:UNTIL A=0
51 A=0:B=9
52 REPEAT
53 PRINTTAB1A,B1CHR#11461"1"
54 B=B+1:UNTIL B=22
55 A=A+9
56 REPEAT
57 PRINTTAB1A,B1CHR#11461"/"
58 A=A-1:UNTIL A=0
59 A=0:B=9
60 REPEAT
61 PRINTTAB1A,B1CHR#11461"/"
62 A=A-1:UNTIL A=0
63 PRINTTAB10,61CHR#11451"2u
64 PRINTTAB10,71CHR#11471"1a
65 DEFPROCwin
66 X=17:Y=20
67 A=RND12711IF A=0 THEN 67
68 FOR #=4 TO 20
69 ECR T=1 TO 80NEXT T
70 PRINTTAB1A,B1CHR#11461"/"
71 PRINTTAB10,9-111"
72 A=-1M:EY=301
73 IF A#-2*AND X#5 THEN X=X-
1:ROUND 1,-10,30,1
74 IE A#-X*AND X.32 THEN X=X
+1:ROUND 1,-10,30,1
75 #X 11,1
76 #X 15,1
77 PRINTTAB1X,Y1CHR#11451"2u
78 PRINTTAB1X,Y+11CHR#11471"1"
79 NEXT B
80 IE X=A AND Y=20THEN PROCsc
ore
81 IE X=A AND Y=20THEN PROC
score
82 IF X=1A AND Y=20THEN PROC
score
83 PROC1:ves
84 DEFPROCscore
85 SOUND 1,-15,30,2
86 S=X:IF S#H THEN H=0
87 C=1:GOTO 24
88 D=0
89 D=0
90 PRINTTAB1A,B-111"
91 PRINTTAB1X,Y+11"
92 PRINTTAB1X,Y+11"
93 SOUND 3,-15,30,2
94 L=L+1:IF L=0 THEN ECR T=1
TO 240:NEXT T:GOTO 102
95 IE L=1 THEN 99
96 PRINTTAB14,611"
97 PRINTTAB14,711"
98 PROCwin
99 PRINTTAB10,611"
100 PRINTTAB10,711"
101 PROCwin
102 SOUND 1,-15,40,7:ROUND 1,-
15,30,5:ROUND 1,-15,20,7:ROUND 1,-
15,30,5:ROUND 1,-15,40,10
103 CLR
104 PRINTTAB10,91CHR#11411"CH
R#11361CHR#11321"Press SPACE B
RA To Play Again"
105 PRINTTAB10,101CHR#11411"CH
R#11361CHR#11321"Press SPACE
BAR To Play Again..."GOTO 22

```

**M**R DOO has just built a brick wall but someone is throwing the bricks back at him. Help him to catch the bricks before the wall falls down, using the Z and X keys to move our hero left and right.

Mr Doo was written for the BBC B by Simon Hackett of Nottingham

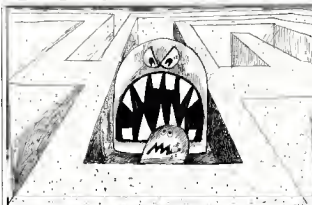


# MUNCHMAN

**E**LECTRON owners familiar with the classic arcade game of Pac-man will enjoy this version by Sharon Jones of Widnes, Cheshire. The player steers the red muncher round the maze using A to move up, Z to move down, and N and M to move left and right.

Each of the dots in the maze is worth 10 points and picking up the fruit in the corners is worth 50 points a time. Beware of the monsters which are trying to make a meal of the munchman.

Use A and Z to move up and down, N and M to move left and right. Munchman will also run on the BBC B



```

(IPDF)A:PRINTTAB(1,3,7)*SCOR
FG* TAB(1)'Dot'TAB(2)FO'T
AB(1)'Star'50'TAB(9)M
unchar'100'ResultP
Zscore@DOM* and
vesLEFT'NovesRIGHT'TAD1
10,20'Free any key.'IT=0
20M(1),Y(1),Z(1),F(1),GOSU
D4:REPEATPRINTTAB(9,3)'MUNC
HYNAN'10*'NEE'FORA=4E9T
OBFFS(FFZ)A=9'IAZ+2:NEFT)9FF
9=8Z:INTLINKEY(9)(<-)
54FX:0
45X=0:LZ=3
SMODES:AZ=8ND:6:FORCZ=OTDZ
VDU19,CX,RX(10):NEFT:SDSLB4(=VDU2
3,224,-1(-1-1-1)23,227,60,126,
90,-,231,C26,102,60,17,3,23,226
10,24,24,9,23,225,36,102,126,2(9
-,99,102,60:PRINI=0GOSUD4:3FO
RA=110Z:PRINT'1:COLOUR1
6FORAZ=1TO10:PRINT'0':NEFT:
COLOUR3:PRINT'1':NEFT:EDSLB4:3AP
RINTTAB(1,3)'*TAB(10,3)'*TAB(1
,20)'*TAB(10,20)'*1:RESFOR:FO
RA=1TO4:RPAZX, YZ:GOSUB9:YZ=3
1-YZ:GOSUB39:NEFT
7DAY=6,3,1,0,4,6,4,5,3,3,3,
4,4,6,4,9,1,5,1,9,2,7,8,6,4,7,
4,4,6,4,4,2,12,2,13,2,(4,3,15,6,
8,6,9,6,10,6,11,6,12,6,17,4,13,4
,14,5,14,7,6,9,2,6,9,6,10,9,10,7
,13,9,15,9,15,7,14,10,14,9,14,9,1
3
BFCRAZ=OTD3:VDU19,AZ, RX(1)IN
FX(1),LX=30Z, Y(1)=3:Y(1)=18: XZ=13
+YZ=15:COLOUR2:FORAZ=OTD1:Z(AZ=

```

```

226: X(AZ)=2IF(AZ)=2:PRINTTAB(3,6
2), Y(AZ)(<=>A)(<NEFT:COLOUR(1)PRINT
TAB(3, YZ)(<=>A)IFL3:PRINTTAB(9,1
7)'*1:IFL3:PRINTTAB(10,17)'*
9M=1NKEY(99)(<=>9)1)DZ=1A
2=7B(-AZ=7)E3(AZ=6)C(-AZ=9)1
1FAZ=1:GDB1B
10VZ=XZ+DZ:WZ=YX+EZ:GOSUD4:1
FP=255GP=208D:TO1B
111FPZ(SZ=SZ+1)WZ=UX-1)SOUND
1,=13,190,2
121FPZ=515Z=65+9:COLOUR3:FORA
2=OTD11:IAZ=3:PRINTTAB(1,IAZ),Y(
AZ)1'0'NEKEY:UZ=UZ-1:SLND1,=15,
90,2
131FPZ)2215OTD16
14EZ=SZ+10:AZ=3VZ=Y(1)ANDAZ=
Y(1)(<=>1Z(AZ)<=>SZ:UX=1
15:IAZ=7:Y(AZ)=3:F(AZ)=2:Z(
AZ)=32:GOSUB39:IF(4)M(1)Z75:1
Z(AZ)=2,6
16:COLOUR3:AZ=0:SZ=SZ:FORAZ=
1TO3:AZ=3M(3)GOSUB10:4B1=6Z:6Z=
NDV(10):NEFT:PRINTTAB(10,15)(<A)
17:COLOUR1:PRINTTAB(1, YZ)('1
TAB(19, WZ)(<=>XZ=VZ:Y=MS
18:IFUZ=DSZ=9Z=5)GOTO5
19:FORZ=OTD1:1FAND(9)Z=5XDV1
10:GOTO30
20:PRINTD(99)'9FF(AZ)=2
21DZ=XZ-X(AZ)Z=VZ-Y(AZ):1FF
(AZ)=3DZ=DZ+EZ=EX
22DZ=(ABS(DZ)-ABS(EZ))0Z=SGN
(DZ)1:FZ=SGN(EZ)1:FOZ=1:GOTO32
23VZ=X(AZ)+DZ:WZ=Y(AZ)+GOSUB4
2:FPZ=515GP3
24VZ=X(AZ)+WZ-Y(AZ)+FZ:GOSUB4

```

```

2:1FPZ:515GP3
251FOZ=50TDZ
26VZ=X(AZ)+DZ+WZ-Y(AZ)1:GOSUB4
2:1FPZ:515GP3
27FZ=X(AZ)-DZ+WZ-Y(AZ)1:GOSUB4
2:1FPZ:515GP3
28VZ=X(AZ)+WZ-Y(AZ)-FZ:GOSUB4
2:1FPZ:515GP3
29VZ=X(AZ)-DZ+WZ-Y(AZ)1:GOSUB4
2:1FPZ:515GP3
30EXZ=90T9
311FPZ=156NF(AZ)3SDTD30
32:COLOUR1:PRINTTAB(1, VZ, WZ
'0':COLOUR1:PRINTTAB(X(AZ), Y(AZ
1)IAZ)=Z(AZ)1: X(AZ)=VZ:Y(AZ)=WZ
1Z(AZ)=32-9Z=11:1:44:1FFZ=150GT
030
33AZ=(NEXT:GOSUB39:FORAZ=110
900:INFT:1Z=LZ-LZ-<1FL3:GOTO5
34RDEZ:PRINTTAB(12,2)'You ha
ve been'LAB(1,4)'*MUNCH'D:LAB(1
,2,2)'three times'*TAB(8,9)'You
score'53:0:1FFZ)PRINTTAB(10,
12)'The high score'1:TX=53:GOTO
30
35PRINTTAB(10,12)'High score'
TX=0
36NF15,0
37GOSUB1:PRINTTAB(10,10)A
nother game'1:AZ=5FZ:1FAZ=95SDT
O4FL3:FAZ)78SD:DSABL:SECLB:VZ,
36SDUND,=15,4,2:RTURN
3:GOSUB40:KZ=19-KZ
4:PRINTTAB(1, YZ)('1:RETURN
4:VDU3,3:GOTO10)0:0:0:1:RTURN
RFTURN
43FORAZ=1TO20:PRINT'(<NEFT:
RETRN

```



```

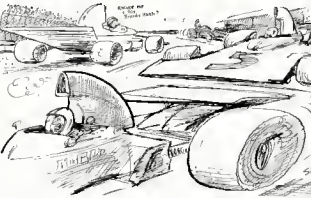
10 REM ONE-WAY DRIVE
20 REM by Federico Forri
30 REM 2/1/1984
40 ENVELOPE 1,0,50,-50,50,1,1
1,126,0,0,-126,126,126
50 R%-1279
60 ON ERROR GOTO 70
70 GOTO 4
80 PRINT " ONE-WAY
DRIVER"
90 PRINT " You are a mad F
1 driver that is going in the
wrong direction around the
circuit. Your aim is try not to
hit the cars or the guard-rail.
"
100 PRINT "As you go on t
he road becomes narrower and mo
e
" Cars run against you."
110 PRINT " You move left
with the J' key " and ri
ght with the K key."
120 PRINT " Press the ESCAP
E key when you want " to rest
at."
130 PRINT " GOOD LUCK."
140 PRINT " Press the SPAC
E BAR to start"
150 #F%1,0
160 IF GET#=" THEN 170 ELSE 1
70
170 VDU%1,1,010,0,0,0
180 VDU%3,242,20,90,60,60,60,2
19,219,60
190 VDU%3,243,219,250,219,24,
1,90,90,24
200 VDU%3,244,204,204,51,51,20
1,204,51,51
210 VDU%5,250,60,60,60,60,60,0
,60,60
220 VDU%3,254,0,0,120,192,224,
,90,120,60
230 VDU%3,253,36,15,7,3,1,0,0,0
240 VDU%3,251,0,0,1,3,7,15,30,
60
250 VDU%3,252,120,240,204,192,
120,0,0,0
260 VDU%3,224,4,10,69,161,56,1
76,76,40
270 VDU%3,225,32,80,162,91,29,
35,50,20
280 VDU%3,226,101,42,90,40,60,
59,219,60
290 VDU%3,227,154,81,42,20,60,
219,219,60
300 VDU%3,228,0,16,118,169,210
,164,80,40
310 VDU%3,229,0,0,99,94,104,80,
44,20
320 CLS: CLEAR
330 VDU#1,1,7,0,0,0
340 FOR P%1=1014 STEP-1:PRINT
P%10,P1CHR#1250:TAB150,P1CHR#125
1:1:NEXT
350 FOR D=13101 STEP-1:PRINT#
113,0,0,1CHR#1251:CHR#1252:TAB15
,0,0,1CHR#1253:CHR#1254:1:NEXT
360 PRINT TAB(13,0),CHR#1250:11
FOR#-1:01:VDU%2,0,0,1:PRINT 1C
HR#1250:1:01:VDU%0,0,0,1:CHR#1111
370 K%-13:K%-1:5%0
380 FOR#0:12:05:STEP-1
390 H%-38:0%:K%-4%:K%-5%:0
400 PRINT TAB(19,251) " "
410 IF#%1-12:THEN:PRINT TAB(14,0
)CHR#1250:1:01:01:01:CHR#1253:1C
HR#1254:1:01:01:01:01:01:01:01
420 #F%0-110200
430 #F%ND(6X)1-5:THE#PR:INTTAB(6X
)TAB(6X-11,0)CHR#1245:1
440 IF B%-1:THEN:PRINTTAB(16X,0)
CHR#1251:CHR#1251:TAB(16X+7,0)CHR
#1251:CHR#1251:CHR#11:11:01:01:0
450 IF B%-1:THEN:PRINTTAB(16X-1,0
)CHR#1251:CHR#1252:TAB(16X+8,0)
CHR#1251:CHR#1252:CHR#11:11:01:0
470
480 #PRINTTAB(16X,0)CHR#1250:TAB
(16X+8,0)CHR#1250:CHR#11:11
470 IF INKEY="7":GOTO 800:GOTO 1,150

```



**F**OOLISHLY, you are driving your Formula One car the wrong way round the race track. Can you avoid the oncoming cars? Use Q and P to steer your car left and right, gaining 100 points for each car you pass. You have an automatic accelerator and your speed will increase gradually as you reach 500, 1,000 and 10,000

points. The track becomes narrower the further you proceed. If you survive all the dangers in level one, you go to stage two, where each car is worth 250 points. At the winning post you will be welcomed by a chequered flag. Formula One was written for the BBC B by Stephen Gates of Hornchurch, Essex.



```

1:PROC=0:0:0:0:
480 #F%1=98:THE#SOUND,1,150
1:PROC:1:0:0:0:0:
490 #PRINTTAB(1X,251)CHR#1242:ITA
2:1X,261 " 1
500 #F%Q:INT(32+K%-16,220):1:THE
#F%Q:0:0:
510 B%-RND(71-2):A%0:5X
520 #F%K%:THE#A%:K%-1:5X:0:0:0:0
7040
530 #F%K%:0:THE#A%:K%-1:5X:0
540 SOUND1,0,0,0:1:0:0:0:1,15,10
1
550 #NEXTK
560 #NEXTQ
570 DEF PROC:K%+K%-1:1:PRINT1
32:K%+16,19%:THE#PRINTTAB(1X,1,2
0) " "1:PROC:0:ELSE:PRINTTAB(1X,2
5)CHR#1245:TAB(1X-1,261) "1:ENDP
ROC
580 DEF PROC:K%+K%-1:1:PRINT1
32:K%+16,19%:THE#PRINTTAB(1X,1,2
0) " "1:PROC:0:ELSE:PRINTTAB(1X,2
5)CHR#1245:TAB(1X+1,261) "1:ENDP
ROC

```

```

590 #F%PROC:0:
600 #F%1,0
610 #F%19,1,14,0,0,0
620 FOR #F%1 TO 11:PRINT TAB(1
2,25)CHR#1226:1:01:01:01:01:01:01
15:100:0:1:PRINT TAB(1X,
25)CHR#1227:1:01:01:01:01:01:01:01
SOUND,0,45,100,3:1:NEXT#
640 #PRINT TAB(10,31) "Distance
travelled:1(12-0X)1200*K%1" km"
650 #VDU#
660 IF 112-0X1+200<K%:K%:THEN R
3:112-0X1+200<K%:PRINT "New recor
d:1(SOUND1,-15,150,10
670 IF 112-0X1+200<K%:100:THEN
PRINT "Please don't drive on stre
ets..."" You are a road
dancer.
680 PRINT "Record 1(R%)" km"
690 PRINT "Press V to restar
t"
700 #F%1,0
710 IF GET#="V" THEN CLS:GOTO 710

```

# ERRORS

**I**N THE August/September issue, the first section of the **Ghost Hunter** listings, containing the program graphics instructions, was inadvertently omitted.

We apologise for the inconvenience which many may have experienced as a result. We are investigating the cause of the difficulty and will provide the solution when it is resolved.

Two other errors in our last issue have come to our attention, both concerning lines missing in listings.

**Gothic Horror**, line 690 should read as follows:

```
690IFAS="*"ANDX% > 2Y%=Y%  
-1-PRIN
```

**Whist** (page 55), the missing line is:

```
11501F wn=1 THEN PROCY
```

play.rk

# &

# MISHAPS

## Programs must be your own work

FOLLOWING recent problems involving readers sending programs which were not their own work, we aim to ensure that does not happen again by deciding that only programs which are accompanied by a Program Voucher will be considered for publication.

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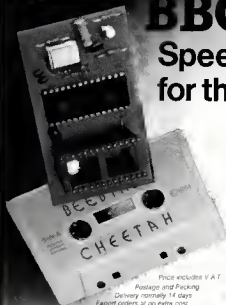
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AP



# Mathematical certainties

Jeremy Richards' programming series goes on from numeric variables to loops

**I**N THE FIRST instalment of this series I left you with the problem of writing a program to test a person's knowledge of any multiplication table. Given the commands I covered the last time, you should have been able to write such a program. There is no single correct way of writing it but you should have been able to construct a program which works in a similar manner to the one I offer here:

#### Program 1.

```

10 counter = 1
20 INPUT "Enter multiplication table", table
30 PRINT "What is", counter; "times", table
40 INPUT reply
50 IF reply = counter * table GOTO 80
60 PRINT "That is wrong Try again"
70 GOTO 30
80 PRINT "That is correct Let's try another"
90 counter = counter + 1
100 IF counter > 12 GOTO 120
110 GOTO 30
120 PRINT "You have completed the", table, "times table."
130 END

```

The program is by no means perfect and I will show you how it can be improved but first see if you can understand the way it works. There are three numeric variables at the heart of the program. The numeric variable counter is used to keep track of the number to be

see whether the answer is correct. It does so by seeing whether the number held in variable reply is equal to the sum of counter \* table—remember that "\*" is the sign for multiplication. If it is correct, the program goes to line 80—GOTO 80.

If the user has typed an incorrect answer an appropriate message is printed and the question is printed again by sending the user back to line 30. By increasing the value of counter when the answer is correct, the same line for asking the questions can be used but with a different number.

You might think that is all we can do with this particular program but that is not so. Would it not be pleasant for an element of uncertainty to enter the program? At the moment the program is extremely predictable, as it will ask the questions in order from one to 12 but we can enter the element of uncertainty by letting it choose a random number every time a new question is asked.

To do that we use another Basic keyword, RND. It is a random number generator facility and builds into a program randomness. For instance, instead of writing:

```
counter = counter + 1
```

we could write:

```
counter = RND (12)
```

This would cause a random whole

number to be added to counter. RND is always fun and program two is a short game to test your powers of observation and memory. A set of numbers will appear briefly on the screen and you have to recall the numbers

#### Program 2.

```

10 goes = 0
20 counter = 0
30 CLS
40 x = RND (99999)
50 PRINT x
60 wait = INKEY (50)
70 CLS
80 INPUT "What was the number", guess
90 IF guess = x THEN PRINT "Well done"
ELSE PRINT "Wrong"
100 IF guess = x THEN counter = counter + 1
110 goes = goes + 1 IF goes > 10 GOTO 140
120 REPEAT PRINT "Press the spacebar to continue" UNTIL GET = 32
130 GOTO 30
140 PRINT "You have scored", counter; "out of 10"

```

Do not worry if you did not follow all the program, as I have put in a few new commands. They are INKEY, REPEAT—UNTIL, ELSE, GET and CLS. Line 40 is where the program chooses the random number and line 50 prints that number to the screen. To make sure that the number does not remain on the screen I have used the CLS command at line 70.

CLS is the command to clear the screen and in this program ensures that the number does not remain printed on the screen.

You are probably wondering how we can instruct the machine to keep the number printed on-screen for a specified period. If you were to omit line 60 you would not see the number, so therefore line 60 contains the necessary instruction to cause a time delay between the number being printed and the screen being cleared.

The command is INKEY and in the context of this program causes the program to pause for a certain time. That period can be altered by changing the number in the brackets.

Line 120 uses the commands REPEAT, UNTIL and GET. The function GET tells the computer we are waiting for a certain key to be pressed.

## 'Would it not be pleasant for an element of uncertainty to enter the program?'

multiplied and it is incremented by one every time the program reaches line 90.

The program allows the user to type in any number, which is the multiplication table to be tested. That number is held in the variable table. Note that I use meaningful variable names. You could, of course, call your variables what you like but it helps to clarify the program and makes it easier to follow.

Line 40 waits for the user to answer and the number entered is held in the variable reply. Line 50 then checks to

number between one and 12 inclusive to be assigned to the variable counter. By changing the number in the brackets, the range for a random number to be chosen is altered. Therefore:

```
anynumber = RND (145)
```

will choose a number between 1 to 145.

By incorporating the RND function into programs we can allow the computer to choose a number randomly. Besides using it in our multiplication program there are other ways we can utilise the command. Games of skill and

in this case the spacebar. How do we know it is the spacebar? Well, 32 is the number assigned to the spacebar key — you can look it up in the ASCII table at the back of the user guide — and therefore tells the program to recognise only the spacebar being pressed.

The REPEAT-UNTIL command sends the program into a loop, i.e., the command to wait for the spacebar to be pressed is REPEATED UNTIL the spacebar is pressed — GET=32. The colons in line 120 divide the different statements and allow more than one command a line. That is what is called a multi-statement line.

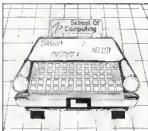
The variable 'goes' counts the number of questions asked and the value of 'goes' is equal to 10 — line 110 — the final score is given — line 140 — and the program finishes. In a similar way, counter keeps track of the score — line 100. To make the program more challenging you can change the possible number of digits presented by increasing the number in the RND statement — line 40 — or by decreasing the time delay in line 60.

Finally, line 90 shows a way of expanding the power of the decision statement IF. The command ELSE is very much as its name suggests. It tells the machine that IF an event has or has not occurred, THEN do this ELSE proceed to another course of action.

I mentioned the concept of loops and that is a very useful and powerful technique in programming. In my first article I showed how to ease the writing of your programs by using a counter in the program to increment numbers. For example, it is very tedious to type-in 45 PRINT statements just to print your name 45 times. To make it easier you could write the program as follows:

```
10 s=1
20 PRINT "Jeremy"
30 s=s+1
40 IF s<45 GOTO 20
50 END
```

There is a faster and more efficient way of writing this program. The au-



swer is to place the 'PRINT "Jeremy"' sequence within a loop and tell the machine that you want it repeated 45 times. This can be done using the FOR-NEXT command. Type-in program three:

```
Program 3.
10 FOR s=1 TO 45
20 PRINT "Jeremy"
30 NEXT s
```

As you can see, that is far simpler and quicker. When the program runs, variable 's' is set to a value of one and then proceeds to line 20. When the name is printed, line 30 checks to see if there is a NEXT number which 's' can be. As we have told the computer in line 10 that 's' will equal all values between one TO 45, the program returns to line 10

and 's' is incremented by 1 to equal 2. That continues in a loop until 's' equals 45. The numbers in line 10 can be whatever you like but remember they must go from low to high. If you wish to count down you must use the STEP command. To see this working type the following three short programs:

```
Program 4a.
10 FOR X=1 TO 100
20 PRINT X
30 NEXT
```

```
Program 4b.
10 FOR X=100 TO 1 STEP -1
20 PRINT X
30 NEXT
```

```
Program 4c.
10 FOR X=1 TO 100 STEP 10
20 PRINT X
30 NEXT
```

Program 4a carries out what we have learned so far but to count backwards we have to tag on STEP at the end of the command — program 4b — to tell the machine we are counting backwards in steps of one. Try writing the program leaving out STEP to see the effect. Finally, one can use STEP to tell the computer to count in steps of more than one, for instance in program 4c I have told the computer to count in steps of 10.

You may have noticed also that in line 30 I just say NEXT without tagging the variable name on the end. It is not necessary to place the name on the end as BBC Basic understands that the NEXT statement refers to the FOR loop in line 10. One golden rule to try to

remember is not to jump out of a FOR-NEXT loop if you can avoid it

Now for procedures. They are one of the better features of BBC Basic and make programs very neat and easy to follow. Creating a large Basic program is no more than stringing together a load of small Basic programs. The best way of achieving this is to use a procedure and program five is an example.

```
Program 5.
10 PROCIntro
20 PROCQuestion
30 PROCReply
40 END
50 DEFPROCIntro
60 CLS
70 PRINT "The following is a short test of your"
80 PRINT "mental arithmetic. Press the SPACEBAR"
```

## 'One golden rule to remember is not to jump out of a FOR-NEXT loop if you can avoid it'

```
90 PRINT "when ready"
100 REPEAT UNTIL GET=32
110 ENDPROC
120 DEFPROCQuestion
130 x=RND (10) y=RND (10)
140 PRINT "What is" as "times" y
150 INPUT reply
160 ENDFPROC
170 DEFPROCReply
180 IF reply=x*y PRINT "Correct" ELSE PRINT "Wrong"
190 ENDFPROC
```

Program five is another example of writing a mathematical program but this time it is split into three sections or procedures. Each section is a small program in itself and is given a name, i.e., PROCIntro, PROCQuestion, PROCReply. To call this subroutine we use the command PROC followed by the name of the procedure.

The program is then sent to the line where the subroutine is and carries out the commands in that section. To identify the beginning and the end of the subroutine, DEFPROC initialises the routine by DEFINING the procedure name and ENDFPROC tells the machine the procedure is finished. When the procedure has ended the program returns to the command after where the procedure was called, i.e., in program five after PROCIntro is carried out it returns to line 20 to PROCQuestion.

We can therefore say that the main program is just three lines long — lines 10 to 30 — and by splitting the program into subroutines and also giving the procedures meaningful names it is easier to follow. Try to use procedures in your larger programs and you will find that they help tremendously.

# SIDNEY SQUIRREL



```

10
20 REM *****
   * ACORN PROGRAMS *
   * SIDNEY SQUIRREL *
   * PART 2 *
   *****
30
40
50 ONERROR IF ERR=17 RUN ELSE PRINT
:REPORT:PRINT " at line ":ERL:END
*60 MODE7:PROCinit
70 REPEAT: PROCvar:MODE2
80 PROCsetup:PROCplay
90 MODE7:PROCendgame
100 UNTIL FALSE
110
120
130 DEFPROCinit
140 H1X=0;A1=0;SP1=1;DIR1=1
150 ENDPROC
160
170
180 DEFPROCsetup
190 VDU12,23;B202;0;0;0;4,19,1,0;0;19
2,0;0;19,3,0;0;19,7,0;0;
200 COLOUR1:COLOUR135
210 PRINTTAB(0,0);" ACORN PROGRAMS
   "
220 COLOUR7:COLOUR12B
230 PRINTTAB(0,2);"DAY ":DX;TAB(9,2)
:LIVES " ;MX;TAB(0,3)"NUTS " ;ACX-AX;
240 PRINTTAB(9,3);"H1 " ;H1X;TAB(0
,4);"TIME " ;TX;TAB(9,4);"DIST " ;SZ;
250 GCOL(7);MOVE0,0;MOVE0,832;PLOT85,
1279,0;PLOT85,1279,832
260 VDU20,5;XX=640;YX=832;
270 PROCsquirrel(X1,Y1)
280 FOR C=1 TO LEAF1:PROleaf(RND(18)
*64,832-(RND(24)*32));NEXT
290 IF RND(1)<.1 VDU19,7,0,0,0,0 ELSE
VDU19,0,0,0,0,0
300 ENDPROC
310
320
330 DEFPROCplay
340 REPEAT:AX=0;J=FALSE
350 CX1=0;CY1=0;DX=POINT(CX1,CY1)
360 REPEAT:IF L=TRUE PROCsetup
370 REPEAT:AX=RND(18)*64;AY=832
-(RND(24)+32);UNTIL POINT(AX,AY)<>6
380 PROCacorn(AX,AY,SP1);TIME=0
390 REPEAT:L=FALSE;B=FALSE;F=FALSE
E
400 SP1=SP1+1;IF SP1=5 SP1=1
410 PROCacorn(AX,AY,SP1)
420 IF DX>3 AND RND(1)<.5 PROC
haser
430 IFINKEY(-98) PROCleft
440 IFINKEY(-67) PROCright
450 IFINKEY(-73) PROCup
460 IFINKEY(-105) PROCdown
470 IF INKEY(-99) PROCjump
480 IFINKEY(-56) PROCpause
490 PROCupdate
500 UNTIL (X1=AX AND Y1=AY) O
R L=TRUE OR B=TRUE OR F=TRUE
MX-1;VDU5:PROClosean(3," SLIPPED ON LE
AF ")
520 IF F=TRUE VDU4,31,16,2;PRINT;
MX-1;VDU5:PROClosean(3," GOTCHA ")

```

## HELP SIDNEY

Squirrel gather as many acorns as he can before the long winter sets in.

The acorns are scattered about a large, frozen lake, and as Sidney skids over it, the ice melts so that he cannot cross his own trail. To make matters worse, there are leaves on the lake on which Sidney might slip and kill himself, and he only has three lives.

Sidney has enough energy for one jump, but there is no telling where he might land.

Be careful how you guide Sidney. If he approaches the acorns too quickly, he may lose his chance of picking them up. Beware, too, of sudden nightfall, when Sidney cannot see where he is going or how much time he has left.

In the enhanced version of the game, you will also have to cope with the park-keeper who is attempting to catch Sidney and make squirrel stew out of him.

The keys you need are Z to go left, X to go right, \* to go up, ? to go down, P to pause, R to re-start and space bar to jump.

```

530 UNTIL MX<1 OR AY=ACX
540 IF AX=ACX SOUND 1,2,150,10
550 ACX=ACX+1;TX=TX-1;DX=DX+1;LEAF1
=LEAF1+2;SX=SX+(20*DX);L=TRUE
560 UNTIL MX<1;ENDPROC
570
580
590 DEFPROCleft
600 DIR1=1
610 IF POINT(X1-32,Y1)=6 ENDPROC
620 IF POINT(X1-32,Y1-16)=1;B=TRUE
630 SOUND 1,-15,180,1
640 VDU25,4,XX;Y1;18,0,6,255
650 X1=X1-64;IF X1<0 X1=1216 X1=0
660 PROCsquirrel(X1,Y1);SX=SX+1;ENDPR
OC
670
680
690 DEFPROCright
700 DIR1=2
710 IF POINT(X1+96,Y1)=6 ENDPROC
720 IF POINT(X1+96,Y1-16)=1;B=TRUE
730 SOUND 1,-15,180,1
740 VDU25,4,XX;Y1;18,0,6,255
750 X1=X1+64;IF X1>1216 X1=0
760 PROCsquirrel(X1,Y1);SX=SX+1;ENDPR
OC
770
780
790 DEFPROCup
800 IF POINT(X1+32,Y1+16)=6 ENDPROC
810 IF POINT(X1+32,Y1+16)=1;B=TRUE
820 SOUND 1,-15,180,1
830 VDU25,4,XX;Y1;18,0,6,255

```

**M**ANY readers have already received a leaflet containing the vital graphics instructions to *Acorn Programs*. You will receive not only the program for our exciting special offer program, Sidney Squirrel. Now we bring you the main part of the program which will make Sidney Squirrel even more challenging and entertaining.

For those of you not lucky enough to have received the first instalment, the answer is simple, those of you who already have both parts of the program will also receive the enhancement.

```

840 Y%=Y%+32:IF Y%>832 Y%=32
850 PROCsquirrel (XX,Y%):S%=S%+1:ENDPR
OC
860
870
880 DEFPROCdown
890 IF POINT (X%+32,Y%-48)=6:ENDPRDC
900 IF POINT (X%+32,Y%-48)=1:B=TRUE
910 SOUND 1,-15,180,1
920 VDU25,4,X%,Y%:18,0,6,255
930 Y%=Y%-32:IF Y%<32 Y%=832
940 PROCsquirrel (XX,Y%):S%=S%+1:ENDPR
DC
950
960
970 DEFPROCvar
980 VDU23,8202:0:0:0:1:L=FALSE:M%=3
990 S%=0:D%=1:T%=15:AC%=5:LEAF%=10
1000 ENDPROC
1010
1020
1030 DEFPROCjump
1040 IF J=TRUE:ENDPROC
1050 VDU25,4,X%,Y%:18,0,6,255
1060 REPEAT: X%=(RND(18)*64):Y%=832-(RND
D(24)*32):UNTIL POINT (X%,Y%)<>6
1070 PROCsquirrel (X%,Y%):J=TRUE:ENDPR
OC
1080
1090
1100 DEFPROCendgame
1110 *FX15,1
1120 FOR C=1 TO 2
1130 PRINTTAB(S,C):CHR#141:CHR#129:"
ACORN PROGRAMS":NEXT
1140 PRINTTAB(3,4):CHR#133:"YOU HAVE B
EEN KILLED AFTER":D%:"DAYS":CHR#133:
"HAVING SCORED":S%:"POINTS"
1150 IF S%>H% THEN PRINTTAB(2):CHR#1
31:"A NEW HIGHSCORE!! CONGRATULATIONS!!":
H%=S%
1160 PRINTTAB(B):"PRESS SPACE TO PLA
Y"
1170 REPEATUNTILGET=32:ENDPRDC
1180
1190
1200 DEFPROCpause
1210 *FX15,1
1220 N=TIME:REPEAT:K%=GET#:UNTIL K%="R
":TIME=N
1230 ENDPROC
1240
1250
1260 DEFPROCupdate
1270 TL=INT (T%-TIME/100)
1280 VDU4,31,16,4:PRINT:BX:VDU31,5,4:
PRINT:TL:" "
1290 IF TL=0:VDU31,16,2:PRINT:M%-1:PR
OC:closean(4,"NO TIME LEFT")
1300 IF X%-AX% AND Y%-AY%:X%=X%+1:S%=S
%+1:BOUND 1,1,100,10:VDU31,5,3:PRINT:AC
%:AX%:" "
1310 VDU5:ENDPROC
1320
1330
1340 DEFPROCclosean(P,M%)
1350 SOUND0,-15,20,10:L=TRUE:M%=M%-1
1360 VDU4,31,P,20:PRINT:M%:
1370 PROCdelay(5000):ENDPRDC
1380
1390
1400 DEFPROCdelay(P)
1410 FOR Z=1 TO P:NEXT
1420 ENDPROC
1430
1440
1450 DEFPROCsquirrel (AZ,BX)
1460 VDU25,4,AZ,BX:18,0,1,224
1480 ENDPROC
1490
1500
1510 DEFPROCacorn (AZ,BX,CX)
1520 VDU25,4,AZ,BX:18,0,3,235:8,18,0,1
,228
1560 ENDPROC
1570
1580
1590 DEFPROCleaf (AZ,BX)
1600 VDU 25,4,AZ,BX:18,0,1,253:8,18,0,
2,254
1610 ENDPROC
1620
1630
1640 DEFPROCchaser
1720 ENDPROC
1730
1740
1750 DEFPROCchpr (AZ,BX)
1770 ENDPROC

```

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# reaction timer



**R**EACTION TIMER, a simple program for the BBC B by A Moulder of Rainham, Essex will help you sharpen those reflexes so necessary for playing the latest computer games or for making the brilliant catch which might put the West Indies out of a Test match for good.

After a variable time, a question mark appears at a random position on the monitor display. Hit the RETURN key as fast as you can and, after three attempts, your average time will be given in centiseconds, together with your rating.

See the breakdown of what each section of the program does to help you understand how it works

The program is run in mode 7. Use is made of the CHR3 codes to produce coloured text

Line 30 initialises a user-defined key for run using the program

Line 50 suppresses the cursor.

Line 110 produces a random delay.

Line 120 sets the external times to zero.

Lines 140-150 produce a random TAB display

Line 190 is a cheat control

Lines 280-340 print out reaction comments related to times.

Lines 350-360 simple sound generation

```

10 REM REACTION TIMER
20 REM BY A. A. MOULDER 1984
30 *KEYO RUNIM
40 CLS
50 PRINT "CHR#129" This will
  test your reactions"
60 PRINT "CHR#130" Wait for ?
  ? to appear"
70 PRINT "CHR#132" When it do
  es hit the return key"
80 PRINT "CHR#133" This will
  occur three times"
90 PRINT "CHR#134" The averag
  e will then be printed out"
100 PRINT "CHR#134" Hit any
  key to proceed"
110 pause = GET
120 delay = RND(200)
130 test = 0
140 r# = "Reaction "
150 total = 0
160 DIM try(3)
170 FOR repeat = 1 TO 3
180 FOR delay = 1 TO (1500+RN
  D(2000)):NEXT delay
190 TIME = 0
200 REM COORDINATES TAB(x,y)
210 x=RND(36)
220 y=RND(23)
230 PRINTTAB(x,y)CHR#130"?";
240 REM SOUND1,-15,200,3
250 INPUT try
260 IF TIME < 5 THEN PRINT CH

```

```

R#129"CHEAT ""Press f0 to cont
  inue" #END
270 try(repeat)=TIME
280 CLS
290 NEXT repeat
300 PRINT ""
310 FOR repeat = 1 TO 3
320 PRINT SPC(15)try(repeat)
330 total = total + try(repea
  t)
340 NEXT repeat
350 REM REACTION COMMENTS
360 PRINT "CHR#134" THE AVERAG
  E IS"INT(total/3)" CENTI SECOND
  S"
370 IF total/3 < 20 THEN PRINTC
  HR#130r#" Very fast"
380 IF total/3 >= 20 AND total
  /3 < 28 PRINTCHR#131r#"PRETTY OOO
  D"
390 IF total/3 >= 28 AND total/
  3 < 37 PRINTCHR#130r#" So So"
400 IF total/3 >= 37 AND total/
  3 < 45 PRINTr#" You are gettin
  g old"
410 IF total/3 >= 45 THEN PRINT
  CHR#130r#" You are either dead o
  r Irish"
420 SOUND1,-15,10,20
430 SOUND1,-15,200,20
440 PRINT "CHR#129" Press f0 t
  o continue"

```

# MUSIC MAKER

BEGINNERS



```

TUNE *** MUSIC MAKER ***
DORH *** BY MIKE SMITH ***
DORH *** JULY 1984 ***
40CLEAR:CLS
5*MODE7
40PROCINIT
70MODE3
80VDU23,0,10,39,0:VDU23:G200:
0:0:0:
70PRINT:PRINT"QUAVER....."
....."S"
100PRINT"CRDCHET....."
....."10"
110PRINT"MINI M....."
....."20"
120PRINT"SEMI BREVIE....."
....."40"
130VDU10,0,24,39,10
140REFEST
150PRINT:PRINT"ENTER NOTE "1:1
INPUT N#
160PROC CONVERT
170PRINT:PRINT"ENTER VOLUME 0
to 15 "1:INPUT B(N)
    
```

```

180PRINT:PRINT"ENTER DURATION
(as given above) "1:INPUT D(N)
190PRINT:PRINT"ENTER OCTAVE (H
is above 0 "1:INPUT O#
20ND=N#1
21UNTIL LEFT$(IN$,1)=""$ OR NO
3450
220CLS
230PRINT:PRINT:PRINT" Do you w
ant the tune played "1:INPUT AN#
IF LEFT$(AN$,1)=""$ THEN PROG#L
AV ELSE RUN
240END
250DEFPROC CONVERT
260IF N#="B" THEN N(ND)=145
270IF N#="AE" THEN N(ND)=141
280IF N#="A" THEN N(ND)=137
290IF N#="GE" THEN N(ND)=133
300IF N#="D" THEN N(ND)=129
310IF N#="FE" THEN N(ND)=125
320IF N#="F" THEN N(ND)=121
    
```

```

330IF N#="E" THEN N(ND)=117
340IF N#="DE" THEN N(ND)=113
350IF N#="D" THEN N(ND)=109
360IF N#="CE" THEN N(ND)=105
370IF N#="C" THEN N(ND)=101
380IF O#="H" THEN N(ND)=N(ND)+
46
390ENDPROC
400DEFPROC INIT
410DPR(150),D(150),N(150)
420ND=0:D#=""
430ENDPROC
440DEFPROC PLAY:CLS
450FOR TUNE = 0 TO NO
460SOUND1,-A(TUNE),N(TUNE),DIT
LINE
470NEXT TUNE
480PRINT:PRINT:PRINT" AGAIN
"1:G=GET:IF G#="Y" THEN RUN E
LSE IF G#="N" THEN ENDPROC
490ENDPROC
    
```

**T**HIS SHORT program by M K Smith of Motingham, London, enables your BBC B to play any tune you instruct it to play. All you need to do is to key-in the note, for example F#; if you need B flat, use A#, which is the same.

You can adjust the volume of each note by typing-in any number from 0 to 15; typing 0 will give you a rest in the tune. Keying one of the numbers at the top of the screen will determine the duration of each note. When asked for the octave, you type 'H' for an octave higher than B, otherwise press RETURN.

When you have entered all your notes, type 'S', press RETURN four times, and then sit back and enjoy the music.





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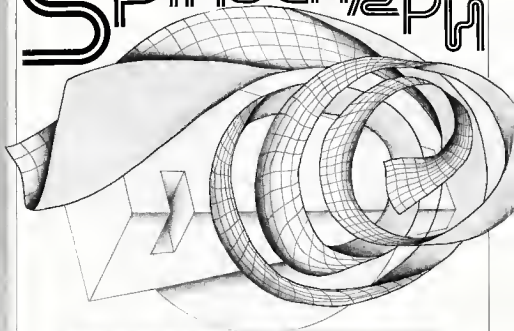
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# SPIROGRAPH



**H**AVE your computer draw a shape with any number of sides with **Spirograph** by I Doyle of Little Sutton, Cheshire. Besides telling the computer how many sides you want, you can move your shape up and down by using ; and ? or left and right by using Z and X. The same keys also

allow you to use the program as a sketcher if you type-in 1 when asked for the number of sides. Pressing . will make the shape smaller, ; makes it bigger and pressing the space bar will start the program again.

Try typing numbers with a decimal point for some interesting shapes.

```

1MODE7
2PRINTCHR#141"S P I R O
B R A P H"
3PRINTCHR#141"S P I R O
B R A P H"
13XX=600:YX=500
14RX=200
20PRINTTAB(15,5)"HOW MANY SID
ES DO YOU WANT THE SHAPE(1=SKETC
HER)":INPUT NS
21IF NS=0 THEN CLS:RUN
25MODE2
26GCOLOR,RND(5)
50TH=2*PI/NS
51MOVEXX+RX,YX
55TH=0
63PROCmove
    
```

```

BOTH=TH+0TH
91DRAWX+RX*CDOS(TH),YX+RX*SIN
(TH)
101GOTO63
110DEF PROCmove
120HZ=INKEY(0)
130 IF HX=5BYX=YX+4
140 IF HX=47YX=YX-4
150 IF HX=8BX=X+4
160 IF HX=90XX=X-4
170 IF HX=59RX=RX+4
180 IF HX=46RX=RX-4:IF RX<0 RX
=-0
190 IF HX=32 RUN
200 IF HX=-1 ENDPROC
210GOTO120
211GOTO26
    
```

# TYPING TEST

BEGINNERS



**I**MPROVE your skill on the typewriter or keyboard with **Typing Test** by Vicky Patel of Luton, Bedfordshire. A letter is displayed briefly on the screen and if you type that letter in the time allowed, you score a point. Your rating will be given at the end.

You can vary the length of time that the letters are displayed by typing in any number from one to 10. The program will show you the letters it gave you at the end.

```
10 MODE 7
20 LET F=0
25 PRINTTAB(0,2);"INPUT SPEED
1-10 (5=AVERAGE)";INPUT
S;IF S<1 OR S>10 THEN GOTO 25
30 PRINTTAB(0,4);"PRESS THE K
EY SHOWN TO SCORE A POINT"
40 PRINTTAB(8,6);"HIT ANY KEY
TO START"
50 G=GET
55 DIM R(20)
60 FOR D=1 TO 1000:NEXT D
70 FOR A=0 TO 19
80 LET Z=RND(26)
90 LET Z=Z+64
95 LET R(A+1)=Z;IF R(A)=Z THE
N GOTO 80
100 PRINTTAB(16,11);CHR$(141);
CHR$(Z)
110 PRINTTAB(16);CHR$(141);CHR
$(Z)
120 LET I$=INKEY$(S*32)
130 IF I$=CHR$(Z) THEN LET F=F
+1
140 NEXT A
150 CLS
160 PRINTTAB(8,9);"YOU SCORED
";F;" OUT OF ";A
170 IF F>16 THEN PRINTTAB(12,1
1);"THAT IS EXCELLENT"
180 IF F<10 THEN PRINTTAB(12,1
1);"THAT IS RUBBISH"
190 IF F>9 AND F<17 THEN PRINT
TAB(10,11);"THAT IS QUITE GOOD"
195 PRINTTAB(11,14);"THE LETTE
RS WERE ";PRINT;FOR A=1 TO 20:PR
INTCHR$(R(A));" ";NEXT
200 PRINTTAB(6,19);"DO YOU WAN
T ANOTHER GO Y/N"
210 PRINTTAB(17,21);INPUT C$
220 IF LEFT$(C$,1)="Y" THEN RU
N ELSE MODE 7
```

**F**ROM a mixed bag of queries, D Clayton of Lancashire, following my mention of the command OSCLI in the July issue, wrote to ask what OSCLI does and how to use it.

Last month I included a short menu program. One problem with it is that for every file loaded the appropriate command LOAD or CHAIN has to be used. It would be far simpler if one could type-in the name and the program would be loaded. It is not so easy as that. To see what I mean, try to set up a one-line program — just a REM statement is sufficient — and SAVE the program with the name "TEST", type-in Programs 1 and 2 and run them both.

**Program 1.**

```
10 name$="TEST"  
20 LOAD name$
```

**Program 2.**

```
10 name$="TEST"  
20 OSCLI "LOAD"+name$
```

Program one produces a syntax error message but program two loads the program successfully. What OSCLI does is to take a string expression and pass it to the operating system. It is rather similar to operating system commands and adds a powerful feature to Basic.

A natural extension of the foregoing program is to use it in a menu. The following program CATALOGues the disc and then allows the user to type the name of the program to be used and implements OSCLI as the means of

# Peripherals which expand the frontiers of the BBC

## Modems and processors loom large among queries to Jeremy Richards

but there is still some confusion as to the differences between them.

The Z-80 second processor is aimed primarily at the business market and turns the BBC into a CP/M machine. The processor is a Z-80B running at 6MHz and has 64K RAM. By means of the tube interface the second processor allows the BBC to become an input/output processor whose job it is to handle the screen display and I/O jobs such as disc drive.

While that is happening the second processor processes programs. Effectively that splits the tasks of processing between two machines and speeds the

though if you are using Basic the increase is only to about 44K. The 6502, however, has already found a specific field in which it can be used, namely computer-aided design. The 6502 is practicable for simulation and graphics because of its speed.

The Batsuk package from Acorn is an implementation of the Robocorn software originally for the Apple and is a professional package which provides an inexpensive CAD system. It may be the first of many products which will utilise the power of the second processor and it maintains the BBC as an exciting product.

All, though, is not good news. It seems that some people are having difficulty in getting a 6502 second processor to work with the paged ROMs. With sideways ROMs appearing in vast quantities, many people now have software on EPROM. Unfortunately not all these products will work with the second processor because of the way the EPROMs have been written, using locations which are incompatible with the tube software.

Two specific problems have arisen. First, where the ROM will not work when the second processor is working and, second, and more serious, where the ROM appears to prevent a second processor working. The latter is unusual and the answer is to disable the ROM before using the tube.

In the case of ROMs not working across the tube there is little you can do other than contact the manufacturers of the firmware and hope they produce tube-compatible ROMs.

My mention of modems and acoustic couplers last month has sparked requests for more information about the field. So here is a lightning introduction to the world of micro communications,

**'The 6502 is geared to a wider market though it will probably have most appeal to enthusiasts who demand more speed and memory'**

loading the file. As with last month's program, use !BOOT to call the menu program.

**Program 3.**

```
10 ON ERROR GO TO 30  
20 *CAT  
30 INPUT "Which file to load", file$  
40 OSCLI "LOAD"+file$
```

Remember that OSCLI will work only if you have Basic 2 in your machine. If you have any more interesting uses of OSCLI, please send them in.

The next subject is second processors for the BBC. I have had several queries on the differences between the two processors, the Z-80 and the 6502, what they can and cannot do and their use. So I shall look at the two offerings from Acorn. The Z-80 and 6502 second processors were launched earlier in the year

time of execution. On the Z-80 the speed increase is approximately 30 percent on Basic programs, compared to 50 percent on the 6502.

The Z-80 is in a package with bundled CP/M software such as word processor, spreadsheet and databases. Aimed primarily at the business market, it provides business users with a relatively inexpensive CP/M system. Running under CP/M there is a full implementation of BBC Basic and titles have been included to transfer from the DFS disc format to the CP/M format.

The 6502 is geared to a wider market though it will probably have most appeal initially to enthusiasts who demand more speed and memory in their programs. It doubles the memory to 64K,





with an explanation of the jargon which confuses many people.

Two terms you will hear used constantly are modem and acoustic coupler and they are often interchanged when meaning different items. Generally an acoustic coupler is where the handset of a telephone is placed so that the signals may be transmitted between two micros.

The difficulty with acoustic couplers is that they can suffer from line noise distortion. A better method is to use a hard-wired modem where the modem is connected directly to a telephone line. That can also dispense with the need to pick up handsets and dial, as dialling can be handled from the micro — the new Prestel adaptor from Acorn is one such modem.

What happens when you connect a computer to a modem? The digital signals from a micro are converted by the modem into a form which can be transmitted along a telephone line to a receiving computer at the other end. The difficulty is that there is no universal system in use and there are many protocols — protocol being the accepted term for the rules used between machines.

When looking for a modem, make sure it will work with the systems you want. Firmware is available from various companies which can permit you to change the transmit and receive rates — i.e., speeds of data transmission — as well as other protocols.

Computer Concepts and Pace produce ROMs like Termi, Communicator and Commstar which permit the user to establish contact with a growing range of systems, many freely-accessible to the public, with public bulletin boards for users to exchange news and views.

To help survive in the world of communications I have listed below the most commonly used jargon.

Acoustic coupler: A modem which

transmits and receives data via the

handset of a telephone. Also a portable package.

Auto-answer: A modem which can answer an incoming telephone call, rather like an answerphone for micros.

Auto-Dial: Enables the telephone number of the host computer to be dialed from a micro or modems. Not available with acoustic couplers.

Band: Transmission rate of data. CCITT: The international committee responsible for communications. Acronym for Comité Consultatif International Téléphonique et Télégraphique.

Full-duplex: A system which can send data both ways at the same time.

Half-duplex: A system which can send data both ways but only in one direction at a time.

There are also many protocols which systems may use, usually referred to by name like V21, V24. They refer to the bits-per-second rates, half- or full-duplex, and the kind of telephone systems being used.

So what is there to use? The best-known microdata system is Prestel. Be-

## 'The communications industry is growing and learning fast and hacking is not so easy as it was'

transmits and receives data via the handset of a telephone. Also a portable package.

Auto-answer: A modem which can answer an incoming telephone call, rather like an answerphone for micros.

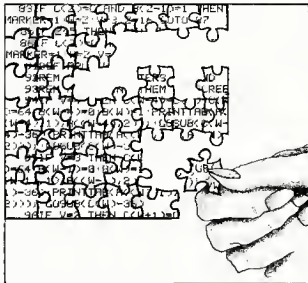
Auto-Dial: Enables the telephone number of the host computer to be dialed from a micro or modems. Not available with acoustic couplers.

vides providing news pages, business information and buying services, it allows users to send electronic mail and Telex messages and to download computer software, all down a telephone line.

There are other similar systems and for the enthusiasts many a happy hour can be spent contacting people. Spending many a happy hour is where the problem arises, as telephone usage is not cheap. Fortunately many systems have free access either all the time or after 6pm and at weekends.

The one disturbing aspect of the communications market is the rise of the computer hacker. Most of us have probably heard or read of the War Games type of incident where young people have broken into military or banking computers. The communications industry, however, is growing and learning fast and hacking is not so easy as it was.

The BBC computer is ideal for tele-communications and there is support for the machine in that area and there are many Special Interest Groups for BBC users on the various systems. Where does that leave the Electron user? Well, certainly not in the cold. Because of the lack of mode 7, systems which use teletext graphics such as Prestel are not accessible but with the appearance of interfaces for the Electron, connections to modems will not be far away and I have just heard of a company launching a mode 7 interface for the Electron.



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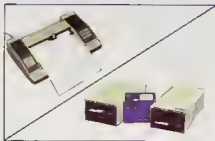
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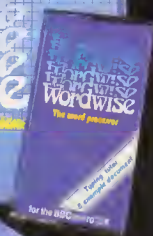
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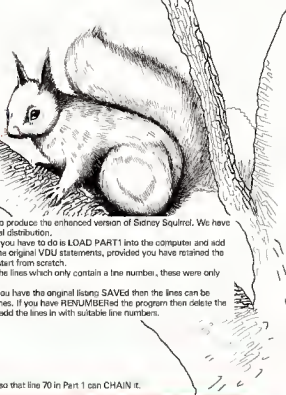
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# SIDNEY SQUIRREL

## Enhancement



These listings contain all the additions necessary to produce the enhanced version of Sidney Squirrel. We have included all of Part 1 for anyone who missed the original distribution.

If you already have a copy on tape or disc then all you have to do is LOAD PART1 into the computer and add lines 120 to 300 inclusive. This will overwrite some of the original VDU statements, provided you have retained the original line numbering. If not then it may be easier to start from scratch.

All the REM statements can be removed, as can the lines which only contain a line number, these were only used to separate the Procedures in the listing.

The same method should be used with Part 2. If you have the original listing SAVED then the lines can be simply added and they will overwrite some of the old lines. If you have RENUMBERED the program then delete the contents of the following PROCEDURE DEFINITIONS and add the lines in with suitable line numbers.

PROCsqürel	1460 & 1470
PROCacorn	1520 to 1560
PROCchaser	1650 to 1710
PROCchpr	1760

The enhanced version should be SAVED as "PART2" so that line 70 in Part 1 can CHAIN it.

**Part 1**

```

10
20 REM *****
      * ACORN (PROC1)
      * STEN
MS *
EY SQUIRREL *
  * PART 1 *
      *****
30
40
50 ONEPROR IF ERR=17 RUN ELSE
PRINT "":REPRORT:FRINT" at line
"ERR:END
60 MOUE 7:PROCI:st:PPOLine
70 CHAIN"PART2":END
80
90
100 DEFPROCint
110 VDU23,224,2,7,76,38,751,62
,26,56
120 VDU23,225,0,0,0,64,0,0,0,0
130 VDU23,226,64,224,50,100,22
3,124,56,12
140 VDU23,227,0,0,0,2,9,0,0,0
150 VDU23,228,32,32,128,192,96
,32,0,0
160 VDU23,229,0,64,96,32,128,6
4,32,0
170 VDU23,230,0,96,32,128,192,
96,32,0
180 VDU23,231,32,0,192,96,32,0
,0,0
190 VDU23,232,0,0,0,3,28,0,0,0
200 VDU23,233,0,0,0,30,0,0,0,0
210 VDU23,234,0,0,28,2,0,0,0,0
220 VDU23,235,0,28,0,2,0,28,0,
0
230 VDU23,236,0,0,30,29,30,0,0
,0
240 VDU23,237,0,28,30,29,2,78,
0,0
250 VDU23,238,0,28,30,1,30,28,
0,0
260 VDU23,239,0,28,2,29,30,28,
0,0
270 VDU23,240,60,126,66,126,90
,102,126,60
280 VDU23,241,0,0,0,0,36,24,0,
0
290 VDU23,242,0,0,40,0,0,0,0,0
300 VDU23,243,0,0,2,0,0,0,0,0
310 VDU23,253,0,0,0,36,254,36,
0,0
320 VDU23,254,0,32,116,218,1,2
18,116,52
330 VDU23,255,255,,55,255,255,
255,255,255,255
340 ENVELOPE 1,2,3,-6,3,1,1,1,
127,0,0,-127,126,126
350 ENVELOPE 2,4,-8,4,-12,1,1,
1,127,0,0,-127,126,126
360 ENDPROC
370
  
```

```

380
390 DEFPROCtitle
400 PROCLtitle:PRINT " Sidney
the Squirrel is getting ready 4
or winter. He has to go out every
day to collect his favourite
food.":CHR#13:"ACORNS":CHR#13:
"."
410 PRINT " He lives by a large
lake, frozen, lake from which he can
not escape and, as he has no foot
s to cross the lake. The ice he
lives behind him so he can not cross
his trail":
420 PRINT " To make life even
more difficult there are many leaves
scattered around on the ice
and if he steps on one of them
he will slip and possibly kill
himself. He only has three lives
."
430 PRINT " you must guide Sid
ney around the ice, collecting":
CHR#13:"ACORNS":CHR#13:"and st
opping him from slipping up. To
help you Sidney has enough en
ergy for just one jump, but he
could land anywhere."
440 PROCcont:PROCLtitle
450 PRINT " Be VERY careful!!
Now you guide Sidney, if he appro
aches the":CHR#13:"ACORNS":CHR#
13:"too close": he will lose his
chance of getting another
."
460 PRINT " If there was just one
more occasion!! Tonight will be
the last and Sidney will not be able
to see how much time he has left
."
470 PRINT " Watch out for the
fall keeper, he will help you he
is going to sweep up the leaves
but if he catches you..."
180 PRINT "Kiss..." * * * Le
t's go to bed tonight" * * * Up
to you to choose" * * * P. Faise
[ * * * * * ] * * * [SPACE] * * *
]
490 PROC cont:ENDPROC
500
510 PROC title
520 CLS:FOR C=1 TO
530 PRINT TAB(2,0),CHR#114):CHR#
127:" ACORN PROGRAMS"
540 NEXT:ENDPROC
550
560 PROC title
570 PRINT:CHR#133:CHR#176:"
Press SPACE BAR "
580 REPEAT UNTIL BE=(3):ENLPRO
C.

```

## Part 2

```

1460 IF DIRX=1 VDU 25,4,AX;BX;1
8,0,1,224,8,18,0,0,225
1470 IF DIRX=2 VDU 25,4,AX;BX;1
8,0,1,226,8,18,0,0,227
1520 IF CX=1 VDU 25,4,AX;BX;18,0
,3,237,8,18,0,6,234,8,18,0,0,228
,8,18,0,1,229
1530 IF CX=2 VDU 25,4,AX;BX;18,0
,3,238,8,18,0,6,233,8,18,0,0,230
,8,18,0,1,231
1540 IF CX=3 VDU 25,4,AX;BX;18,0
,3,239,8,18,0,6,232,8,18,0,0,229
,8,18,0,1,228
1550 IF CX=4 VDU 25,4,AX;BX;18,0
,3,236,8,18,0,6,235,8,18,0,0,231
,8,18,0,1,230
1650 CX1X=CX+64*((CX)>XX)-(CX
<XX);CY1X=CX+32*((CY)>YX)-(CY
<YX)
1660 CNUX=POINT(CX1X,CY1X)
1670 IF CUX=6 VDU 25,4,CX;CY;1
8,0,6,255
1680 IF CUX=7 VDU 25,4,CX;CY;1
8,0,7,255
1690 PROC chpr(CX1X,CY1X)
1700 CUX=CNUX:CX=CX1X:CY=CY1X
1710 IF CUX=XZ AND CY=YX F=TRUE
E
1760 VDU 25,4,AX;BX;18,0,7,240,8
,18,0,1,241,8,18,0,8,242,8,18,0
,15,243

```