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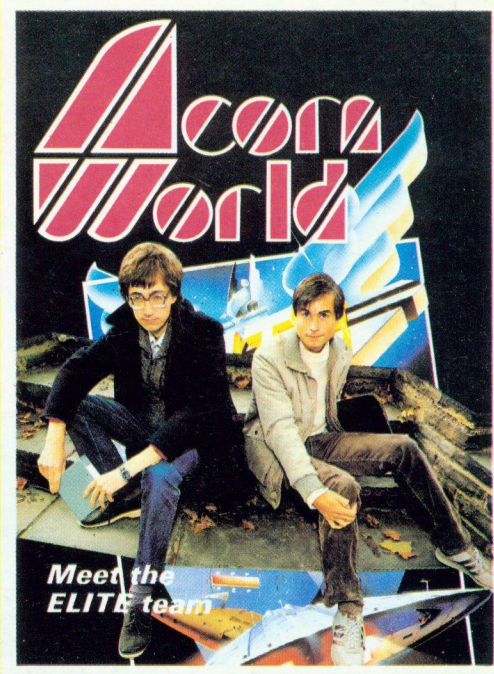
**Shopping for
Christmas down
Memory Lane**

**Bumper software
reviews**

**Best program
listings**

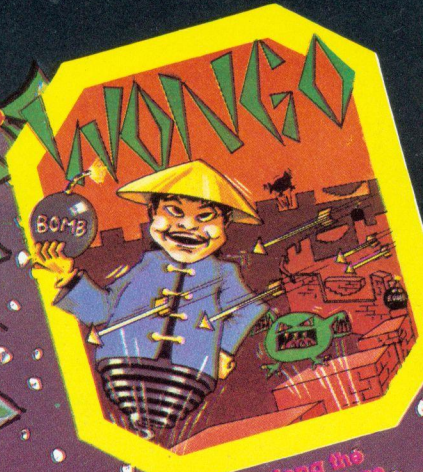


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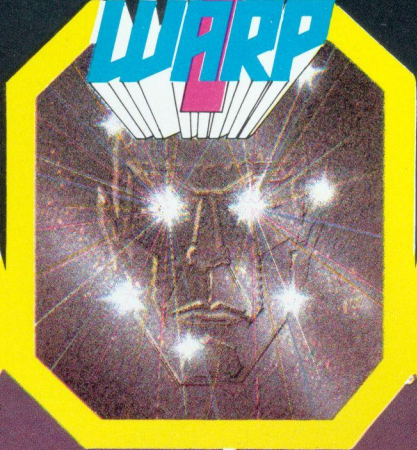


Meet the
ELITE team

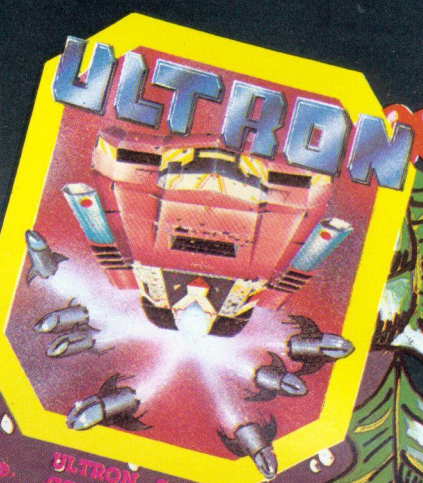
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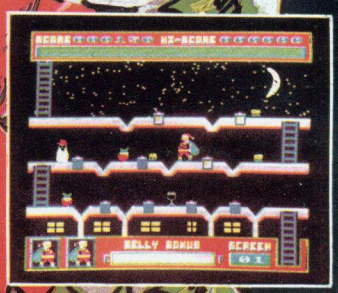
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Acorn programs

Incorporating
Acorn World

Wider coverage of Acorn scene

MANY READERS will have noticed a gradual change of emphasis in *Acorn Programs* in the last few months. We believe that as the base of BBC and Electron computers spreads and consolidates, our readers want, as well as listings and programming advice, an accurate and up-to-date appraisal of latest developments in the Acorn market. To bring you this wider coverage, we are launching a new section called *Acorn World* — see centre pages.

Christmas would not be Christmas without a thorough survey of the software scene and this month's magazine includes, besides a record five pages of reviews, a nostalgic tour by Martin Cooper of games past and present which deserve a special place in any software library — page 16. Do not miss our great Christmas competition on page 19.

Once again, we have a bumper crop of readers' programs and a selection of the best begins on page 23.

When sending your programs, please remember to include a brief description and a SAE for the return of the disc or tape if it is not selected for publication. All programs must also be accompanied by the coupon on page 46 or by a letter stating that they are entirely your own work.

The Editor

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Telephone, all departments: 01-359 3525. If you would like to contribute to *Acorn Programs*, please send programs on disc or cassette to *Acorn Programs*, ECC Publications, 2 Newington Green Road, London N1 4AQ. We cannot undertake to return them unless a stamped addressed envelope is enclosed. We pay a basic rate of £15 for the copyright of each program published.

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COMPUTING EVENTS

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Foreign sales hamper growth

ACORN COMPUTERS announced record profit of £10.5 million for the year to July 1, 1984. Profit in the U.K. was £14 million, representing an increase of 58 per cent over the previous year, but overseas sales, especially in the U.S., fell below expectations. Commenting on the figures, Acorn chairman Hermann Hauser said:

"Despite our disappointment with the overseas performance, we consider the figures demonstrate a satisfactory rate of growth."

With the population of BBC micros in the U.K. now around 370,000, and sales of the Electron reaching 90,000 since its launch in October, 1983, Acorn predicts another major business boost from sales of both machines in the Christmas period.

"The main growth area in 1985, however, is expected to be the sale of upgrade and expansion facilities for the large installed base of computers," says Hauser. "Sales of the recently-launched ABC

business range will be the second area in which Acorn is seeking to grow."

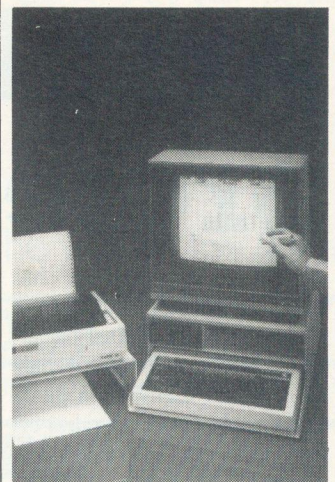
Meanwhile, the company has leapt into the future with a new subsidiary called Acorn Video. Based at Maidenhead, the company will be producing the world's first integrated interactive video disc system, the AIS.

"The aim is to exploit convergent technologies," explains an Acorn spokesman. "Instead of different parts from different makers, the

AIS will be sold as a complete system."

The new system has taken more than two years to develop. It uses one of the machines in the new ABC range and a Philips laser disc to create linked frames in computer-aided teaching and training programs.

Priced at around £3,000, the AIS is expected to attract large educational establishments as well as companies running staff training courses.



Drawing room package

A COMPUTER-AIDED schematic drawing package aimed mainly at home users has been launched by Datapen Microtechnology Ltd.

Armed with the disc-based software, a Datapen light pen, a BBC micro and a dot matrix printer, a user can produce complex circuit diagrams, power system diagrams, flowcharts and other professional and engineering applications.

Up to eight computer screens can be dumped to the normal 80-column printer in one pass.

Costing £19.95 for the software and £25 for the light pen, the package is available by mail order from Datapen Microtechnology Ltd, Kingsclere Road, Overton, Hampshire RG25 3JB.

Eastern push

AS PART of an overseas sales push, Acorn Computers sent a representative on a trade mission to the Gulf States.

Derek Lee, regional manager for the Middle East,

hopes to promote a new Arabic version of the BBC micro, with an Arabic and European text processor and Arabic keyboard. Acorn has its sights set on the Middle East educational market.

BBC B TOP TEN

	Title	Company
1	Elite	Acornsoft
2	Frak!	Aardvark Software
3	Fortress	Pace Software
4	Micro Olympics	Database Publications
5	Aviator	Acornsoft
6	Stock Car	Micro Power
7	Wallaby	Superior Software
8	Smash and Grab	Superior Software
9	Ghouls	Micro Power
10	Dune Rider	Micro Power

Figures supplied by W H Smith

Logo chip

A ROM-based version of Logo for the BBC micro has been released by Logo Software Ltd. Developed in the last two years, LSL Logo is written in Assembler and fits on to a single 16K EPROM chip. An optional utilities disc provides the software needed to run turtles and the BBC Buggy. The makers claim that it is fast and easy to debug, with nine debugging commands and 22 error messages. A free 16-page booklet, entitled Why Logo? accompanies the product.

LSL Logo is available by mail order from Logo Software Ltd, 316a Richmond Road, Twickenham, Middlesex TW1 2PD. It costs £67.85 including VAT.

Development system

BBC micro owners will be able to use the P-system operating system which has already made its mark on other micros such as the IBM PC and the Apricot.

Marketed by Acornsoft and developed by TDI, the £299 package includes filer, editor, utilities and compilers for UCSD Pascal and Fortran 77. To implement, the system requires a BBC micro with a 6502 second proces-

sor, disc filing system and 800K dual disc drives.

TDI is the main distributor of the P-system, which was written in the U.S. "P-system provides a highly-productive development environment," says a TDI spokesman. Programs written using the P-system are portable to other micros and it includes automatic functions to trace errors.

The Open University has

already expressed interest in the system and other teaching establishments are expected to follow suit. Acornsoft claims that its version provides the cheapest way to learn Pascal.

The system is also aimed at software houses, business users and home micro enthusiasts. A run-time system is available from TDI, 29 Alma Vale Road, Clifton, Bristol.

More news on page 6

Breakdown protection

A NEW organisation has been set up to protect home computer users against breakdown. The Micro Repair Club offers members a guarantee package which takes effect when the manufacturer-provided warranty expires. The repair-guarantee package may run from one to four years. The initial year costs £24.95 and yearly renewals cost £14.95. The four-year subscription costs £57.95.

Club members are guaranteed a repair service plus free parts should a computer break down and membership is transferrable to any other computer which may be bought during the subscription period.

Thorn-EMI will be doing the repair work for the Micro Repair Club. The service is aimed at users of all micros but dealers can also benefit, since they will earn commis-

sion on every new subscription secured from a new computer owner.

The Micro Repair Club also offers a special discount to schools. Any school wishing to join pays one membership fee of £24.95 for a year and another £19.95 for each additional computer covered by the scheme.

"Considerable interest has already been shown in the club, particularly by dealers" says general manager Simon Jamison.

The Micro Repair Club is hoping to extend the warranty to cover peripherals and also theft. If a computer becomes obsolete while covered by the guarantee the club will re-imburse the original cost.

For more information contact Simon Jamison, The Micro Repair Club, Swan Court, Mansel Road, Wimbledon SW19 4AA. Tel: 01-946 7777.

Improving figures good for business

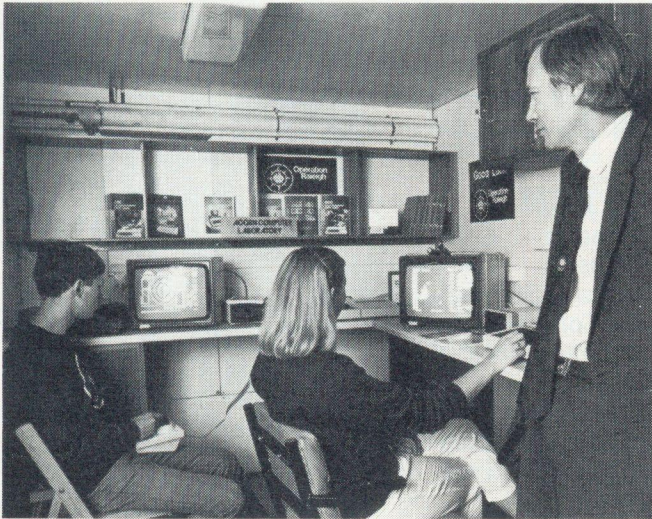
SLIMMERS provide a promising new area for Acornsoft marketing efforts. A new program, **Watch Your Weight**, produced jointly with the Consumers' Association, is designed to help the figure-conscious maintain their shape and health.

Supplied with a calorie calculator, the program provides a personalised weight-loss schedule based on the individual user's height, weight, age and sex. The program suggests a target weight in each case and the number of weeks the dieter should take to reach it.

It also advises on the nutritional value of various foods and recommended daily intake of substances such as fat and fibre. Helpful menu suggestions to tempt the overweight into healthier ways are also included.

Available on cassette, the program costs £11.90.

BBC micros help to blaze the trail



On board the Sir Walter Raleigh

YOUNG EXPLORERS on the Operation Raleigh expedition which set sail on October 13 will be using BBC micros on a variety of projects ranging from studying the rain forests of Costa Rica to analysing crocodile population in Roatan.

Eleven BBC machines form part of a satellite-linked laboratory on board the Sir Walter Raleigh expedition flagship. Seven will be used in the field during the course of 150 research projects planned for the four-year journey.

The remaining systems will help with the adminis-

tration of the expedition and also relay data via satellite to scientists at Leeds University.

"Of the 4,000 young people taking part, many will be using computer technology for the first time," says an expedition spokesman. "The machines will also be subjected to unprecedented extremes of heat and humidity."

One typical research project will be a study of plant and animal life in Bolivia, where the computer system will be used to catalogue artefacts and log and process data.

Competition winner

We were inundated with answers to the code-breaking competition in our October issue. The winner of the Plus-1 prize will be the author of the first correct entry drawn from a hat. Do not miss the announcement in our January issue.

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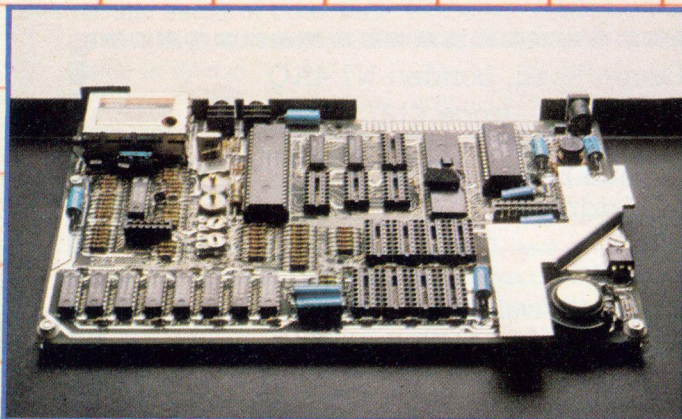


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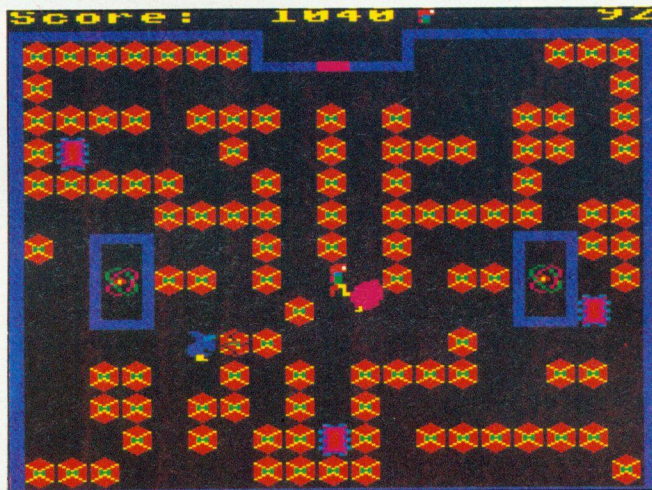
SU/12/84

Difficulties of the highest level

MANY PEOPLE will be familiar with an arcade game featuring a penguin and blocks of ice. Never the easiest game to get into and score well on, most are easy compared to **Plutonium Plunder**.

What you have to do is to clear a path through the maze of hexoid pods and then push the radioactive plutonium canisters behind the safety barrier before the nuclids and megapods break out of their cells to get you. That does not sound too difficult, but now for the bad news. There are a few fundamental obstacles missing from that brief introduction — and it is a description only of level one.

Before you can begin clearing any kind of path, you have to get rid of four devilish little gnomes. Stunning them is not sufficient; you have to crush them to death by pushing a hexoid forcefully at them. If you manage to get all of them you can start the path-clearing, and then the pushing of canisters.



As you begin to think you have it in the bag, the safety door closes and more hexoids appear by the dozen. If that is not enough, the nuclids and megapods break loose from their cells and you are doomed.

The game can be very frustrating. Lives are lost with sickening regularity. It takes a long time to die and be reincarnated and then, once reborn, you find yourself back at the beginning facing four more nasty little gnomes.

There is nothing very original about the graphics. They are attractive but you will have seen most of the ideas somewhere before.

The game is overwhelming for anyone below the rank of expert. Level one alone is as difficult as the highest levels on some other games. You will not be surprised that we never reached the higher levels.

Plutonium Plunder, Micro Power, BBC B, £6.95.

Space Invaders responsible

SPACE INVADERS has much to answer for, including **Galactic Firebirds**. It may be more colourful, smoother and have a greater variety of invaders but it is still Firebirds dressed up as Galaxians.

The game does not start well. Disc drive users, and there are many, may cease trying to load the game. The cassette instructions omit to indicate that you should re-set PAGE, which may be a good idea as the first puzzle in an adventure but is not welcome in an arcade game.

Your ship, a relic from MODE 7, appears at the bottom of the screen and a line of blobs descend from the top, circling and dropping bombs. Large blue blobs buzz round and fire yellow rays at you

and little vs drop on you, spreading green death as they impact the bottom of the screen. Bombs need two hits, the blue things three and the pink squares only one.

It is colourful but there is little to entice you to higher levels where there are more blue blobs and fewer ships.

Galactic Firebirds, Software Invasion, BBC B, £7.95.

Smooth and satisfying

IN ROCKY, you must destroy mutant robots by dropping rocks on them. They patrol a grid of five intersecting horizontal and vertical paths. Rocks are deposited on the top path. The robots move at random and emit a beam of yellow light; if you are caught in the beam you lose strength and, if not carrying a rock, the robots mutate into creatures known as spectres and crunchers.

Spectres chase you and

crunchers eat rocks. The number of robots increases with each identical screen; you move to a new screen when you have hit all the robots on the head with a rock.

The game is well-implemented, with good, smooth graphics and some pleasant touches with the scoring. The sound is appropriate and not too grating but lacks excitement. Positioning yourself above a vertical path to

Marsupial promise unfulfilled

WALLABY is another spin-off from the Killer Gorilla theme. For the uninitiated, it entails surmounting a number of floors to reach the top floor where, in the case of **Wallaby**, a young imprisoned marsupial is awaiting your arrival.

You have to manipulate a bouncing wallaby up ladders, over gaps in the floor and attempt to pick fruit en route. There is also a vicious breed of monkey inhabiting the screen area.

The creatures attempt to kill the wallaby by throwing apple cores. Should the little hero make contact with a monkey or an apple core, instant death results.

There are five screens, each increasing in level of difficulty. Points are awarded for picking fruit and punching the odd bell which seems to appear at various levels. An extra wallaby is awarded for every 10,000 points gained.

The control keys are fixed and there is no facility to re-define them.

The title page of this program with its rendition of *Waltzing Matilda* seems promising enough. The game itself, however, is not, but perhaps our antipodean friends would find it interesting.

Wallaby, Superior Software, BBC B, tape £7.95.

drop a rock requires a deft touch with the joystick or keyboard. The best strategy seems to be to wait in a top corner with a rock — and hope.

There is a flashy high-score table and the sound can be turned on and off but there is no pause facility.

Rocky, Superior Software, BBC B, £7.95.

More software on page 10

Five go into one

FIVE ACTIVITIES are provided on **Mathspack**. Each is LOADED separately. **Windmills** is a two-player game testing addition or subtraction or both, with target numbers ranging from five to 30. The sums appear on one of two windmills and each player has to answer in turn.

Abacus illustrates the notion of adding and subtracting large numbers in a graphic way.

In **Fractions 1** two circles are shown, one with a section coloured and one with all segments marked. Questions are formulated thus: 'One fifth = how many 30ths?'. **Fractions 2** continues on the same theme.

Balloons has a choice of nine types of arithmetic problems ranging from easy, '2+4=?', to the much more tricky '14+5=13+?'. It is a two-player game like **Windmills** but this time hot air balloons are divided into segments.

Windmills and **Balloons** are two adequate testing devices for addition and subtraction up to a certain level. **Abacus**, **Fractions 1** and **2** attempt to explain difficult mathematical concepts and it is doubtful whether a child would achieve much greater understanding by using the programs without the aid of an adult.

Mathspack, Ega Beva Software, BBC B. £11.95.



The trouble with Claude

HAS the producer of **Uncle Claude** been inspired by the head of another electronics company whose first name begins with CL? When you hear what happens in Claude's factory, you will hope not.

This is a workers-against-boss story. The workers employ you, **Micro Micky**, to smuggle the electrical goods from **Uncle Claude's** factory before he can raise the price and put the workers out of jobs. Claude hears of your plan and sets out to prevent it succeeding. Your task is to shunt the various electrical items, ranging from strip plugs to cruise missiles, on to a conveyor belt.

For players eager to make their mark at the top of the scoring chart, stunning **Uncle Claude** by knocking him out with one of his goods is

the best way. Remember that you can hit Claude from below as well as above, and there is no limit to how often you stun him per level.

Unfortunately, **Uncle Claude** can get you, too, by firing lethal nasties called **umstrads**. One of the most attractive features of the game is the ambulance which arrives post-haste to whisk you to hospital before you have barely touched the ground. There is also refreshingly little waiting time between lives.

The first two levels are not very challenging but from level three things become gradually more interesting. The graphics are good. Apart from the already-praised ambulance, special mention must go to the likeable **Micro Micky**.

Uncle Claude, Alligata Software, BBC B, £7.95.

Attacking divisions

SIX PROGRAMS are provided in **Frac Attack** on the understanding of fractions. They are all LOADED together and the user can choose which game to play from the menu. The motivation is provided by the games being based on arcade-type action.

The game **Frac Attack** shows the method admirably. The sum is given, for example threequarters of 24, and the player has to bomb two incorrect answers as they pass across and then rescue the correct answer.

In **More or Less** the player has to ENTER the signs < = >. That is simple on level 1, as not only are the two fractions relatively easy to assess but help can be given in the form of questions. For example, you are shown $\frac{3}{5}$ and $\frac{1}{2}$ and are asked 'is $\frac{3}{5}$ greater than $\frac{1}{2}$ '?

Beamup is useful for estimating fractions. A grid is shown and questions asked, for example is the red space $\frac{1}{3}$ of the shape. The player has to press y/n and then the next number will appear.

Scores of correct and incorrect answers and number of attempts are displayed after each session. With testing routines which have the added excitement of the arcade, **Frac Attack** is ideal for testing both the concepts and the practice of fractions.

Frac Attack, BBC B, Study Software, £6.95.

Thrills and spills are sure to please

ALIEN BREAK-IN is yet another rip-roaring arcade game. It has been described as "a real action shot of a game" and it is just that. You are faced with an almost impossible task, to defend Earth from the onslaught of the Zargon fleet which seems determined to launch a number of lethal missiles at your base.

If that was not sufficient, the mother ships, which are

indestructible, lay pods which hatch into deadly creepy-crawlies on landing. The only defence against successfully hatched-out pods is to dig one of five holes in the sub-strata to trap the nasties. To encourage the chaos, other ships peel off from the main fleet and dive towards the holes made in the defences. The successful ones mutate into motherships.

Simple control keys can be re-defined from the initial menu page. Joysticks may also be selected. A high-score table of five players is displayed on the page, as is the option to switch off the sound. The program also features a freeze/unfreeze facility to enable you to collect your wits.

The only criticism concerns the number of spelling

errors in the on-screen instructions.

For fast and furious action the game will please. When you think you have mastered level 8, try running the program on a BBC model B. The speed on level 8 has to be seen to be believed.

Alien Break-in, Romik Software Ltd, Electron, tape £6.99.

More software on page 12

Ain't She Sweet



AND WITH A VERY TRIM LITTLE FIGURE £159.00 (and Packing)

The Bevan Nymph 3-inch Compact Floppy Disk Drive is tailored for use with your BBC Micro and is compatible with all disk interfaces and comes complete with cables, comprehensive manual and utilities disk.

The Nymph has been developed by Hitachi and its rotation speed, data transfer rate, recording capacity per track and other specifications are designed to be the same as those of the conventional 5.25-inch drives and is therefore, fully compatible.

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Dangerous explorations entertaining

SADIM CASTLE and Valley of the Kings are two text-only adventure games which create very different landscapes to be explored but much the same grisly end for the unwary.

The imagination of the writers seems to run to Gothic horror rather than sword and sorcery. **Valley of the Kings** is set in an arid desert where a group of archaeologists search for the lost pyramids of Kaculud. Their camp is deserted, apart from a few Arabs and some very unhygienic camels, and before you can set out on your search for the treasure you have to find sufficient water to survive.

In **Sadim Castle** the atmosphere is sufficiently damp and misty. Your quest is to lay the ghost of the beautiful Lady Sadim, walled-up years before as punishment for infidelity. Both are real-time games, which usually means that if you spend too long thinking about your next move something nasty happens. In practice, the action is updated every 30 seconds or so but there is a freeze option to allow for map-drawing and cups of tea.

Both games feature a TALK command which enables you to extract information from the characters

you meet on your travels. It is not much use in Valley of the Kings, since none of them speaks English. You may, however, stumble across a book entitled Speed Learn Dead Languages. Pick it up — it is very handy.

Neither game is of the bash-'em - and - hope - for - the - best variety. In Sadim Castle you are advised to be kind and helpful to everyone you meet and it pays. Of the two, Sadim Castle is the more satisfying to play, not least because you survive longer — most options in Valley of the Kings prove to be fatal. It also has a fascinating Russian doll structure of landscapes within landscapes.

Sadim Castle and Valley of the Kings, MP Software, BBC B.

Colourful motivation

KOSMOS SOFTWARE has launched a follow-up to its Answer Back Senior Quiz. Sensibly packaged, **Answer Back Junior Quiz** has a master program and 15 well-researched quizzes on general knowledge topics. Subjects include nature, science, spelling, music, books, games and sport.

Correct answers are rewarded with a chance to save the princess from a dreadful



Excitement behind a dull facade

WHATEVER happens, do not reject **Copter Capers** because of the blurb and picture on the cassette cover. Beneath that dull and old-fashioned exterior lurks a genuinely bright and exciting new game.

As a helicopter pilot, your mission is to pick up survivors from a shipwrecked fishing boat. Then, from

nowhere in a calm, blue sea and sky, appears a series of war machines intent on shooting you down — airships, submarines and heat-seeking missiles. Luckily, you find you can shoot back, so the zapping starts.

One small piece of advice which is not sufficiently clear from the copious instructions which appear before the game is that you have to land each survivor on the island at the left of the screen before you can pick up and save the next desperate fisherman. Many lives can be lost discovering that vital snippet of information.

The excitement and interest are from the combination of zapping plenty of baddies and manoeuvring your helicopter to pick up survivors and land them safely with pinpoint accuracy.

From a gentle and confidence-boosting first two levels you move up a gear or two on the established game and new, more demanding features are introduced. Impressive is the word to describe the graphics. Every feature is well-defined and realistic-looking but the prize for authenticity must go to the whirring helicopter noise which accompanies the game. Highly recommended.

Copter Capers, A & F Software, BBC B, £6.90.

Old theme alive and well

STAIRCASE STAMPEDE is a direct descendant of that old arcade favourite Q'Bert, give or take the odd change of cast and board shape.

As in so many variations on the theme, the object is to jump from square to square, changing the colour of each as you do so. Trying to prevent the successful accomplishment of your task is a villainous character called

Horrible Harold, who is assisted by a ticking bomb and a crushing boot.

Once you have mastered the rather unexpected keyboard arrangement — with the left forefinger moving you down to the right and vice versa — and also become accustomed to the fact that your character keeps moving even after you have ceased to press the keys, **Staircase**

Stampede is lively and entertaining, provided you are not looking for originality.

Graphics are colourful and amusing and the sound is effective. A pause facility and a choice of start levels are other thoughtful details which help to keep a well-worn theme alive.

Staircase Stampede, Comsoft, BBC B, cassette £4.95, disc £6.95.

Assortment provides more variety but less spice

CHARTBUSTER, a collection of five games on one tape, sounds good but fails to live up to its name. **Eagle Empire** is the best of a mixed bunch. A variety of bird-shaped aliens swoop Arcadians-style on your scoutship. On the fifth screen you reach the Eagle Emperor but you have to blast a hole through the base of his citadel to reach him. This is an old friend from the arcades,

with brighter than average aliens and a ship equipped with shields and different fire rates at each level.

The display in **Web Runner** shows a spider's web, anchored to the edges of the screen at eight points and swarming with creepy-crawlies. You control the web-runner, a small vehicle which skids along the strands placing bombs in the corners. When the web is destroyed

you can move to the next level but the spiders are after your blood and, naturally, remove the bombs as fast as they can. There are eight screens of good, fast play, with centipedes, ladybirds and flies joining the action.

The other three games are makeweight. All are secondary by commercial standards. **Blogger** concerns the efforts of a burglar to open the safe in a rather improb-

able bank. There are the usual conveyor belts and obstacles—including bushes, animated mouths and things which look like rotating toffee papers — and he expires at the end of a time limit. The graphics look rather cramped, being confined to the top two-thirds of the screen, and the animation is irritatingly imprecise.

Neanderthal Man is a maze game involving a caveman who must find food for his family while avoiding prowling monsters. At the beginning of each round the food — hamburgers, roast turkey and boiled eggs — falls from heaven and lodges at various levels in the maze. The caveman has to kick it down from level to level until it finishes in his den at the bottom. From time to time one of his children wanders into the maze and has to be rescued. **Monaco** is a road race game with little to commend it except the kamikaze ambulances which barrel up from behind, knocking everyone aside.

The overall verdict is that there is plenty of variety and it is perhaps worthwhile as an introduction to games-playing but one well-tryed program which would hold its appeal might be better value.

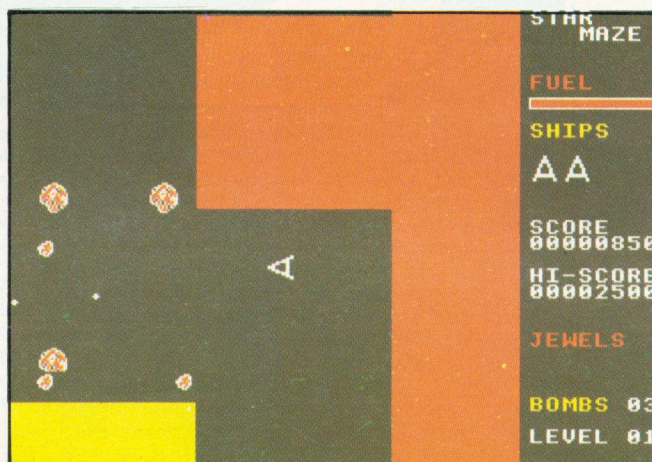
Chartbuster, Alligata Software, BBC B; cassette £9.95, disc £13.95.

Planning needed in space maze

STARMAZE takes the original game of Asteroids and brings it up-to-date. The asteroids are still there but now your ship is inside a big, colourful, maze which scrolls round you as you move as smoothly as Torvill and Dean dancing the Bolero.

The plot is simple. You are trapped inside the maze and you have to travel round it, finding lost jewels, which have to be returned to the mothership in the centre. Your fuel is limited and you can refuel only at the mothership.

Three types of aliens inhabit the maze, some more deadly than others, but your main difficulty is the maze. Touching the walls means instant destruction and so your control of the ship must be complete. You can rotate left and right or invert the ship



but your jets need time to increase acceleration; face in the wrong direction and you curve gracefully into the walls of the maze.

It is not a zap-everything-in-sight game but one where thought, planning and an appreciation of the laws of motion are needed. When you have to zap something

you have to consider how to turn, fire and turn again, while still avoiding the walls. You also have smart bombs as a panic measure.

All in all, a welcome change from having to stick down the fire button.

Starmaze, Software Invasion, BBC B, £7.95.

3-D race effects lack drive

THERE IS plenty of variety in **Overdrive** on which any budding James Hunt can cut his teeth. The cars race over five stretches of countryside, including night, snow and desert landscapes.

The controls are responsive, allowing positive acceleration and deceleration, as well as left/right movement. Good control of the car is vital, too, as the opposition

seems suicidally determined to prevent you reaching the finishing line.

A speedometer is provided but scoring is based on the number of cars you overtake. A bar counter at the top of the screen shows how close you are to qualifying for the next stage and points are deducted when you are overtaken. A collision brings your car to a standstill.

The 3D effects are disappointing. The road dwindles towards the horizon and other cars grow from tiny dots as you approach them but the main sense of movement is from the road markings flickering past. The five landscapes are not much more than different colours — white for snow, yellow for desert. All are featureless plains and the mountains on

the horizon never seem to get closer. Another disappointment is the lack of obstacles; there are no oil slicks and no bends in the road — the drawing on the cassette insert is misleading. It is a well-presented game for enthusiasts; other players may find it dull.

Overdrive, Superior Software, BBC B, £7.95.

More software on page 15

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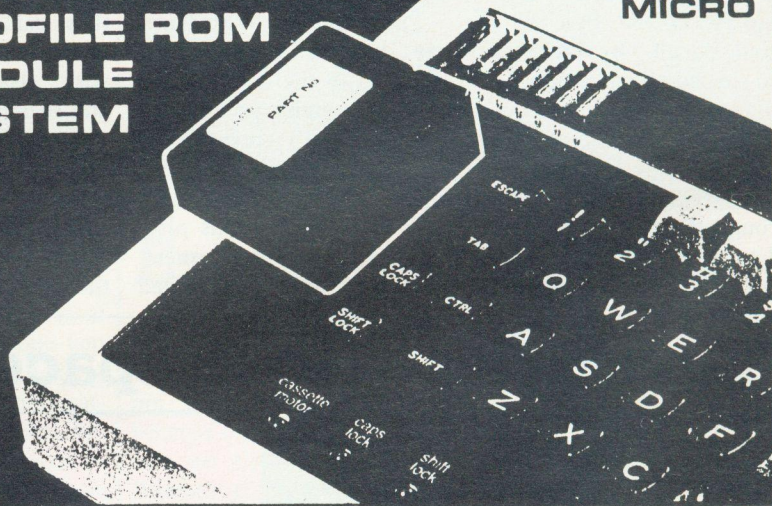
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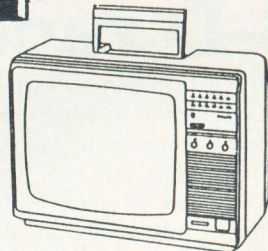
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Well-presented Swag is worth loading

IN SWAG, you are an armed robber out to steal £250,000 in diamonds — i.e., reach 250,000 points — ahead of your opponent, who may be another player or the program. You must collect the diamonds and take them to the cache in your house. To obtain ammunition, you must also collect gold and take it to the bank. Killer droids and police cars must be avoided.

That is a familiar scenario but this game succeeds in maintaining enough excitement to be worth loading. The droids, which with your

opponent are the main obstacles, act with menace but lack the killer instinct which can make this kind of game frustrating.

The animation is fluid and reasonably fast but the game-play would be improved if the robbers were to move a little faster vertically.

Moving on to a DH symbol, which appears at random, makes droids which were attacking you start attacking your opponent, and vice-versa, allowing a sneak comeback by a seemingly overwhelmed competitor.

Mode 2 is used, giving a colourful screen, with good graphics within the constraints of the resolution available. The presentation is excellent.

Joysticks may also be used. Unlike many programs, it will respond immediately to a request for a new game. The computer plays a reasonable game but could be a little more intelligent, as it can be beaten easily. As a to-player game it is better.

Swag, Micro Power, BBC B, £7.95.

Son of Trooper Trucker

SPACEMAN SID is an adequate if unremarkable version of Trooper Trucker which started life in the arcades. In it you play the part of Sid, driving his XR5 laser-armed combat Rover, whose throttle has stuck, over the surface of Tribos, zapping anything which moves and some things which do not, to reach the enemy base. That does not include the dreaded small rock and the even more menacing large rock.

The surface of the planet is littered with potholes which have to be jumped over, and in later levels meteors fall to create new holes. If you miss, are bombed by the alien scoutship or just generally blown up, you are faced with the wheels of the Rover flying off. You have only four spare sets.

Apart from the pleasant snatches of music, reminiscent of the cafe in Star Wars, this is an unexciting game, a kind of one-dimensional Miner 2049er in which you can shoot things. According to the inlay card the reason the aliens are out to get you is because at the start of the game you shoot an approaching drone. Even if you don't, they still bomb you.

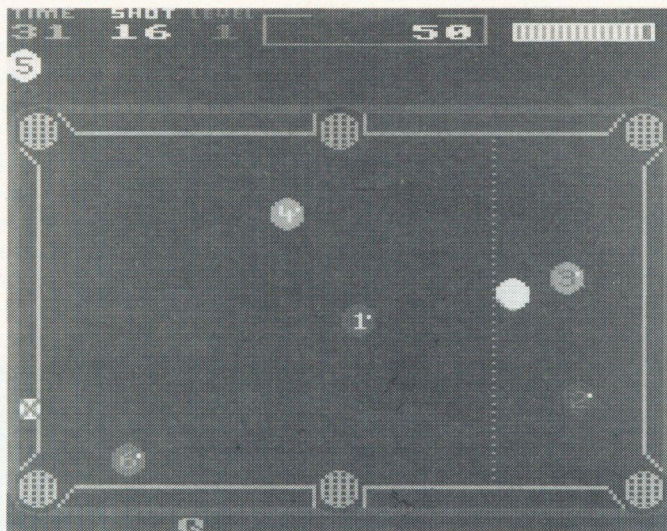
Spaceman Sid, English Software, BBC B, £7.95.

Real pool players abstain

SUPER POOL may not teach you much about pool but it is, nevertheless, an entertaining program. In it you are presented with a colourful pool table with six balls which you have to pot. You control your shot by moving a cursor round the outside of the table as an aiming mark and you can also alter the strength.

Each level comprises three frames. In the first you have to pot all the balls. The second requires you to pot them in order, and in the last you also have to hit them in order. To make life more difficult you have a limited number of shots per frame and only one minute to make the shot. Three foul shots are allowed in each game.

Because the screen can display only a limited resolution, that will affect the accuracy of the shots. Sometimes you need to make more than one shot, as you cannot get the angle you want. Cushion shots are particularly difficult, as are fine cuts. Often you can miss the object ball completely if you play to hit the cushion and ball at the same time. Also if you are used to playing pool or snooker, you will find it difficult to line up the shots, as



the normal method is to look down the cue rather than from the other side of the ball.

Real-life players will find it frustrating.

Super Pool, Software Invasion, BBC B, £7.95.

Me Andy Capp, you Jane

HOW CAN one find fault with a program which plays a pleasant tune as it loads? You have to negotiate **Tarzan** through four typical jungle environments, with their snakes, birds, monkeys, cheetahs, alligators, river logs, teeth, flying saucers and strange blue cylinders which go up and down. Tarzan can run in either direction and jump.

He can be controlled either

by a joystick or the keyboard. Each screen presents new obstacles to be overcome. The objective is, of course, to save Jane from an awesome but unspecified fate.

The difficulty with this type of game is that you have to go through the screens in the prescribed order — there is no 'practice' facility allowing you to try a particular screen. Tarzan is great fun, though, and very addictive.

The graphics are terrific; Tarzan looks more like Andy Capp but the cheetah in particular moves beautifully. Precise movement of Tarzan requires a deft hand but with a little practice he can be made to leap gaping chasms with ease. The sound lacks variety on the first two screens. The game has no high-score table.

Tarzan, Alligata, BBC B, £7.95.

Martin Cooper recommends a personal choice of vintage games

Look back in pleasure

BUYING a new game is a hit-and-miss business at the best of times but if you are a newcomer to the BBC or Electron, or if you have no micro and are buying a Christmas present for someone else, there is a good chance your money will be wasted. The game will be played for a time and then it will gather dust. As with books and records, so with computer games — a few are good, some are dreadful and most are somewhere between.

The difficulty is how to tell them apart. The sound, the movement, the sense of involvement a really good game generates is difficult to describe on a 6in. x 3in. piece of card for a cassette insert. Most software houses do not try, so packaging can be very misleading. Few inserts have screen dumps to show what the game looks like and the fad for storyline introductions only muddles the issue.

So how do you cope when faced with a shelf full of cassettes? One approach is to find a shop which will let you play before you buy. Even if you are not a games-player, you will be able to watch the other customers and form an opinion. Unfortunately, it is usually only the small specialist shops which are flexible enough for that kind of luxury.

An alternative is to buy a few magazines and read the reviews and Top Twenty tables. The difficulty there is that only the most recent games are mentioned. Many of the classics have been around for two years.

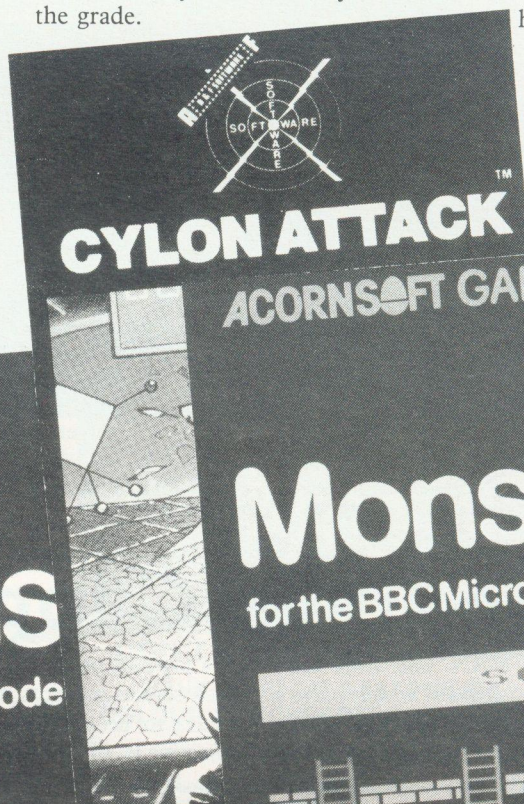
So here are a few suggestions about games which seem to have "the right stuff". Those listed all deserve a place between the user guide and the welcome pack on all games players' shelves. Most have been available for some time and were tried and tested in the amusement arcades before they found their way to the home computer. They are the kind of games you can re-discover after putting them aside for a month or two and well worth the investment of a few pounds. Two are more recent releases but they look as if they will make the grade.

However many new releases reach the shops, people still write to magazines boasting of their latest incredibly high scores on **Arcadians**. It is a familiar space invaders format. The player's ship moves from side to side at the bottom of the screen while the attackers mass at the top.

Instead of lumbering downwards dropping bombs, the Arcadians swoop, singly or in formation. There are four types of alien and a variety of attack patterns, with extra defending ships at intervals. An open-ended game, it will continue indefinitely for as long as you manage to stay alive, the Arcadians becoming faster and more aggressive with each succeeding screen. Options: joystick, two players, sound on/off. High-score table.

If you are tired of zapping aliens, **Aviator** may be the answer. It is a flight simulator based on the Mark II Spitfire single-seater fighter which went into service in 1940. The display shows the complete aircraft instrument panel down to the rivets, and the pilot's view forwards drawn in 3D line graphics.

If you can get off the ground, the simulation is frighteningly real and the accompanying handbook warns that you should expect to spend some hours "in the air" before getting the feel of the controls. When you become accustomed to it you can test your skill by trying some aerobatics or stunts like flying beneath bridges. If you really must zap those aliens there is a theme

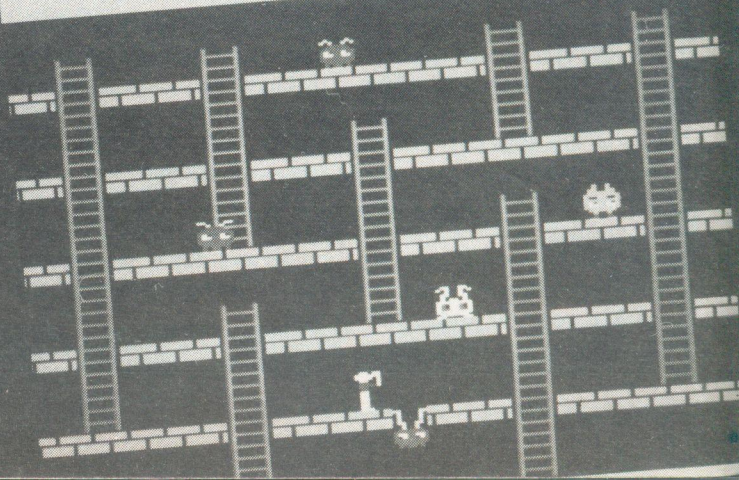


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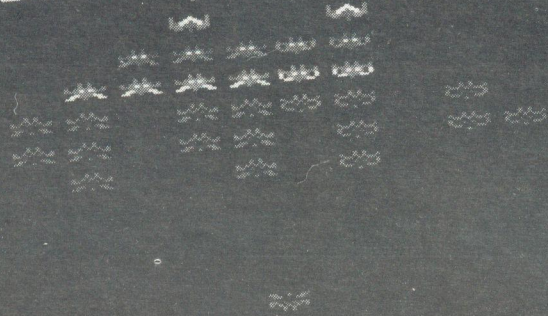
ACORNSOFT GAMES

Arcadians

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involving strange life forms which threaten to destroy Acornsville. Options: joystick, volume control. Manual and map supplied.

As an introduction to adventure games **Colossal Adventure** is difficult to beat. It is the original "hack and slash" adventure written in the '70s, according to folklore, by disenchanted programmers at an American university. The micro acts as your eyes and ears as you move through a fantasy world, presenting you with descriptions of your surroundings — it is a text-only game — and the results of any instructions you may have typed-in — GO NORTH, TAKE KEYS, GIVE DIAMOND TO DWARF. There are puzzles to solve and decisions to be taken at every turn but if you are stumped Level 9 Software will send a clue sheet to help you.

Cylon Attack is back to alien-bashing again but this time in 3D. You pilot the only interceptor on board a cargo ship which is taking supplies to Earth when it is attacked by the Cylon fleet. The display shows the forward view from your ship and as you bank and dive the starfield wheels past, bringing the enemy into view.

Your laser sights are in the centre of the screen, so you have to fly directly towards the Cylons to hit them. Their ships loom towards you and loose their energy bolts before swooping past — the effect is so convincing that you will find yourself ducking.

An instrument panel shows the status of shield and fuel supply. Both are used up gradually. Fuel can be replaced after locating the mothership and docking but the shields cannot. Options: joystick or two alternative sets of control keys; freeze game. The 50-place high-score table can be saved and re-loaded.

Frak! is a recent arrival which has gone straight into the best-seller charts and already seems to have a cult following. The graphics are extraordinary and the thinking behind the game is odd. A caveman wanders about a maze — which seems to consist of primitive ladders and tussocks of grass — collect-

ing jewels, light bulbs and keys. He has to avoid the pink balloons, which rise from below, and the daggers — thrown from the top right-hand corner — and also occasionally bumps into a woolly monster. All those hazards can be disposed of by skilful use of a yo-yo. The maze scrolls sideways as he progresses and there is a time limit. Frak! is a remark he makes each time he falls. Options: freeze action; sound on/off; high-score table.

A non-violent game which nevertheless manages to be highly addictive, **Hopper** must prove something. A frog has to be guided from the hard shoulder of a motorway at the bottom of the screen to a hole in a river bank at the top, dodging the traffic and hopping on to the backs of swimming turtles and floating logs to avoid drowning.

There are five holes to be filled, after which you move to the next screen, where cars move at an even brisker pace, turtles dive at inconvenient moments, and snakes and crocodiles patrol the river banks. Options: joystick; sound on/off; music on/off; high-score table.

There is a cinematic flavour to **Killer Gorilla**. A Fay Wray look-alike has been kidnapped by a giant gorilla, which is holding her at the top of a tall, unfinished building. Our hero has to

passages with a pack of **Monsters** after your blood, you have to trap them one by one before your oxygen supply runs out. The display is divided into a number of horizontal levels, connected by ladders.

Your little man is pursued up and down them by growing numbers of blob-like nasties but if he can find a breathing space he can hack a hole in the floor with his pickaxe and drop them through to the level below.

Unfortunately, even if a monster falls down a hole, it may climb out again, so the hole has to be filled to finish it off. Advanced players dig several holes, one beneath the other, and win extra points by making the monster fall through two or three levels. High-score table.

Based on the arcade favourite Defender, **Planetoid** must still be one of the most demanding shoot-'em-up games available. Your ship occupies the centre of the screen and can fly in either direction at any height above a scrolling landscape.

The inevitable aliens drift from above, intent on capturing the humanoids who potter helplessly about the planet surface. Your mission is to fight off the attackers and rescue any humanoids unfortunate enough to be seized.

One distinctive feature is the long-

'The inevitable aliens drift from above, intent on capturing the humanoids'

scale an assortment of ladders and girders to rescue her.

As he climbs, the gorilla rolls barrels at him. He can jump over them or, if there is a hammer handy, smash them. As if that were not sufficient, a bucket of red-hot rivets glides up the ladders behind him, waiting for him to make a false move. Even when our hero manages to reach the top of the screen the gorilla scoops up his captive and makes off to the next level. Options: joystick; sound on/off; high-score table.

Caught in a system of underground

range scanner at the top of the display which makes it possible for the action to take place over a much wider terrain than usual. Another open-ended game, never the same twice running. High-score table.

Snapper is an excellent version of that grandfather of all arcade games, Pac-man, so familiar that any description seems unnecessary. It is one game which should be on every micro owner's software shelf, even among the spreadsheets and databases.

Arcadians, Acornsoft, BBC B, cassette £9.95, disc £11.50; Electron, £9.20.

Aviator, Acornsoft, BBC B, cassette £14.95, disc £17.65.

Colossal Adventure, Level 9 Computing, BBC B, £9.90.

Cylon Attack, A&F Software, BBC B/Electron, £7.90.

Frak! Aardvark, BBC B, £8.90.

Hopper, Acornsoft, BBC B, cassette £9.95, disc £11.50; Electron £9.20.

Killer Gorilla, Micro Power, BBC B, cassette £7.95, disc £9.95; Electron £7.95.

Monsters, Acornsoft, BBC B, cassette £9.95, disc £11.50; Electron £9.20.

Planetoid, Acornsoft, BBC B, cassette £9.95, disc £11.50; Electron £9.20.

Snapper, Acornsoft, BBC B, cassette £9.95, disc £11.50; Electron £9.20.

frak!
aardvark



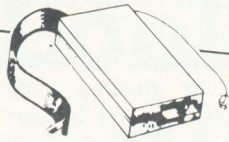
PROGRAM
POWER
BBC MODEL B
KILLER GORILLA





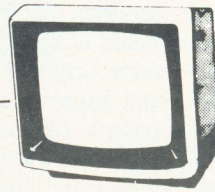
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BEASTY

& Four Fabulous Movits

are waiting to be won in our great Christmas competition. *To make sure Acorn Programs readers move with the times, our prizes open the exciting new world of robotics and automation.*

The winner of the competition will receive a Beasty interface from Commotion, together with two S128 servos — worth a total of almost £60. Plugged into a BBC model B with OS version 1.0 or above, the Beasty and servos can twist, open, close and generally manipulate objects under computer control — the ideal introduction to robotics.

The four runners-up will each receive one of the Prism Movits, ranging in value from £35 for the Memocon Crawler to £18 for the Line Tracer.

All you have to do is to solve the great Christmas Party Conundrum. You could do it with pen and paper but it might take you a very long time. So put your BBC or Electron to work and write a program to find the answer, which will consist of two separate numbers.

Solutions must be sent on the coupon on this page. Winners will be announced in our March issue, when we will also publish the Christmas Party Organiser's program and solution. Prizes will be awarded to the first five correct entries drawn from a hat. Closing date for the competition is December 31.

The Christmas Party Conundrum

The organiser of the office Christmas party was having a difficult time. He couldn't find a venue big enough to accommodate all the staff. There would have to be two parties, at different places.

Each of the two venues had a different seating capacity, greater than 15, which had to be filled exactly. Unfortunately, each of the various groups of staff insisted on going as one undivided group to the same party. No matter how hard he tried, the organiser could find no way of doing this.

In desperation, he wrote a computer program to find the solution. And the computer said . . . there was no solution.

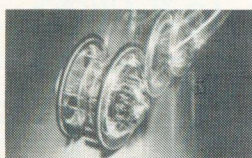
What was the seating capacity at each of the two venues?

The following groups work at the office:

48 engineers	8 cleaning staff
23 computer staff	5 telephonists
17 managerial staff	3 receptionists
11 secretaries	2 porters



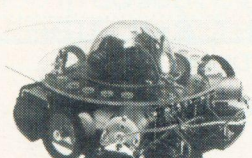
2nd prize
Memocon Crawler
Has its own keyboard and accepts a broad range of commands



3rd prize
Circular
Two independent wheels send it wherever you want it



4th prize
Piper Mouse
Obeys sounds picked up by its condenser microphone



5th prize
Line Tracer
An infra-red sensor will follow any course you plot

Send to: the Editor, Acorn Programs, ECC Publications, 2 Newington Green Road, London N1 4AQ.

The seating capacity of the two office party venues was:

Name:

Address:

.....
.....

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Employees of ECC Publications or their relatives are ineligible.

MICRO MART



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MICRO MART — THE BUY WORD FOR SELLING COMPUTERS

ALL A B'N

DO YOU have difficulty waking up in the morning? If so, Paul Sellers of Driffield, East Yorkshire wrote this program for the BBC B and Electron with you in mind.

After loading, plug the remote lead into the cassette recorder, put in some music and press Play. Set the 24-hour clock to the present time and the time at which you want to rise and the tape will be activated automatically to play at the appropriate hour.

```

K
510 VDU23;B202;0;0;0;
520 PRINT
530 PRINT"BY PAUL SELLERS OF D
RIFFIELD"
540 PRINT"TO USE THIS PROGRAM
YOU NEED"
550 PRINT"A CASSETTE RECORDER
WITH THE THREE PLUGS"
560 PRINT".i.e.EAR,MIC,REM. FIR
STLY CHECK THAT"
570 PRINT"YOU HAVE SOME GOOD M
USIC IN THE RECORDER"
580 PRINT"NEXT PLUG IN ONLY TH
E REM PLUG INTO THE"
590 PRINT"RECORDER . NOW SET T
HE VOLUME TO SUIT YOUR REQUIRM
ENTS. PRESS THE PLAY BUTTON DOWN
. NOTHING SHOULD HAPPEN"
600 PRINT"YOU ARE NOW READY TO
SET THE TIME ETC"
610 PRINT"REM THE CLOCK IS A 2
4 HOUR CLOCK"
620 PRINT"PRESS SPACE"
630 A#=INKEY#(0)
640 IFA#=" THEN.RETURN
650 GOTO630
    
```

```

10 GOSUB480
20 CLS
30 PRINT"PLEASE ENTER THE TIM
E IN HOURS"
40 INPUTA
50 PRINT"MINUTES"
60 INPUTB
70 PRINT"SECONDS"
80 INPUTC
90 LETD=A*360000
100 LETE=B*6000
110 LETF=C*100
120 TIME=D+E+F
130 SEC=(TIME DIV 100)MOD60
140 MIN=(TIME DIV 6000)MOD60
150 HR=(TIME DIV 360000)MOD25
160 PRINT"WHAT TIME WOULD YOU
LIKE THE ALARM TO GO OFF ?"
170 PRINT"IN HOURS"
180 INPUTG
190 PRINT"MINUTES"
200 INPUT H
210 PRINT"SECONDS"
220 INPUT I
230 LETJ=G*360000
240 LETK=H*6000
250 LETL=I*100
260 TIMEA=J+K+L
270 CLS
280 VDU23;B202;0;0;0;
290 FORI=1 TO 9999999999999999
99
300 CLS
310 SEC=(TIME DIV 100)MOD60
320 MIN=(TIME DIV 6000)MOD60
330 HR=(TIME DIV 360000)MOD25
340 IF HR=0 AND MIN=0 AND SEC=
0 THEN TIME=0:TIME=TIME+360000
350 PRINTTAB(17,16);HR;":":MIN
; " ";SEC
360 IF TIME=TIMEA THEN470
370 IF TIME+1=TIMEA THEN 470
380 IF TIME+2=TIMEA THEN 470
390 IF TIME+3=TIMEA THEN 470
400 IF TIME+4=TIMEA THEN 470
410 IF TIME+5=TIMEA THEN 470
420 IF TIME+6=TIMEA THEN 470
430 IF TIME+7=TIMEA THEN 470
440 IF TIME+8=TIMEA THEN 470
450 IF TIME+9=TIMEA THEN 470
460 NEXTI
470 CHAIN""
480 MODE7
490 PRINT CHR$(141);CHR$(130);
CHR$(136);" ALARM CLOC
K
500 PRINT CHR$(141);CHR$(130);
CHR$(136);" ALARM CLOC
    
```



GRAND

```

10 REM *** Race Track
***
20 REM *** R.Kitching JULY 84
***
30 *TV255
40 ONERROR GOT080
50 DIMCX%(134),CY%(134),sc(8)
,NA$(8),LAZ(8)
60 PROCarray
70 PROCsetup
80 MODE1
90 PROCinstruct
100 REPEAT
110 MODE2
120 PROCTRACK
130 LZ=0:G%=3:SC%=0:CL%=1:YL%=
0:VDU23:8202:0;0;0;
140 REPEAT
150 X%=520:Y%=792:PC$=PL$:CR%=
0:CC$=CCL$:D%=2000
160 PROCSTART
170 REPEAT
180 J%=0
190 REPEAT
200 PROCCOMPCAR
210 UNTILJ%=134 OR CR%=10RL%=1
1
220 UNTILCR%=10RL%=11
230 G%=G%-1
240 UNTILG%=0 ORL%=11
250 SOUND1,1,5,50
260 IFL%=11 LZ=10:FORWT=1T0200
0:NEXT
270 MODE1
280 PROCHIGH
290 UNTILO
300 DEFPROCarray
310 J%=0
320 FORX%=520T0104STEP-32: CX%(
J%)=X%:CY%(J%)=760:J%=J%+1:NEXT
330 FORY%=728T0120STEP-32: CX%(
J%)=104:CY%(J%)=Y%:J%=J%+1:NEXT
340 FORX%=104T0264STEP32: CX%(J
%)=X%:CY%(J%)=88:J%=J%+1:NEXT
350 FORY%=120T0440STEP32: CX%(J
%)=296:CY%(J%)=Y%:J%=J%+1:NEXT
360 FORX%=320T0616STEP32: CX%(J
%)=X%:CY%(J%)=440:J%=J%+1:NEXT
370 FORY%=408T0248STEP-32: CX%(
J%)=664:CY%(J%)=Y%:J%=J%+1:NEXT
380 FORX%=680T0808STEP32: CX%(J
%)=X%:CY%(J%)=248:J%=J%+1:NEXT
390 FORY%=216T0152STEP-32: CX%(
J%)=808:CY%(J%)=Y%:J%=J%+1:NEXT
400 FORX%=840T01128STEP32: CX%(
J%)=X%:CY%(J%)=152:J%=J%+1:NEXT
410 FORY%=184T0792STEP32: CX%(J
%)=1128:CY%(J%)=Y%:J%=J%+1:NEXT
420 FORX%=1088T01032STEP-32: CX
%(J%)=X%:CY%(J%)=792:J%=J%+1:NEX
T
430 FORY%=760T0568STEP-32: CX%(
J%)=1032:CY%(J%)=Y%:J%=J%+1:NEXT
440 FORX%=1000T0712STEP-32: CX%(
J%)=X%:CY%(J%)=568:J%=J%+1:NEXT
450 FORY%=600T0760STEP32: CX%(J
%)=712:CY%(J%)=Y%:J%=J%+1:NEXT
460 FORX%=680T0552STEP-32: CX%(
J%)=X%:CY%(J%)=760:J%=J%+1:NEXT
470 FORJ%=1T08: sc (J%)=100*(9-J
%):NA$(J%)="Roland":LAZ(J%)=1:NE
XT
480 ENDPROC
490 DEFPROCsetup

```

THIS IS your chance to be a world championship driver. Using the high-resolution mode 2 screen you must manoeuvre your Acorn Formula BBC or Electron around the S bends and hairpin bends using the Z, X, :, and / keys. You are the blue car and the other competitors are the yellow formula Sinclair and red formula Oric. The program is by R Kitching of Adlington, Lancashire.

```

500 ENVELOPE1,1,-10,1,-10,10,2
0,30,1,0,0,-2,126,120
510 ENVELOPE2,6,10,2,2,0,0,0,1
26,0,0,-10,126,10
520 ENVELOPE3,1,5,5,5,2,2,2,12
6,0,0,-5,100,1
530 VDU23,224,&18,&7E,&18,&18,
&18,&18,&3C,&18,23,225,&66,0,&66
,0,0,&C3,&C3,&C3
540 VDU23,226,0,64,66,255,255,
66,64,0,23,227,7,167,160,0,0,160
,167,7
550 VDU23,228,0,2,66,255,255,6
6,2,0,23,229,224,229,5,0,0,5,229
,224
560 VDU23,230,24,60,24,24,24,2
4,126,24,23,231,195,195,195,0,0,
0,102,102
570 VDU23,232,17,162,74,65,54,
65,38,40,23,233,132,81,4,0,82,10
,80,2
580 VDU23,255,-1,-1,-1,-1,-1,-
1,-1,-1
590 CA$=CHR$18+CHR$3+CHR$1:CB$
=CHR$8+CHR$18+CHR$3+CHR$7
600 CU$=CA$+CHR$224+CB$+CHR$22
5
610 CL$=CA$+CHR$226+CB$+CHR$22
7
620 CR$=CA$+CHR$228+CB$+CHR$22
9
630 CD$=CA$+CHR$230+CB$+CHR$23
1
640 CA$=CHR$18+CHR$3+CHR$3
650 CCU$=CA$+CHR$224+CB$+CHR$2
25
660 CCL$=CA$+CHR$226+CB$+CHR$2
27
670 CCR$=CA$+CHR$228+CB$+CHR$2
29
680 CCD$=CA$+CHR$230+CB$+CHR$2
31
690 CA$=CHR$18+CHR$3+CHR$4
700 PU$=CA$+CHR$224+CB$+CHR$22
5
710 FL$=CA$+CHR$226+CB$+CHR$22
7
720 PR$=CA$+CHR$228+CB$+CHR$22
9
730 PD$=CA$+CHR$230+CB$+CHR$23
1
740 FIRE$=CHR$18+CHR$3+CHR$9+C
HR$232+CHR$8+CHR$18+CHR$3+CHR$14
+CHR$233
750 ENDPROC
760 DEFPROCinstruct

```

```

770 COLOUR129:COLOUR2:PRINTTAB
(6,1)"Beeb RACE TRACK"
780 COLOUR128:COLOUR3:PRINTTAB
(3,3)"Welcome to the Beeb Race T
rack.You""have been entered int
o a Grand Prix racein which you
must attempt to complete""10 la
ps, each lap being more difficul
t""than the last."
790 COLOUR1:PRINT"Your car
is blue, I have two cars a""red
one and a yellow one.You're car
""will crash if it goes off the
track or""hits my car.My cars
can't crash.A lap"
800 PRINT"must be completed be
fore the fuel runs""out or your
car will explode."
810 COLOUR2:PRINT" If you co
mplete a lap the score is""incr
eased by the amount of fuel left
.""A bonus of 1000 points is aw
arded for""beating my yellow ca
r around a lap."
820 COLOUR3:PRINT" To start t
he race or a lap press S"" Us
e Z to go left."" X to go
right."" : to go up.""
/ to go down."" SPACEBA

```



PRIX

R accelerates your car." ESC
APE will return to this page."

```

830 PROCSPACE(8,30)
840 ENDPROC
850 DEFPROCTRACK
860 COLOUR130:CLS:GCOL0,0
870 RESTORE950
880 FORR%=1TO14:READA%,B%,W%,H
%
890 MOVEA%,B%
900 PLOT1,0,H%:PLOT81,W%, -H%:P
LOT81,0,H%
910 NEXT
920 MOVE510,720:GCOL0,7:PLOT1,
0,80:MOVE500,720:PLOT1,0,80
930 MOVE0,840:PLOT1,1280,0:PLD
T81,-1280,200:PLOT81,1280,0
940 ENDFPROC
950 DATA24,40,140,760,160,720,
640,80,680,720,120,-200,800,520,
284,80
960 DATA1024,600,56,200,1068,7
32,192,68,1132,40,128,692,800,40
,320,120,800,160,80,160
970 DATA588,200,216,120,588,32
0,136,160,280,400,304,80,280,40,
152,360,160,40,120,120
980 DEFPROCSTART
990 COLOUR3:COLOUR132:PRINTTAB

```

```

(0,1)"LAPS ";L%;TAB(8,1)"FUEL ";
D%;TAB(8,3)"Score ";SC%;TAB(8,4)
"HIGH ";sc(1)
1000 VDUS:MOVE520,760:PRINTCL$
1010 MOVEX%,Y%:PRINTPC$
1020 IFG%=1:MOVE200,880:PRINTCC
D$:GOTO1040
1030 FORT%=1TOG%-1:MOVET%*100,8
80:PRINTCCD$:NEXT
1040 S$=INKEY$(0):IF S$="S" GDT
01050 ELSE 1040
1050 FORS=3TODOSTEP-1:MOVE320,60
0:GCOL0,0:PRINT:S:SOUND1,-15,4,1
:FORWT=1TO2000:NEXT:MOVE320,600:
GCOL0,2:PRINTCHR$255:NEXT
1060 SOUND0,3,5,255
1070 MOVE520,760:PRINTCL$:VDU4
1080 ENDFPROC
1090 DEFPROCCOMP CAR
1100 K%=J%*2:IFK%>134:K%=J%*2-1
34
1110 IFK%=132:YL%=YL%+1
1120 IFJ%=0DRJ%=129ORJ%=114ORJ%
=104 C$=CL$:GOTO1160
1130 IFJ%=130RJ%=610RJ%=720RJ%=
107 C$=CD$:GOTO1160
1140 IFJ%=350RJ%=510RJ%=670RJ%=
75 C$=CR$:GOTO1160
1150 IFJ%=400RJ%=840RJ%=124 C$=
CU$
1160 IFK%=0DRK%=130DRK%=1140RK%
=104 CC$=CCL$:GOTO1200
1170 IFK%=140RK%=620RK%=720RK%=
108 CC$=CCD$:GOTO1200
1180 IFK%=360RK%=520RK%=680RK%=
76 CC$=CCR$:GOTO1200
1190 IFK%=400RK%=840RK%=124 CC$
=CCU$
1200 MOVECX%(J%),CY%(J%):VDUS:P
RINTC$
1210 MOVECX%(K%),CY%(K%):PRINTC
C$
1220 W$=INKEY$(0):IFW$="." THEN
del=20 ELSE del=10
1230 TIME=0:REPEAT:PROCPLAYERCA
R:UNTILTIME>del OR CR%=1
1240 MOVECX%(J%),CY%(J%):PRINTC
$
1250 MOVECX%(K%),CY%(K%):PRINTC
C$:VDU4
1260 J%=J%+1
1270 ENDFPROC
1280 DEFPROCPLAYERCAR
1290 D%=D%-10:VDU4:PRINTTAB(13,
1);D%:" ";VDUS
1300 *FX15,1
1310 MOVEX%,Y%:PRINTPC$
1320 IF D%<10 PROCCRASH:CR%=1:G
OTO1400
1330 IFINKEY(-98) PC$=PL$:CL%=0
:X%=X%-32:PROCHECK(X%-4,Y%-28,X
%-4,Y%-4):IFCR%=1 GOTO1400
1340 IF Y%>720 AND X%=520 GOTO1
380
1350 IFINKEY(-67) PC$=PR$:X%=X%
+32:PROCHECK(X%+68,Y%-4,X%+68,
Y%-4):IFCR%=1 GOTO1400
1360 IFINKEY(-73) PC$=PU$:Y%=Y%
+32:PROCHECK(X%+32,Y%+4,X%,Y%+4
):IFCR%=1 GOTO1400
1370 IFINKEY(-105) PC$=PD$:Y%=Y
%-32:PROCHECK(X%+32,Y%-36,X%,Y%
-36):IFCR%=1 GOTO1400
1380 MOVEX%,Y%:PRINTPC$

```

```

1390 IFX%=552 ANDY%>720 AND PC$
=PL$ ANDCL%=0:PROCLAP
1400 ENDFPROC
1410 DEFPROCCRASH
1420 *FX15,0
1430 SOUND0,2,5,10
1440 MOVEX%,Y%:PRINTFIRE$
1450 FORWT=1TO5000:NEXT
1460 MOVEX%,Y%:PRINTFIRE$
1470 ENDFPROC
1480 DEFPROCLAP
1490 CL%=1
1500 L%=L%+1:SOUND2,-15,88,3:VD
U4:PRINTTAB(5,1);L%
1510 IFL%>YL% SC%=SC%+D%+1000 E
LSE SC%=6C%+D%
1520 PRINTTAB(14,3);SC%:D%=2000
:VDUS
1530 RESTORE(1560+(L%*10))
1540 READA%,B%,W%,H%
1550 GCOL0,1:MOVEA%,B%:PLOT1,W%
,0:PLOT81,-W%,H%:PLOT81,W%,0
1560 ENDFPROC
1570 DATA168,88,32,72
1580 DATA888,88,72,72
1590 DATA280,168,64,160
1600 DATA108,88,0,640
1610 DATA680,772,120,28
1620 DATA320,40,32,72
1630 DATA680,520,48,200
1640 DATA360,400,280,32
1650 DATA1040,40,72,72
1660 DATA160,772,200,28
1670 DEFPROCHECK(P%,Q%,T%,R%)
1680 IFPOINT(P%,Q%)<>0 OR POINT
(T%,R%)<>0 CR%=1:PROCCRASH
1690 ENDFPROC
1700 DEFPROCHIGH
1710 *FX15,0
1720 VDU4:CLS
1730 IFsc(8)>=SC% COLOUR2:PRINT
TAB(10,24);"You scored ";SC%:n=9
ELSE REPEAT:CLS:COLOUR1:PRINTTA
B(5,10)"You are in the TOP 8"TAB
(7,12)"Enter your name":COLOUR2:
INPUTTAB(10,14),N$:UNTILLEN(N%)<
14:CLS
1740 N%=0:REPEAT:N%=N%+1:UNTILs
c(N%)<SC% OR N%=8
1750 IF sc(8)<SC% n=9:REPEAT n=
n-1:sc(n)=sc(n-1):NA$(n)=NA$(n-1
):LAZ(n)=LAZ(n-1):UNTILN=N%:sc(n
)=SC%:NA$(N%)=N$:LAZ(n)=L%
1760 COLOUR1:COLOUR130:PRINTTAB
(8,1)"Today's Fastest Racers"
1770 COLOUR130:COLOUR0:PRINT"PO
S LAPS SCORE DRIVER
"
1780 FORJ%=1TO8
1790 IFJ%=n COLOUR2:COLOUR129:P
RINTTAB(1);J%:". . . .":LAZ(J%):".
. . . .":sc(J%):". . . .":NA$(J%):"
"ELSE COLOUR1:COLOUR128:PRINT
TAB(1);J%:". . . .":LAZ(J%):". . . .
":sc(J%):". . . .":NA$(J%)
1800 NEXT
1810 PROCSPACE(8,28)
1820 ENDFPROC
1830 DEFPROCSPACE(F%,G%)
1840 *FX15,1
1850 COLOUR128:COLOUR2:PRINTTAB
(F%,G%);"press SPACE to race":R
EPEAT:WT$=INKEY$(0):UNTILWT$=" "
:ENDPROC

```



A Christmas

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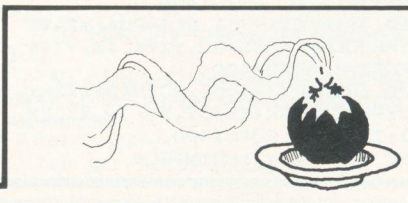
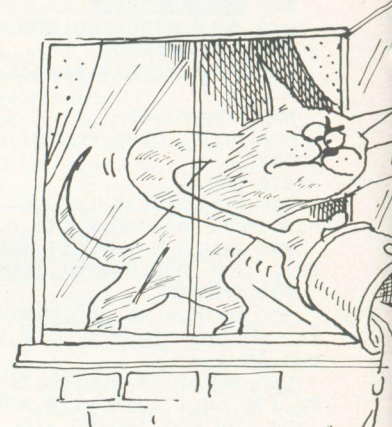
1 REM **** CAROLS ****
10 ENVELOPE1,0,0,0,0,0,0,1,30
,-1,0,-1,127,120
20 *TV255
30 MODE4
40 VDU19,0,3,0,0,0
50 COLOUR128:COLOUR1
60 REPEAT
70 PROCMenu
80 PROCTune
90 PRINT"Press 'P' to play a
gain"
100 PRINT"Press 'F' to finish
"
110 PRINT"Press 'M' to go to
Menu"
120 A$=INKEY$(0)
130 IFA$=""THEN120
140 IFA$="P"PROCTune
150 UNTILA$="F"
155 TUNE=740:C=3:DELAY=22:ENV=
1:CLS:PROCTune:PROCDELAY(100)
160 CLS:PRINTTAB(16,15)"GOODBY
E"
170 END
180 DEFPROCMenu
190 CLS
200 PRINTTAB(18,1)"MENU"
210 PRINTTAB(3,3)"(1) Jingle B
ells"
220 PRINTTAB(3,5)"(2) Rudolph
the Red Nosed Reindeer"
230 PRINTTAB(3,7)"(3) Silent N
ight"
240 PRINTTAB(3,9)"(4) O Come a
ll Ye Faithful"
250 PRINTTAB(3,11)"(5) We Thre
e Kings of Orient are"
260 PRINTTAB(3,20)"Select numb
er of tune"
270 A$=INKEY$(0)
280 IFA$<"1" OR A$>"5"THEN270
290 IFA$="1"THENTUNE=520:C=3:D
ELAY=22:ENV=1
300 IFA$="2"THENTUNE=580:C=4:D
ELAY=24:ENV=1
310 IFA$="3"THENTUNE=640:C=6:D
ELAY=34:ENV=1
320 IFA$="4"THENTUNE=670:C=6:D
ELAY=40:ENV=1
330 IFA$="5"THENTUNE=700:C=6:D
ELAY=30:ENV=1
340 CLS
350 ENDPROC
360 DEFPROCTune
370 CLS
380 RESTORE TUNE
390 REPEAT:READP,D,WORD$
400 PRINTWORD$:
410 IFRIGHT$(WORD$,1)="."THENP
RINT"
420 SOUND&0011,ENV,P,D*C
430 PROCDELAY(4)
440 SOUND&0012,ENV,P,D*C
450 PROCDELAY(4)
460 SOUND&0013,ENV,P,D*C
470 PROCDELAY(D*DELAY)
480 UNTILD=0:ENDPROC
490 DEFPROCDELAY(time)
500 now=TIME:REPEATUNTILTIME>n

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ow+time
510 ENDPROC
520 DATA60,1,Dash,96,1,ing,88,
1," thro",80,1,ugh the,60,3," sn
ow",60,.5," in",60,.5," a",60,1,
" one",96,1," horse",88,1," o",8
0,1,pen,68,4," sleigh.",68,1,0'e
r,100,1," the",96,1," fields",88
,1," we",68,4," go.",108,1,Laugh
,108,1,ing,100,1
530 DATA" all",88,1," the",96,
4," way.",60,1,Bells,96,1," on",
88,1," bob",80,1,tail,60,4," rin
g.",60,1,Mak,96,1,ing,88,1," spi
r",80,1,its,68,4," bright.",68,1
,What,68,1," fun",100,1," it",96
,1," is",88,1," to",108,1," ride
",108,1," and"
540 DATA108,1," sing",108,1,"
a",116,1," sleigh",108,1,ing,100
,1," song",88,1," to",80,4,"nigh
t."
550 DATA96,1,Jin,96,1,gle,96,2
," bells",96,1," jin",96,1,gle,9
6,2," bells",96,1," jin",108,1,g
le,80,1.5," all",88,.5," the",96
,4," way.",100,1,Oh,100,1." what
",100,1.5," fun",100,.5," it",10
0,1," is",96,1," to",96,1," ride
",96,2," in a"
560 DATA96,1," one",88,1," hor
se",88,1," o",96,1,pen,88,2," sl
e",108,2,"igh.",96,1,Jin,96,1,gl
e,96,2," bells",96,1," jin",96,1
,gle,96,2," bells",96,1," jin",1
08,1,gle,80,1.5," all",88,.5," t
he",96,4," way.",100,1,Oh
570 DATA100,1," what",100,2,"
fun",100,.5," it",100,1," is",96
,1," to",96,1," ride",96,.5," in
",96,.5," a",108,1," one",108,1,
" horse",100,1," o",88,1,pen,80,
4," sleigh.",80,0," "
580 DATA80,.5,Ru,88,.5,dolph,8
0,1," the",68,1," Red",100,1," n
osed",88,1," rein",80,3,deer,80,
.5," had",88,.5," a",80,.5,"
ve",88,.5,ry,80,1," shin",100,1,
y,96,4," nose.",72,.5,And,80,.5,
" if",72,1," you",60,1," ev",96,
1,er,88,1," saw"
590 DATA80,3," it",80,.5," you
",88,.5," would",80,.5," ev",88,
.5,en,80,1," say",88,1," it",6
8,4," glows.",80,.5,All,88,.5,"
of",80,1," the",68,1," oth",100,
1,er,88,1," rein",80,3,deer,80,.
5," used",88,.5," to",80,.5," la
ugh",88,.5
600 DATA" and",80,1," call",10
0,1," him",96,4," names.",72,.5,
They,80,.5," nev",72,1,er,60,1,"

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RATIFICATION means different things to different people. It can mean remuneration, the receipt of pleasure, the achieving of a state of satisfaction — but one thing the City money markets do not regard as gratifying at present is the receipt of shares in Acorn Computers. From a one-time high of 193 pence the shares fell to a near all-time low of 108 pence when the City heard the Acorn annual figures. They were not gratified by the figures and, consequently, they are not too gratified by Acorn.

But how bad can a set of annual figures be? Are Acorn's really that bad?

Specifically, Acorn showed a profit of £10.8 million on a turnover of £93.2 million in the year to July, 1984 so, with a little help from a calculator, or computer, that shows a profit on turnover of 11.59 percent. That is the usual way to look at profit figures and, to a limited extent, you can compare it to what you would receive as a percentage return on an investment; it gives a ballpark idea of how well the firm is doing.

Acorn, using that measure, is not doing as well as it did the previous year when its turnover was less than half at £42.4 million and its profit was £8.6 million, giving a percentage profit on turnover of 20.28 percent.

Look at another firm, Sinclair Research, to see how it fared by comparison. In its last financial year it reported a turnover of £77.69 million and a profit of £14.28 million, giving a percentage profit on turnover of 18.38 percent. If we look at Sinclair figures for the previous year, we find a turnover of £54.53 million and a profit of £14.03 million, giving a profit on turnover of 25.73 percent.

More subtle?

So, profitable though the firms are, they have both seen their profit fall. Is that, one asks, the beginning of the end? Or is there some more subtle explanation?

I asked Tom Hohenberg, Acorn marketing manager, why his profit figures had slumped. "We lost £3.5 million on overseas operations — our marketing in the U.S. and West Germany," he said. "That depressed figures. We made £14 million profit in the U.K. and we had to knock £3.5 million off it just like that."

That is the kind of money it costs to try to break into new markets with products and if Acorn had not

spent it, its profit would have shown a percentage profit on turnover of 15.34 percent and the bulk of the Acorn 'slump' would not have happened. Yet if it had not spent the money, where would future markets lie? It has been estimated that half the world market lies in the U.S. and nobody in marketing can ignore that.

There is a sociological concept called deferred gratification, the

Profit is gone today and here tomorrow

Chris Naylor considers a lack-lustre Acorn performance on the money market in the light of the concept known as deferred gratification

idea being that although everyone wants gratification of some kind at some time, some people are willing to defer theirs for a time to achieve greater gratification at a later date.

Sociologists use that concept to explain why people will save money, foregoing present pleasures to achieve future pleasures, or why people become students and study on a low income for years. It is because it often makes sense to defer gratification now and get a bigger heap of it later. That is what Sinclair is doing with the launch of the QL and what Acorn is doing when it tries to break into overseas markets.

It is also doing it with the launch of the ABC. Like the QL, that range of machines cost real money to develop and, as sales do not begin until January, there will be no return on that effort until next year.

Without it, where is the future? That Acorn has a future there is no doubt or, at any rate, much less doubt than there is about many firms in the computer industry. Consider, for instance, just what the ABC offers.

You can start with the Personal

Assistant, which uses the trusty old 6502 CPU at the heart of the present BBC, and has one disc drive. That system, like others in the range, has had no price tag fixed yet but, at a guess, it will probably be around the £700 mark.

Then, staying with exactly the same case, and with no external boxes, you can upgrade it progressively to the ABC 100 which has a second CPU, the Z-80, an extra drive and, if you want, CP/M. From which point you can upgrade it to the ABC 200, which is said to have "the speed of a Digital Equipment VAX" and offers C, Lisp, Pascal, Fortran, Forth, BBC Basic and Assembler.

That you can upgrade to the ABC 300 which uses the 80286 CPU which runs a concurrent operating system from Digital Research, which means that you can run several programs simultaneously, as well as the desk-top model based on 'icons' — little pictures, to mortals — controlled by a mouse in the best Apple Macintosh fashion.

By the time you have upgraded all the way you can be running any application in CP/M, MS-DOS, PC-DOS or Concurrent OS and you can, if you wish, be doing all those things at the same time.

A poor view

The result has to be one thing — gratification. Gratification for the users, for Acorn, for the shareholders and the City. It is just that gratification has been a little deferred.

So it was interesting to hear from Scrimgeour, Kemp-Gee, which has its own financial database held on a Digital VAX. Its customers like to use that information but they also like to use Topic, the Stock Exchange financial information system.

If you use both, you have two screens on your desk, which can be inconvenient. So what did SK-G do? It modified a BBC B so that it could accept and display both its own financial information and Topic.

The upshot of this story is that those who buy and sell shares and who seem to have taken a poor view of Acorn financial results are likely to have established that view of the world while sitting in front of a Model B.

Perhaps they should not have been looking at the figures on their screens so diligently. Perhaps they should have looked at the manufacturer's label instead. Or perhaps they should rest for five minutes and think about deferred gratification.

FROM THE MOMENT the trading ship Avalonia slipped its orbital berth above the planet Lave and began to manoeuvre for the hyperspace jump point . . .

So begins the 50-page novel which accompanies **Elite**, the latest and most ambitious game produced so far by Acornsoft. Greeted by rapturous reviews, the game has already exceeded the company's wildest expectations by rocketing straight to the top of the popularity charts and selling 13,000 copies within two weeks of its launch. Forecasts for sales during the Christmas period are in the region of 100,000 — more than double those of any other Acornsoft game so far.

A complex combination of an arcade shoot-out and an adventure, **Elite** is already said to have stopped work for weeks in more than one department while highly-paid programmers struggle to improve their status as trader-ship commanders — from 'harmless' to the coveted 'dangerous' or even 'deadly' level.

Behind what promises to be a sales record-breaker are two unassuming undergraduates at Jesus College, Cambridge, 20-year-old Ian Bell and 19-year-old David Braben. The pair wrote **Elite** in the spare time allowed them in pursuit of a natural science degree and mathematics degree respectively.

Hideous shortage

The original idea was from Bell who had already produced one successful game for Acornsoft, **Freefall**. "I wanted to follow that with a 3D simulation game and it seemed logical to set it in space," he says. "Then Braben added the trading ship scenario and things just developed from there."

The result of their combined efforts puts the player under the guise of Commander Jameson at the helm of a Cobra Mark III trading and combat craft. Setting-off from the planet Lave, with its famous rain forests and its human colonials governed by a dictatorship, the aim is to achieve fame and fortune by exploring distant planets where goods, weaponry and possibly even slaves can be bought and sold.

The choice ranges from places like Riedquat, inhabited by harmless rodents and noted for its fabulous cuisine, to the tedious industrial corporate state of Zaonce. Many more weird and wonderful worlds lie outside Commander Jameson's initial

Limitless horizons for the Elite team

Nicole Segre sets out to discover what drives two top-flight programmers who are finding fame and fortune as authors of the new chart-busting space odyssey from Acornsoft

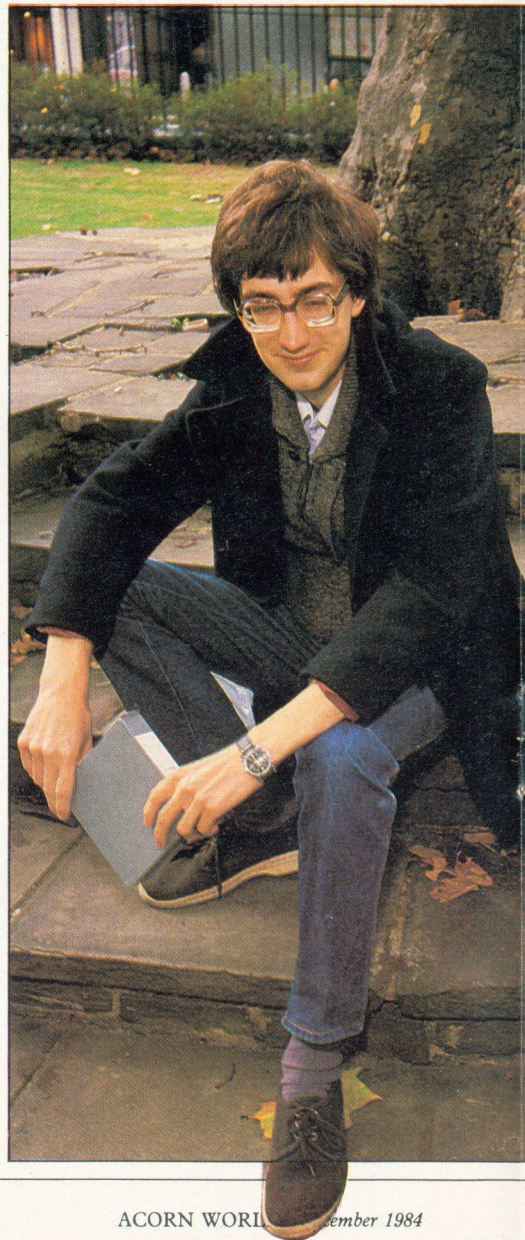
fuel range of seven light years.

Besides fine judgment in deciding which purchases to make before starting on the inter-galactic trail, the player also has to display considerable arcade skills. Space travel in **Elite** is beset by danger as piracy and bounty-hunting spreads through the universe. Each battle against marauding craft is influenced by the specifications of the craft in question. On reaching a planet, the pilot must also dock the ship before any trading can be undertaken, a task which may require hours of practice.

The huge variety of planets, aliens, spaceships and weapons, as well as the complexities of space flight, offer almost endless scope for play. Fortunately the game can be saved and resumed later, allowing the poor addict time for rest and refreshment between bouts of hard flying, fighting and trading. The graphics, too, seem set to earn favour among games buyers, as simple dots, curves and lines convey speed and movement in a startlingly effective way.

There is even a choice of views from the front, back or sides of the spaceship and control panels at the bottom of the screen supply vital information about the player's position and fuel level.

Bell and Braben explain the wealth of detail in the game, an impressive achievement considering what Braben calls the "hideous shortage of memory" of the BBC, by



saying that they started writing it and continued until they had to stop.

"If the BBC had more memory, we would probably still be writing it," says Bell. "As it is, there is not a single free byte in the program."

The authors agree that careful, economical programming enabled them to squeeze much more into the program than they would have thought possible originally. "The main thing is to make sure that every instruction is a useful one," says Braben.

It is astonishing that Elite took them only a year to write, during which time they also had to attend to what Braben calls "little things like college work and end-of-year examinations". Of that time, about half was taken up with writing the program and the other half with finding and eliminating the bugs, some of which, like one particularly elusive semi-colon, were infuriatingly difficult to trace.

"We think we have got rid of all of them" says Bell, "but you can never

be sure." Their working association began as a simple friendship, struck up at dinner in Hall at Jesus. "It took us some time to admit that we were both interested in computers," says Braben. "At first we were too embarrassed."

Both had owned computers since their final year at their respective grammar schools — Braben owned an Acorn Atom and Bell a Tandy TRS-80. Neither, however, has had formal tuition in programming, except for one term of 'computer lessons' which Bell had in the lower fourth. "They had no computers at school in my day," says Braben, who learned to program from the Atom manual. Both taught themselves machine code, for which Bell recommends "poring over other people's listings."

Utmost secrecy

Besides Freefall, Bell had already written one professional game before embarking on Elite, a version of Reversi for the BBC Model A which was marketed by Program Power. "I do not think it was a great seller," he says. Of all his forays into authorship, he has enjoyed Elite most. "It was rather an effort to finish Freefall," he says, "but Elite was sufficiently interesting to keep us hacking away happily."

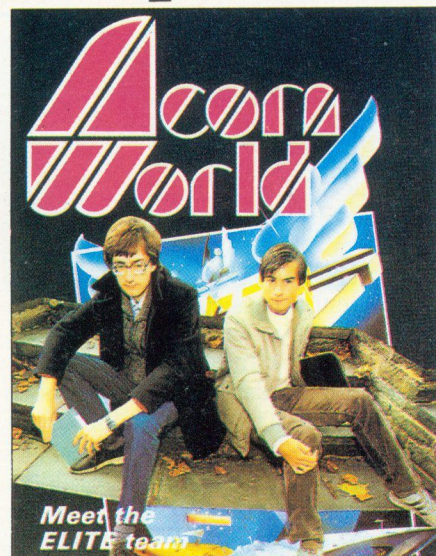
For Braben, Elite was his first professional effort and his first game for the BBC B. Soon after the pair started work on the program, they took it to Acornsoft and the company was sufficiently interested to supply Braben with a BBC micro.

According to Bell, their close association with Acornsoft, which is based in Cambridge, is nothing unusual. Peter Irvin, author of **Starship Command**, another Acornsoft production, and a friend of Bell, is a student at St John's. BBC micros are much in vogue among the undergraduate population and micro clubs flourish. "People take their micros with them at the beginning of term," says Bell. "I suppose they just like to mess around with them."

They finished writing Elite in January, 1984. "Then we finished it again — and several times more after that," says Bell.

Throughout the operation. Acornsoft insisted that the utmost secrecy be maintained; somehow it was, although many of their friends knew what the two authors were doing.

They also managed to remain on the best of terms. "We never bick-



ered" says Braben. "If we did, we would never have finished the program." According to Bell the secret of good relations was that "whenever we disagreed, we would blame the assembler, not each other."

Having shared the work of writing the program, the two will also enjoy an equal share of the proceeds from the game, which already promise to be considerable. Bell thinks he will save his money for the future, while Braben likes the idea of buying a car. Neither has plans to throw everything aside and embark on a lucrative career as programmers.

"It is still a bit of a hobby," says Braben, who hopes to continue to write programs while doing post-graduate studies. Bell says he would not recommend programming games as an easy option. "It is still a good idea to learn how to program," he says, "but games will become increasingly difficult to write, with the market becoming more competitive and machines becoming more sophisticated."

Nevertheless, the two have what they call "bold plans" concerning their future productions but neither is revealing those plans.

Judging by their performance they will no doubt manage to combine some ambitious programming project with everyday activities such as studying, playing squash and tennis in Bell's case, or sailing in Braben's, and reading science fiction. Fortunately, neither is an avid games player and although they try their hand occasionally at Elite, they have not progressed beyond the "competent" stage. Braben sensibly limits his playing to an hour "to see how far I can get."

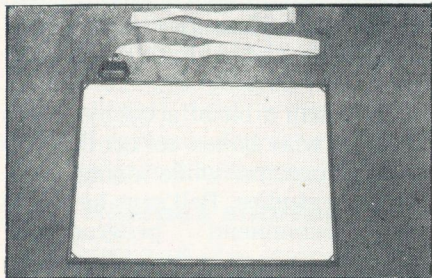
With no such time limit on their programming, it seems likely that both will go a long way.



IN THE early days — late 1970s — of using micros in primary schools, many teachers were amazed how quickly their charges learned to adapt to using a computer keyboard. With the home micro boom today that is not such a surprise, yet for the majority of children the usual QWERTY keyboard arrangement is less than satisfactory.

Historically, the computer keyboard is an adaptation of the traditional typewriter keyboard which was designed specifically for touch typists. Given the additional facilities a computer like the BBC micro offers, the number of keys is increased to 74. The question is whether young children should be presented with so many bizarre symbols and be expected to cope. After all, many adults cannot use the QWERTY layout with ease and speed.

With regard to educational software, the issue is more important than is at first realised. For example, when we teach reading we introduce lower-case letter shapes and their sounds gradually during the first few terms of school. Yet we present pre-



Concept keyboard — figure 1.

readers with a full QWERTY layout and hope learning will happen. If a child can cope with the QWERTY layout it probably indicates that the pre-reading software is unsuitable for that child. The problems for children who have difficulty with reading are often exacerbated by having to use the keyboard.

An alternative to QWERTY exists. The Star Microterminals Concept keyboard — or keypad to be more accurate — has been available in its A4 configuration for more than a year. The latest keyboard comprises an A3-sized plastic surface beneath which lies a network of touch-sensitive pads.

The unit connects to the BBC micro via a ribbon cable to the user port — see figure one. Under software control, individual or groups of cells may be programmed to take the place of keys on the BBC keyboard. By using overlays on the Concept keyboard, a very logical and simple

A keypad to make learning just like child's play

Chris Drage put an alternative to QWERTY through its paces in the primary classroom and found that it opened exciting new possibilities for the younger pupil

arrangement of user inputs is possible.

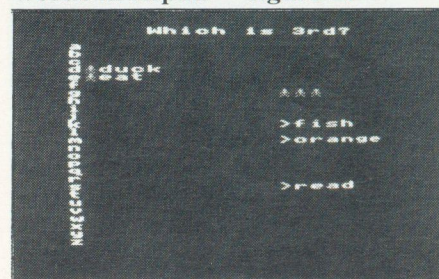
The variety of arrangements is endless. Overlays can be designed to suit the requirements of a particular program. The unnecessary features of the normal keyboard are eliminated, leaving only those functions which are needed for each particular piece of software. Life certainly becomes much easier for a child. With the new A3/128-sized keyboard rapidly becoming an accepted standard, the opportunities for exploration through appropriate software are being adopted by a number of software publishers. The software package provided for starting comprises five programs — **Alpha, Maximus, Shape Matching, Jigsaw and Abacus.**

Armed with a Concept keyboard

and the disc of software I headed for school. In two weeks I used the programs with groups of children aged six to 10.

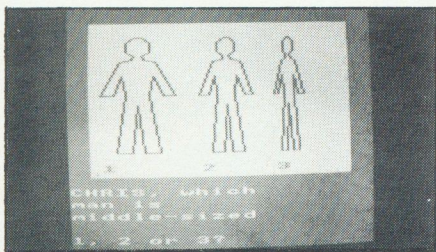
Alpha is a program to help children place letters and words into alphabetical order — see figure two. All that is required is for a child to press anywhere on the overlay to choose the various options and select

Little men pull and push the words in Alpha — figure 2.



correct answers. Individual six- and seven-year-olds, with no previous computer experience, found it simple. They enjoyed the animated graphics. They found seeing the little people move whole words into the correct place on the alphabet display fascinating.

Immediately I was aware how much concentration is improved when children are not asked to type answers. The only difficulty encountered



Maximus — figure 3.

was when they leaned on the keypad occasionally, accidentally choosing the wrong option.

Maximus demonstrates the real advantages of the Concept keyboard system. The overlay, with three numbered keys, is simplicity itself. The program gives practice in prepositions — before, behind, under. Using colourful, high-resolution graphics, a trio of pictures is displayed — see figure three. Using the keyboard, a child selects the correct object and is rewarded by a short ditty and flashing colours to emphasise the answer. The program proved very useful to teachers of six- and seven-year-olds.

Aiming to be little more ambitious, I decided it was time to try the keyboard with five-year-old new entrants. The program Shape Matching aims to give children practice in matching simple regular polygons. It has two levels of operation, single-shape matching — see figure four — and multiple-shape matching. The program is a little vague in its aims. I would have expected such a simple concept to be applicable to pre-readers.

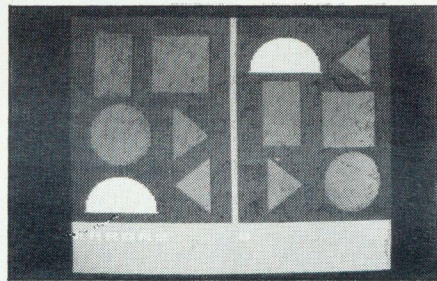
Shape Matching, however, goes laboriously through a demonstration sequence whereby the names of the shapes are taught. Surely it is the recognition of the pattern that is important for that age group, not whether it is a half circle or not.

A far more valuable program is Jigsaw. High-resolution screens of a yacht and a solar system form the basis of it — figure five. Each picture can be divided into four to 25 segments depending on the level set. Jigsaw is valuable as a shape recognition/perception program. Where it

scores over its physical counterpart is in its ability to increase the level of difficulty. Using the Concept keyboard overlay, children found the program delightful to use.

I decided to use Abacus with my class of 10-year-olds as it was relevant to the work on numeration on which they were engaged. The program uses spike-abacii to teach two-, three- and four-digit addition and subtraction — figure six. The keyboard overlay for the program is very good. Abacus is a model of simplicity in use. Children were able to appreciate what the program was asking them to do without having to search for all the key presses which otherwise would be required. Animated graphics and use of colour reinforce the concept of decomposition. I think it is Abacus which finally convinced me that there is a very real place for touch keypads higher up the school.

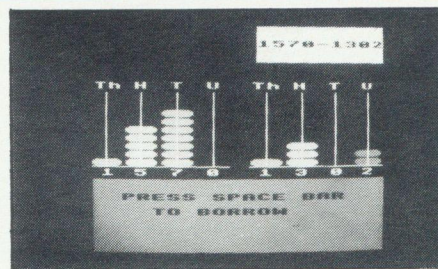
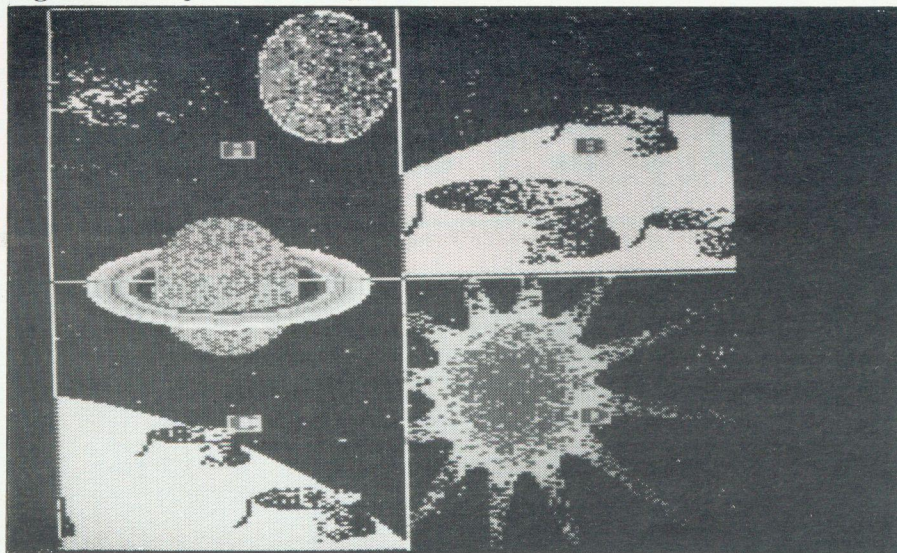
Starset, also available from Star Microterminals, permits the user to create new overlays or edit previous



Shape Matching — figure 4.

overlays for the Concept keyboard without having to adapt their user programs. The finished product of the Starset program is a machine code file which resides in the computer memory, permitting the computer to be controlled by either the main QWERTY keyboard or the Concept.

Jigsaw — simple level — figure 5.



Abacus — figure 6.

A teacher creates a keyboard overlay on a screen representation of the original. Individual or groups of keys may be defined, the maximum number being 128, for use by the main program. Once completed and saved, an A3 overlay may be drawn. The result is that the most popular programs in the school software library may be converted for use with Concept keyboard.

The increasing number of software publishers now producing software for the Concept keyboard only confirms the credibility of this most important of peripherals for the primary school micro. Without doubt the versatile keyboard, coupled with the proper software, removes the difficulties for a child and opens unlimited horizons in primary school computing.

Next month I shall look at a number of software packages written exclusively for the Concept keyboard and deal with a range of classroom applications.

The A3 Concept keyboard with 128 touch pads is available from **Star Microterminals**, 22 Hyde Street, Winchester, Hampshire SQ23 7DR. It costs £99 plus VAT.

The **Starset** program costs £8.50 plus VAT.

The other programs are available separately from **Specialised Education Software & Services**, Central Trading Estate, 275-277 Bath Road, Bristol.

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Christmas Carol



CHRISTMAS is coming, the goose is getting fat. Gather round the BBC and let a selection of popular Christmas tunes from J Thorpe of Gainsborough, Lincs put you into a festive mood. The singalong offerings are *Jingle Bells*, *Rudolph the Red-Nosed Reindeer*, *O Come All Ye Faithful* and *We Three Kings*.



let",96,1," poor",88,1," Ru",80,3,dolph,80,.5," join",88,.5," in",80,.5," an",88,.5,y,80,1," rein",108,1,deer,100,4," games.",88,1,Then,88,1

610 DATA" one",100,1," fog",88,1,gy,80,1," christ",68,1,mas,80,2," eve",72,1," San",88,1,ta,80,1," came",72,1," to",68,4," say",60,1,Ru,68,1,dolph,80,1," with",88,1," your",96,1," nose",96,1," so",96,2," bright",100,1," won't",100,1

620 DATA" you",96,1," guide",88,1," my",80,1," sleigh",72,.5," to",60,2.5," night.",80,.5,The n,88,.5," how",80,1," the",68,1," rein",100,1,deer,88,1," loved",80,3," him",80,.5," as",88,.5," they",80,.5," shout",88,.5.ed.80,1," out",100,1

630 DATA" with",96,4," glee.",72,.5,Ru,80,.5,dolph,72,1," the",60,1," red",96,1,nosed,88,1," rein",80,3,deer,80,.5," you'll",88,.5," go",80,.5," down",88,.5," in",80,1," his",108,1,to,100,3,ry,100,0," "

640 DATA80,1.5,Si,88,.5,_80,1,lent,68,3," night",80,1.5," ho",88,.5,_80,1,ly,68,3," night.",108,2,All,108,1," is",96,3," calm",100,2," all",100,1," is",80,3," bright.",88,2,Round,88,1," you",100,1," vir",96,.5,_88,1,gin

650 DATA80,1.5," moth",88,.5,e r,80,1," and",68,3," child.",88,2,Ho,88,1,ly,100,1.5," in",96,.5,fant,88,1," so",80,1.5," ten",88,.5,der,80,1," and",68,3," mild",108,2,Sleep,108,1," in",120,1.5," hea",108,.5,ven,96,1,ly,100,3," pea"

660 DATA116,3," ce.",100,1.5,S1 e,80,.5,ep,68,1," in",80,1.5," hea",72,.5,ven,60,1,ly,52,3," pea ce",52,2," ",52,0," "

670 DATA80,1,0,80,2." come",60,1," all",80,1," ye",88,2," fait

h",60,2,"ful.",96,1,Joy,88,1,ful,96,1," and",100,1," tri",96,2,umph,88,1,"ant.",80,1,0,80,2," come",76,1," ye",68,1," o",76,1," come",80,1," ",88,1,ye,96,1," to",76,2," Beth"

680 DATA68,1.5,_60,.5,1e,60,4,"hem.",108,2,Come,100,1," and",96,1," be",100,2,hold,96,2," him",88,1,Born,96,1," the",80,1," king",88,1," of",76,2," an",60,1," gels.",80,1,0,80,1," come",76,1," let",80,1," us",88,1," a",80,2,dore,60,1

690 DATA" him.",96,1,0,96,1," come",88,1," let",96,1," us",100,1," a",96,2,dore,88,1," him.",96,1,0,100,1," come",96,1," let",88,1," us",80,1," a",76,2,dore,80,1," him",100,1," ",96,2,Christ,88,1.5," ",80,.5,the,80,4," Lord",80,0," "

700 DATA96,2,We,88,1," three",80,2," kings",68,1," of",76,1," or",80,1,i,76,1,ent,68,3," are.",96,2,Bear,88,1,ing,80,2," gifts",68,1," we",76,1," trav",80,1,e rse,76,1," a",68,3,"far.",80,2,F ield,80,1," and",88,2," foun",88,1,tain,96,2

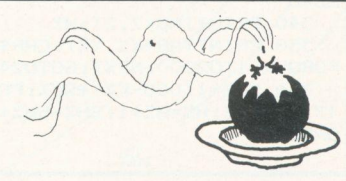
710 DATA" moor".96,1," and",108,1," moun",100,1,_96,1,"tain.",88,1,Fol,96,1,low,88,1,ing,80,2," yan",76,1,der,68,3," star.",76,2,0,88,1," ",80,2,star,80,1," of",80,2," won",60,1,der,80,2," star",68,1," of",80,3," night.",80,2,Star,80,1

720 DATA" a",80,2," roy",60,1,al,80,2," beau",68,1,ty,80,3," b right.",80,2,West,80,1,ward,88,2," lead",96,1,ing,100,2," still",96,1," pro",88,2,ceed,96,1,"ing",80,2,Guide,80,1," us",80,2," to",60,1," thy",80,2," per",68,1,fect,80,3

730 DATA" light",80,0," "

740 DATA80,2,We,100,1," wish",100,.5," you",108,.5," a",100,.5," mer",96,.5,ry,88,1," christ",72,1,"mas.",88,1,We,108,1," wish",108,.5," you",116,.5," a",108,.5," mer",100,.5,ry,96,1," chris t",80,1,"mas.",80,1,We,116,1," wish",116,.5

750 DATA" you",120,.5," a",116,.5," mer",108,.5,ry,100,1," chr ist",88,1,mas,80,.5," and",80,.5," a",88,1," hap",108,1,py,96,1," new",100,2," year",100,0," "



KNOCKOUT

KNOCKOUT, supplied by Kanwaljit Kooner of Southall, Middlesex, is an absolute knockout. Based on the ever-popular Breakout, the game requires you to demolish a multi-coloured brick wall using the left and right arrow keys to move your bat. Do not be fooled; it is a difficult version of a popular game.

```

10 REM ***          KNOCKOUT
***
20 REM *** by Kanwaljit Kooner ***
30 ON ERROR PROCerr
40 *FX4,1
50 *FX11,1
60 VDU23,240,0,0,60,126,126,6
0,0,0,23,242,0,0,0,0,0,0,23,
243,255,255,255,255,255,255,
255:A$=CHR$(240)
70 ENVELOPE1,25,0,2,-3,2,20,2
0,10,20,-30,-2,-20,123
80 MODE7:VDU23;8202;0;0;0;:PR
OCdisplay
90 H%=3:SC%=0:DELAY%=250:SH%=
1
100 MODE1:VDU23;8202;0;0;0;:PR
OCscreen
110 A%=608:X%=30:Y%=28:D%=-1:E
%=-1:F%=0:W%=0:PX%=960:PY%=96
120 MOVE500,95
130 REPEAT
140 FORR%=1TODELAY%:NEXT
150 IFAZ>32THENIFINKEY(-26)THE
NAZ=A%-96:Z%=96
160 IFAZ<1216THENIFINKEY(-122)
THENAZ=A%+96:Z%=-96
170 IFAZ=W%THEN190
180 GCOL0,4:DRAWAZ,95:GCOL0,2:
DRAWAZ+Z%,95:W%=AZ
190 IFX%<=30RFX%>=37THEND%=-D%:
SOUND&11,-10,89,2
200 PRINTTAB(X%,Y%);CHR$(242):
X%=X%+D%:Y%=Y%+E%:PX%=PX%+32*D%:
PY%=PY%+(32*-E%):PRINTTAB(X%,Y%);
A$
210 PC%=PY%+35:PO%=POINT(PX%,P
C%):IFPO%=20RPO%=1THEN250
220 IFY%=4THEN360
230 IFY%=28THEN260
240 UNTILFALSE
250 SOUND&11,-10,105,2:E%=1:PR
INTTAB(X%,Y%-1);CHR$(242):GOTO24
0
260 IFPOINT(PX%,95)<>2THEN330
270 SOUND&11,-10,130,2:F%=F%+1
:PRINTTAB(30,2);SC%+F%
280 PB%=POINT(AZ-96,95):IFPB%=
2THENL%=(AZ-96)/32ELSE L%=AZ/32
290 L%=X%-L%
300 IFLX<=1THEND%=-1
310 IFLX>=2THEND%=1
320 E%=-1:GOTO240
330 E%=-1:IFH%>1THENH%=H%-1ELS
E390
340 PRINTTAB(7,2);H%
350 PRINTTAB(X%,Y%);CHR$(242):
FORQV%=1TO2000:NEXT:GOTO240
360 SC%=(1000-F%)+SC%:PRINTTAB
(7,2);SC%;H%=H%+1:SH%=SH%+1:REST
ORE670

```



```

370 PROCscreen:IFDELAY%>0THEND
ELAY%=DELAY%-50
380 GOTO110
390 PRINTTAB(X%,Y%);CHR$(242):
TAB(12,16)"GAME OVER":
FORQV%=1TO20000:NEXT:GOTO80
400 DEFPROCdisplay
410 PRINTTAB(5,7);CHR$(157);TA
B(35,7);CHR$(156);TAB(5,8);CHR$(
157);TAB(35,8);CHR$(156);TAB(6,7
);CHR$(136);
420 FORM%=1TO2:RESTORE
430 FORNM%=1TO8
440 READA,V$:PRINTCHR$(141);CH
R$(A);V$;:NEXTNM%:PRINTTAB(6,8);
CHR$(136);:NEXTM%
450 PRINTTAB(11,10);CHR$(149);
"KANWALJIT KOONER";TAB(15,12);"1
984";TAB(14,14);CHR$(147);CHR$(9
1);" ";CHR$(93);TAB(1,23);"Pres
s Any Key ":*FX15,1
460 Z$=GET$
470 FORT=1TO1000:NEXTT
480 ENDPROC
490 DEFPROCscreen
500 CLS:CLG:COLOUR2:PRINTTAB(1
2,16);"SHEET";SH%:SOUND1,1,
10,100:FORT=1TO7000:NEXT:CLS
510 REPEAT
520 READQZ,C%:COLOURQZ
530 PRINTTAB(1,C%);
540 FORI%=2TO40:VDU243:NEXTI%
550 UNTILC%=10
560 GCOL0,3:MOVE37,98:DRAW37,9
00:DRAW1279,900:DRAW1279,98
570 PRINTTAB(23,2);"SCORE=";S
C%;TAB(7,2);H%
580 ENDPROC
590 DEFPROCerr
600 IFERR=17ENDPROC
610 *FX4,0
620 *FX11,0
630 CLS
640 REPORT:PRINT" in line ";ER
L
650 END
660 DATA146,K,145,N,150,D,132,
C,145,K,146,0,132,U,150,T
670 DATA1,5,2,6,1,7,2,8,1,9,2,
10

```


LABYRINTH

```

5 DIM SCORE$(12):DIM SCD(12)
:FORA=1TO10:SCD(A)=A*100:SCORE$(
A)="Acorn Programs":NEXT:SCD(11)
=1000000
10 VDU23,224,128,192,224,224,
240,248,252,252
20 VDU23,225,127,193,221,221,
89,67,126,0
30 VDU23,226,240,152,140,134,
254,134,252,0
50 VDU23,228,255,255,255,255,
255,255,255,255
90 ENVELOPE 1,1,0,0,0,0,0,0,2
,0,-10,-5,120,0
100 VDU23,235,56,126,254,255,2
55,127,126,28
110 ENVELOPE 2,7,2,1,1,1,1,1,1
21,-10,-5,-2,120,120
111 MODE7:SCORE=0:PROCTITLE
140 ?&FE45=19:STAGE=1:MAN=4:SP
EED=&B:SPEED2=15.9875:DIM data 9
:SCORE=0
150 MODE1:VDU5:GCOL0,3:PROCBIG
("GET READY!",400,600):GCOL0,1:P
ROCBIG("GET READY!",405,605):MOV
E30,300:PRINT"Written for 'Acorn
Programs' by J.Odowd":PROCTUNE(
470)
160 FORZ=1TO1000:NEXT
170 D=200:VDU23,226,240,152,14
0,134,254,134,252,0

```

SCRAMBLE into the labyrinth with this game from John O'Dowd of Stourbridge, W Midlands. You must steer your starship through a deep space cavern, using the * and / keys. Keep clear of the cave walls and meteors but refuel by picking-up precious fuel pods. The game uses hardware scrolling so will not work on the Electron.

```

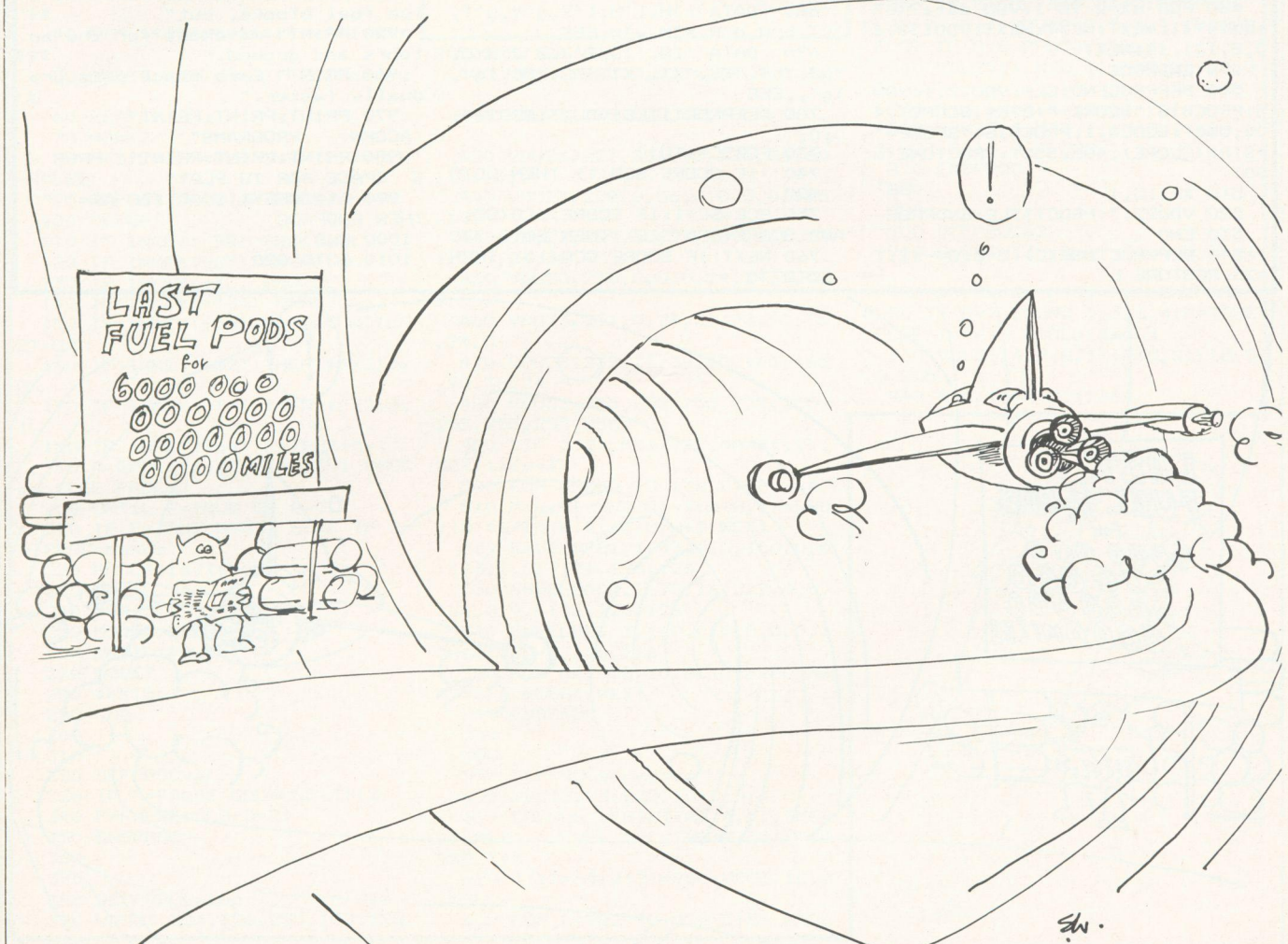
180 MODE1:VDU19,2,6;0::START=&
3008:CLS:VDU5:B=1200:X=100:Y=200
:FUEL=200:*FX15,0
190 PROCPUT:REPEAT:A=RND(INT(D
)):E=RND(INT(D)):PLOT69,B,0:PLOT
1,0,A:PLOT85,B+80,0:PLOT69,B,100
0:PLOT1,0,-A:PLOT85,B+80,1000
200 Q=RND(INT(STAGE*10)):IF Q>
(STAGE*10)-(STAGE*3) THEN MOVEB,
RND(INT(1000)):GCOL0,3:VDU235
210 IF Q<STAGE*8 THEN MOVEB,RN
D(INT(1000)):GCOL0,2:VDU228
220 IF FUEL<30 THEN SOUND1,2,1
0,1
221 IF FUEL<10 THEN SOUND2,2,3
0,1
230 VDU23;12,START DIV 2048;0;

```

```

0;0:VDU23;13,START MOD 2048 DIV
8;0;0;0:FUEL=FUEL-2:SOUND3,1,Y/8
,1:START=START+SPEED:B=B-60:IF S
TART>=&3278 THEN PROCRESET
240 IF D>=480 THEN SPEED=SPEED
*1.5:SPEED2=SPEED2*1.5:MODE1:VDU
5:PROCBIG(" S T A G E "+STR$(ST
AGE)+" C O M P L E T E D",70,60
0):GCOL0,1:PROCBIG(" S T A G E
"+STR$(STAGE)+" C O M P L E T E
D",75,605):PROCTUNE(610):STAGE=
STAGE+1
250 IF D>=480 GCOL0,3:PROCBIG(
" B O N U S ' O F "+STR$(FUEL*10),270,4
00):GCOL0,1:PROCBIG(" B O N U S O F "
+STR$(FUEL*10),275,405):FORW=1TO
3000:NEXT:SCORE=SCORE+FUEL*10:GO
TO170
260 SCORE=SCORE+1
270 PROCPUT:X=X+SPEED2:IF INKEY
Y-105 THEN Y=Y-32
280 IF INKEY-73 THEN Y=Y+32
290 IF FUEL<10 THEN Y=Y-40
300 PROCPUT
310 F=POINT(X+70,Y-35):G=POINT
(X+70,Y-50):H=POINT(X+30,Y-60):I
=POINT(X+30,Y-60)
320 IF F=2 OR G=2 THEN FUEL=FU
EL+40:SCORE=SCORE+50:SOUND2,1,10
,10:GCOL0,0:MOVEX+60,Y-32:VDU228
:MOVEX+60,Y:VDU228:MOVEX+60,Y-64

```

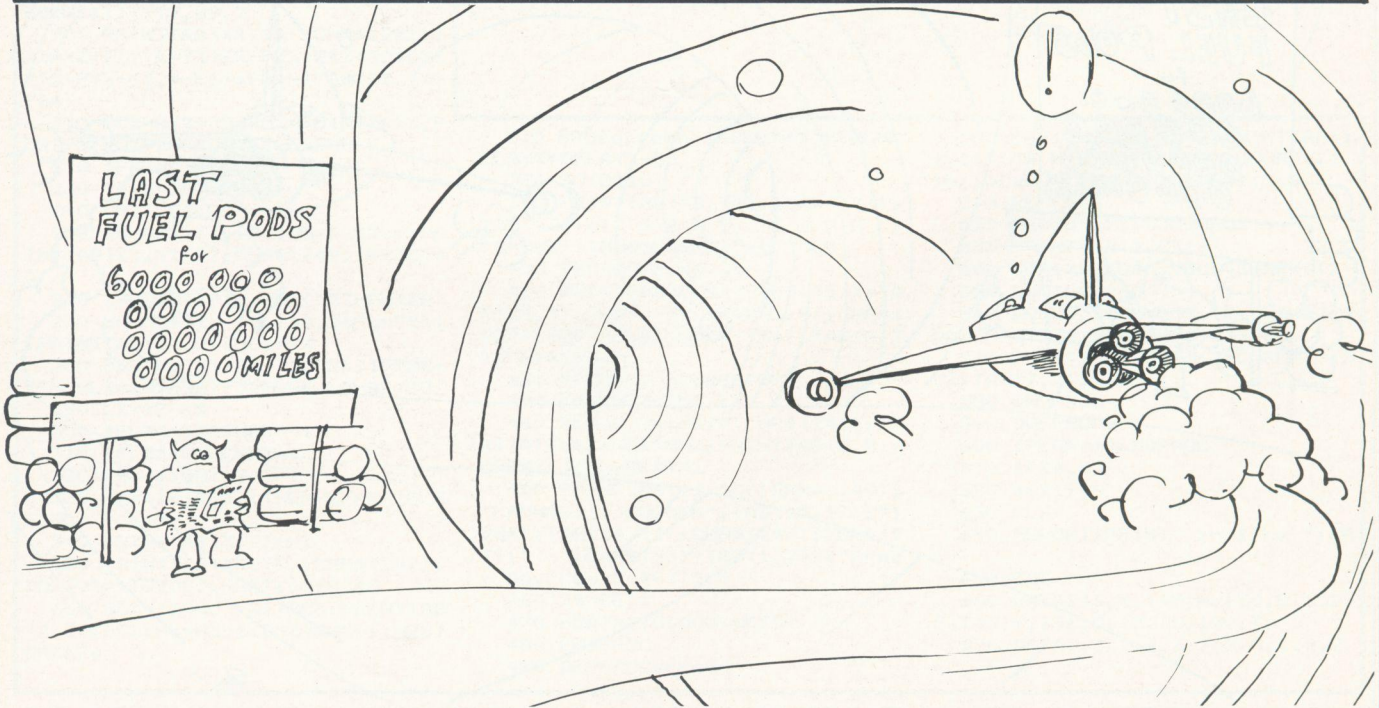


LABYRINTH

```

:VDU228:MOVEX+38,Y:VDU228:MOVEX+
92,Y-32:VDU228:MOVEX+92,Y:VDU228
:MOVEX+92,Y-64:VDU228
330 IF F=3 OR G=3 OR H=3 OR I=
3 OR H=2 OR I=2 THEN PROCDEAD:60
T0360
340 UNTIL FALSE
350 PROCEND
351 GOTO 140
360 IF MAN=0 THEN GOTO 350 ELS
E GOTO180
370 GOTO 340
380 DEFPROCRESET:PROCPUT:START
=&3008:B=1200:X=20:Y=Y-30:PROCFU
T:IF D<490 THEN D=D+50/STAGE+20
390 ENDPROC
400 DEFPROCPUT
410 GCOL3,1:MOVEX,Y:VDU224,10,
8:GCOL3,3:VDU225,226:GCOL0,3:END
PROC
420 DEFPROCDEAD:SOUND0,-10,4,2
0:FOR S=100 TO 50 STEP -2:SOUND1
,-15,S,1:NEXT S:MAN=MAN-1:ENDPRD
C
440 DEFPROCBIG(A%,X%,Y%):F%=1
450 PLOT69,X%+F%,(Y%+F%)-100
460 LOCAL a%,b%,c%,d%,X%,Y%,A%
:FORa%=1TO LEN A%:?data=ASC (MID
$(A%,a%,1)):X%=data MOD 256:Y%=d
ata DIV 256:A%=10:CALL &FFF1:FOR
b%=0 TO 1:VDU23,b%+130
470 FOR c%=0 TO 3
480 FOR d%=0 TO 1:VDU data?(c%
+b%*4+1):NEXT:NEXT:VDU130,1
0,8,131,11:NEXT
490 ENDPROC
500 DEFPROCEND:CLS:VDU22,1:VDU
5:PROCBIG ("SCORE="+STR$(SCORE),4
00,550):GCOL0,1:PROCBIG ("SCORE="
+STR$(SCORE),405,555):PROCTUNE (6
90)
510 *FX15,1
520 VDU22,7:PROCTITLE:ENDPROC
530 END
540 DEFPROCTUNE (L):U=5:O=-12:T
=25:RESTORE L
550 READ S$:IF S$="EEE" THEN E
NDPROC
560 FOR I=1 TO 3
570 IF I<=LEN(S$)THEN SOUND I,
0,(ASC (MID$(S$,I,1))-65)*4+T,U E
LSE SOUND I,0,1,U
580 NEXTI:GOTO550
590 DATA nb,pd,l',il,il,k_,g[
,g[,bV,dX,'T,JQ,JQ,_S,[O,[O
600 DATA VJ,XL,TH,QE,QE,SG,QE
,PD,OC,OC,EEE
610 DATA ieA,hA,ieY,ieY,ieH,i
eH,liY,liY,njF,njF,n^Y,njY,n^M,n
'M,nbY,nbY
620 DATA eb>,d>,ebY,ebY,ebE,e
bE,ieY,ieY,jeC,jeC,j[V,jzV,j[J,j
JJ,j^V,g^V
630 DATA BRf,BRf,gVR,bVR,bOC,
gOC,bPD,bPD,'QE,'QE,'YQ,'YQ,eF,e
F,eYQ,eYQ
640 DATA dL,hL,kXS,pXS,pP,nP,
kXS,lXS,iXQ,iXQ,iXQ,iXQ,jXO,jXO,
jXH,jXH
650 DATA ieA,hA,ieY,ieY,ieH,i
eH,liY,liY,njF,njF,n^Y,njY,n^M,n
'M,nbY,nbY
660 DATA eb>,d>,ebY,ebY,ebE,e
bE,ieY,ieY,jeC,jeC,j[V,jzV,j[J,j
JJ,j^V,g^V
670 DATA BRf,BRf,gVR,bVR,bOC,
gOC,bPD,bPD,'QE,'MA,'L@,'J>,e\I,
e\I,e\I,YI=
680 DATA iJH,l^H,l^Y,g^Y,g^T,
^T,b^H,d^H,eJM,eJM,EEE
690 DATA 'ZQ,'ZQ,Z^J,Z^J,dYD,
YbO,YbS,'XS,'XT,'XT,'OC,'OC,lg<,
lg<,,EEE
700 DEFPROCTITLE:VDU23:8202:0;
0;0;
730 FORSC=1TO10
740 IF SCORE<SCO(1) THEN GOTO
820
750 SCE=SC+1:IF SCORE>SCO(SC)
AND SCORE<SCO(SCE) THEN GOTO 770
760 NEXT:IF SCORE>SCO(10) THEN
GOTO770
770 *FX15,1
780 PRINT:INPUT " A high_score
,name please>"NAME$
790 CLS
800 FOR O=1 TO SC:SCORE$(O)=SC
ORE$(O+1):SCO(O)=SCO(O+1):NEXT
810 SCORE$(SC)=NAME$:SCO(SC)=S
CORE
820 PRINT:PRINT:PRINT:PRINT:PR
INT
830 PRINT:VDU141:PRINT"
LABYRINTH":VDU141:PRINT"
LABYRINTH":PRINT
840 VDU141:PRINT" High
score table":VDU141:PRINT"
High score table"
850 PRINT:FORA=1TO10:PRINT"
";A:"";SCORE$(11-A)::PRINT TAB
(30,11+A):SCO(11-A):NEXT:PRINT
860 PRINT:PRINT:PRINT" PRES
S SPACE BAR TO PLAY"
870 A$=INKEY$(800):IF A$=" " T
HEN ENDPROC
880 CLS
890 PRINT:PRINT:PRINT:PRINT
910 PRINT:PRINT" C O N
T R O L S"
920 PRINT:PRINT:PRINT"
*=UP"
930 PRINT:PRINT" /=D
OWN"
940 PRINT:PRINT" Collect the b
lue fuel blocks, but"
950 PRINT" watchout for the me
teors and ground."
960 PRINT" Each stage gets gra
dually faster."
970 PRINT:PRINT:PRINT"
ACORN PROGRAMS"
980 PRINT:PRINT:PRINT" PRES
S SPACE BAR TO PLAY"
990 A$=INKEY$(1000):IF A$=" "
THEN ENDPROC
1000 CLS
1010 GOTO 820

```



IN THE MINE

STEPHEN FLOOD of Thornton Cleveleys, Lancashire, supplies another adventure for Dennis. Following his escape, On the Farm, in the June/July issue, Dennis finds himself deep in some South African mines. His mission is to collect as many diamonds as possible while avoiding the perils of deadly green monsters and some red bombs.

Reach the diamonds before the monsters or they will be replaced with bombs. You had better watch your step, for if you tread on a bomb you lose one of your three lives. Move the intrepid hero through the mines by using the Z, X, * and ? keys to move left, right, up and down.



```

10 REM *****
***
20 REM ** DENNIS IN THE MINES
**
30 REM ** BY S.T. FLOOD
**
40 REM *****
***
50 MODE7:PROCsetup:PROCinstru
ct
60 REPEAT
70 MODE2
80 M=3:L=1:S=0:H=5:B=1::D=0:F
=FALSE
90 REPEAT:PROCvar:PROCscreen
100 REPEAT
110 IF INKEY(-98) PROCleft
120 IF INKEY(-67) PROCright
130 IF INKEY(-73) PROCup
140 IF INKEY(-105) PROCdown
150 IF INKEY(-56) REPEATUNTILG
ET=82
160 IF INKEY(-82) THEN *FX210,
0
170 IF INKEY(-17) THEN *FX210,
1
180 IF INKEY(-66) F=TRUE:M=1
190 Q=RND(11):IF M(Q,0)=1 PROC
m1 ELSE PROCm2
200 UNTIL F=TRUE OR D=0
210 IF F=TRUE M=M-1 ELSE IF D=
0 PROCchange
220 PROCdelay(4000)
230 UNTIL M=0
240 *FX15,1
250 MODE7:PROCend
260 UNTIL FALSE
270 MODE7
280 *FX15,1
290 END
300
310
320 DEFPROCvar
330 IF F=FALSE COL=RND(4)+2
340 F=FALSE:CLS:D=21
350 ENDPROC
360
370
380 DEFPROCsetup
390 VDU23,224,126,255,153,153,

```

```

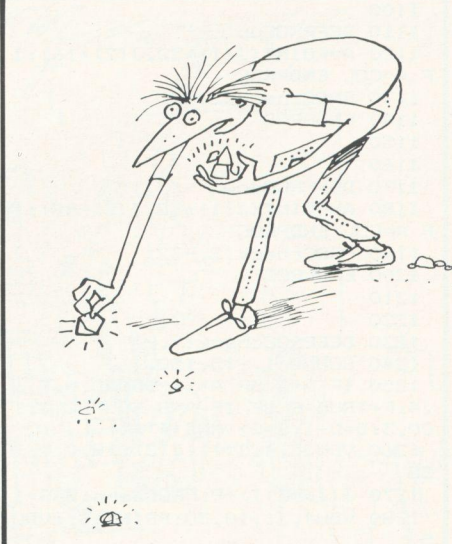
255,195,126,60
400 VDU23,225,0,0,34,34,0,0,0,
0
410 VDU23,226,0,0,68,68,0,0,0,
0
420 VDU23,227,231,90,126,24,60
,126,0,0
430 VDU23,228,0,36,0,0,0,0,195
,129
440 VDU23,229,60,24,189,231,23
1,189,24,60
450 VDU23,230,0,0,0,24,24,0,0,
0
460 VDU23,231,0,24,36,90,90,36
,24,0
470 VDU23,232,24,36,90,165,165
,90,36,24
480 VDU23,255,255,255,255,255,
255,255,255,255
490 DIM J(2),M(11,2),NAM$(11),
SC(11):H=1
500 FOR C=800 TO 128 STEP -64
510 M(H,0)=RND(2)-1:M(H,1)=RND
(18)*64:M(H,2)=C:H=H+1:NEXT
520 ENVELOPE1,1,43,0,0,100,0,0
,126,0,0,-126,126,126
530 ENVELOPE2,1,70,16,2,2,0,0,
126,0,0,-126,126,126
540 ENVELOPE 3,1,0,0,0,0,0,0,1
26,-1,0,-3,126,126
550 FOR C=1 TO 10:SC(C)=200:NA
M$(C)="BEEB":NEXT
560 ENDPROC
570
580
590 DEFPROCscreen
600 VDU12,23;8202;0;0;0;4
610 COLOUR7:PRINTTAB(4,1);"MEN
";M;" LEVEL ";L;TAB(4,30);"SC
ORE ";S
620 J(1)=64:J(2)=960:VDU5,18,0
,COL
630 FOR C=992 TO 928 STEP -32:

```

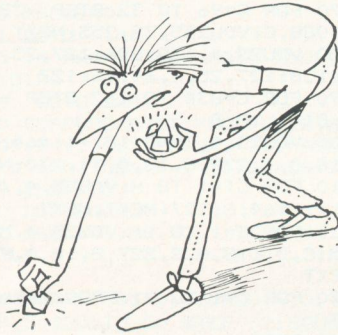
```

MOVE 0,C:VDU255,32,255:NEXT
640 FOR C=898 TO 98 STEP -64
650 MOVE 0,C:MOVE1279,C:PLOT85
,0,C-30:PLOT 85,1279,C-30
660 VDU25,4,0;C-32;255;25,4,12
16;C-32;255:NEXT
670 FOR C=96 TO 32 STEP -32:MO
VE 1088,C:VDU255,32,255:NEXT
680 VDU25,4,128;896;127,25,4,1
216;128;127,25,4,64;96;127
690 FOR C=834 TO 162 STEP -64:
FOR C1=1 TO B
700 VDU25,4,(RND(18)+1)*64;C;1
27,18,0,1,229,8,18,0,11,230:NEXT
710 FOR C1=1 TO H:VDU25,4,(RND
(18)+1)*64;C;127:NEXT:NEXT
720 FOR C=1 TO 11:VDU25,4,M(C,
1);M(C,2);18,0,2,227,8,18,0,7,22
B:NEXT
730 FOR C=1 TO 21:PROCdiamond:
NEXT
740 PROCdenn
750 ENDPROC
760
770
780
790
800
810 DEFPROCm1
820 R=POINT(M(Q,1)-32,M(Q,2)-1
6)
830 IF R=COL M(Q,0)=0:ENDPROC
ELSE IF R=7 SOUND 0,3,6,4:F=TRUE
ELSE IF R=8 PROCdiamond
840 VDU25,4,M(Q,1);M(Q,2);18,0
,0,255
850 M(Q,1)=M(Q,1)-64
860 VDU25,4,M(Q,1);M(Q,2);18,0
,2,227,8,18,0,7,22B
870 ENDPROC
880
890
900 DEFPROCm2
910 R=POINT(M(Q,1)+96,M(Q,2)-1
6)
920 IF R=COL M(Q,0)=1:ENDPROC
ELSE IF R=7 SOUND 0,3,6,4:F=TRUE
ELSE IF R=8 PROCdiamond
930 VDU25,4,M(Q,1);M(Q,2);18,0
,0,255
940 M(Q,1)=M(Q,1)+64

```



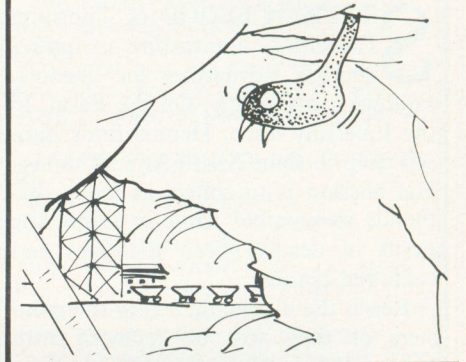
IN THE MINE



```

1290 ENDPROC
1300
1310
1320 DEFPROCchange
1330 SOUND 2,1,17,18
1340 H=H-1:IF H<1 H=1
1350 B=B+1:IF B>15 B=15
1360 S=S+100*L:L=L+1
1370 ENDPROC
1380
1390
1400 DEFPROCend
1410 VDU23;8202;0;0;0;
1420 PROCheader:PROCfind
1430 PRINTTAB(11,4):CHR$132:CHR
$136;"HALL OF FAME..."
1440 FOR C=1 TO 10
1450 PRINTTAB(5,C+6):CHR$133:C;
TAB(10,C+6):CHR$134:NAM$(C);TAB(
30,C+6):CHR$130:SC(C);
1460 NEXT
1470 PRINTTAB(6,22):CHR$131:CHR
$136;"PRESS KEY 'F' TO FINISH.."
1480 PRINTTAB(6,23):CHR$131:CHR
$136;"PRESS SPACE BAR TO PLAY.."
1490 REPEAT:K=GET:UNTIL K=32 OR
K=70
1500 IF K=70 VDU22,7:END
1510 ENDPROC
1520
1530 DEFPROCfind
1540 C=0:REPEAT:C=C+1:UNTIL S>S
C(C) OR C=11
1550 IF C=11 ENDPROC
1560 FOR C1=10 TO C STEP -1:SC(
C1)=SC(C1-1):NAM$(C1)=NAM$(C1-1)
:NEXT
1570 SC(C)=S
1580 PRINT"CHR$130:"YOUR SCORE
OF ";S;" IS IN THE TOP 10"
1590 PRINTCHR$130:"PLEASE ENTER
YOUR NAME":CHR$133;
1600 INPUT,N$:NAM$(C)=LEFT$(N$,
15)
1610 PROCdelay(500):PROCheader
1620 ENDPROC
1630
1640
1650 DEFPROCdelay(Q%)
1660 FOR DE=1 TO Q%:NEXT
1670 ENDPROC

```



```

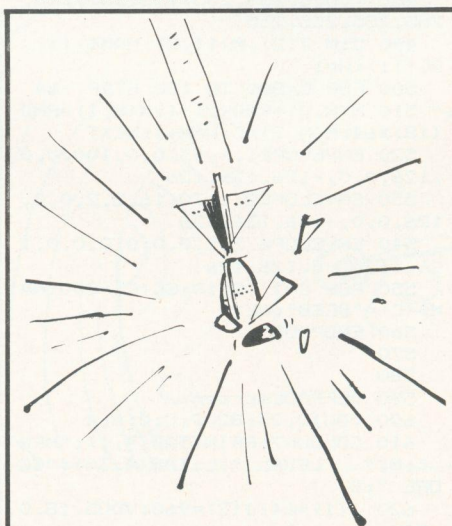
1680
1690
1700 DEFPROCheader
1710 CLS
1720 FOR C=1 TO 2
1730 PRINTTAB(8,C):CHR$141:CHR$
129;"DENNIS IN THE MINES"
1740 NEXT
1750 ENDPROC
1760
1770
1780
1790
1800 DEFPROCdenn
1810 IF J(2)>992 J(1)=1152:J(2)
=32
1820 IF J(2)<32 J(1)=68:J(2)=99
2
1830 VDU25,4,J(1):J(2):18,0,7,2
24,8,18,0,8,225,8,18,0,15,226
1840 ENDPROC
1850
1860
1870 DEFPROCdiamond
1880 REPEAT:X=RND(19)*64:Y=(RND
(24)+4)*32:UNTIL POINT(X+32,Y-16
)=0
1890 VDU25,4,X:Y:18,0,8,231,8,1
8,0,15,232
1900 ENDPROC
1910 DEFPROCinstruct
1920 PROCheader
1930 PRINT" Dennis has becom
e a diamond miner in South Afric
a. He must collect as many dia
monds as possible whilst avoidin
g all the monsters and unexploded
bombs."
1940 PRINT" When a monster ap
proaches a diamond it picks it
up and replaces it at a rand
om position in the mines. The bo
mbs never move but increase in n
umbers as the game progresses.
"
1950 PRINT" KEYS:-"
1960 PRINT" Z - LEFT
X - RIGHT"
1970 PRINT" * - UP
? - DOWN"
1980 PRINT" S - SOUND ON
Q - SOUND OFF"
1990 PRINT" P - PAUSE
R - RESUME"
2000 PRINT" A - ABORT GAME"
2010 PRINTTAB(5,23):CHR$132:"PR
ESS SPACE TO CONTINUE..";
2020 REPEATUNTILGET=32
2030 ENDPROC

```

```

950 VDU25,4,M(Q,1):M(Q,2):18,0
,2,227,8,18,0,7,228
960 ENDPROC
970
980
990 DEFPROCleft
1000 A=POINT(J(1)-32,J(2)-16):I
F A=COL ENDPROC
1010 PROCcheck(1,-64)
1020 ENDPROC
1030
1040
1050 DEFPROCright
1060 A=POINT(J(1)+96,J(2)-16):I
F A=COL ENDPROC
1070 PROCcheck(1,64)
1080 ENDPROC
1090
1100
1110 DEFPROCup
1120 A=POINT(J(1)+32,J(2)+16):I
F A=COL ENDPROC
1130 PROCcheck(2,32)
1140 ENDPROC
1150
1160
1170 DEFPROCdown
1180 A=POINT(J(1)+32,J(2)-48):I
F A=COL ENDPROC
1190 PROCcheck(2,-32)
1200 ENDPROC
1210
1220
1230 DEFPROCcheck(T,F)
1240 SOUND 1,-15,150,1
1250 IF A=2 OR A=11 SOUND 0,3,6
,4:F=TRUE ELSE IF A=8 SOUND 2,2,1
00,3:D=D-1:S=S+(RND(4)*5)
1260 VDU25,4,J(1):J(2):18,0,0,2
55
1270 J(T)=J(T)+P:PROCdenn:S=S+1
1280 VDU4,31,10,30:PRINT:S;VDU
5

```



ORGANIC BLASTER

```

10 MODE7:PROCINSTRUCT
20 MODE1
30 PROCINIT
40 REM -MAIN LOOP-
50 REPEAT:SOUND0,-15,4,1
60 VDU20
70 PROCUPDATE
80 COLOUR 0:PRINTTAB(4,R*8-3
);"+":PRINTTAB(C*8+2,0);"+
90 PROCKEY
100 COLOUR3:PRINTTAB(4,R*8-3)
;"+":PRINTTAB(C*8+2,0);"+
110 UNTILA(0,0)=1 AND A(0,1)=
1 AND A(0,2)=1 AND A(1,0)=1 AND
A(1,2)=1 AND A(2,0)=1 AND A(2,1)
=1 AND A(2,2)=1 AND A(1,1)=0
120 PROCUPDATE:VDU20:FORT=1 T
D1000:WIN=TRUE:NEXT:S=S+200:PROC
SCORE
130 END
140 REM -SET UP VARIABLES-
150 DEFPROCINIT
160 DIM A(2,2)
170 FOR T=0T02
180 FORY=0T02
190 A(Y,T)=RND(2)-1
200 NEXTY
210 NEXTT
220 B$=CHR$224+CHR$224+CHR$10
+CHR$8+CHR$8+CHR$224+CHR$224+CHR
$11
230 BLOCK$=B$+B$+CHR$10+CHR$8
+CHR$8+CHR$8+CHR$8+B$+B$+CHR$10+
CHR$8+CHR$8+CHR$8+CHR$8+B$+B$
240 VDU23,224,255,255,255,255
,255,255,255,255:R=1:C=1:VDU23;B
202;0;0;0;M=0
250 TIME=0:WIN=FALSE
260 ENDPROC
270 REM -UPDATE BOARD AND TIME
-
280 DEFPROCUPDATE
290 FOR T=0T02
300 FORY=0T02
310 COLOUR A(Y,T)+1:PRINTTAB(
Y*8+7,T*8+3);BLOCK$
320 NEXTY
330 NEXTT
340 PRINTTAB(7,28)"TIME: ";INT
(TIME/100):IF TIME>=6000 PROCSCOR
E
350 PRINTTAB(15,28)"ORGANIC B
LASTS: ";M
360 ENDPROC
370 REM -CHECK FOR INPUT-
380 DEFPROCKEY
390 A$=INKEY$(0):IF R<3 AND A
$="Z" THEN R=R+1 ELSE IF R=3 AND
A$="Z" THEN R=1 ELSE IF A$="/"
AND C<3 THEN C=C+1 ELSE IF C=3 A
ND A$="/" THEN C=1
400 IF A$=" " PROCFIRE ELSE E
NDPROC
410 REM -ANALYSE INPUT-
420 IF R=1 AND C=1 OR R=1 AND
C=3 OR R=3 AND C=1 OR R=3 AND C
=3 THEN PROCCOR(R,C)
430 IF R=1 AND C=2 OR R=2 AND
C=1 OR R=2 AND C=3 OR R=3 AND C=
2 THEN PROCEEDGE(R,C)
440 IF R=2 AND C=2 PROCCENT
450 ENDPROC
460 REM -AFFECT STATUS IN PRE-
DETERMINED WAY-
470 DEFPROCCOR(R,C)
480 PROCCH(C-1,R-1)
490 C=C+1:IF C>3 THEN GOTO 53
0
500 R=R+1:IF R>3 THEN 520
510 PROCCH(1,0):PROCCH(0,1):P
ROCCH(1,1):ENDPROC
520 PROCCH(0,1):PROCCH(1,2):P
ROCCH(1,1):ENDPROC
530 R=R+1:IF R>3 THEN 550
540 PROCCH(1,0):PROCCH(2,1):P
ROCCH(1,1):ENDPROC
550 PROCCH(2,1):PROCCH(1,2):P
ROCCH(1,1):ENDPROC

```

```

560 DEFPROCEEDGE(R,C):PROCCH(C
-1,R-1)
570 IF C=1 PROCCH(0,0):PROCCH
(0,2):ENDPROC
580 IF C=3 PROCCH(2,0):PROCCH
(2,2):ENDPROC
590 IF C=2 AND R=1 PROCCH(0,0
):PROCCH(2,0):ENDPROC
600 PROCCH(0,2):PROCCH(2,2)
610 ENDPROC
620 DEFPROCCENT:PROCCH(R-1,C-
1):PROCCH(0,1):PROCCH(2,1):PROCC
H(1,0):PROCCH(1,2):ENDPROC
630 REM-FIRING PROCEDURE
640 DEFPROCFIRE:M=M+1:FOR T=1
50 TO 1 STEP -16:SOUND1,-15,T,2:
NEXT:ENDPROC
650 REM -CHANGE SQUARE-
660 DEFPROCCOR(R1,C1)
670 FOR T=1 TO 15:VDU19,1,T,0
,0,0:VDU19,2,T,0,0,0:NEXT T:IF A
(R1,C1)=0 THEN A(R1,C1)=1 ELSE A
(R1,C1)=0
680 ENDPROC
690 REM -FINAL SCORE-
700 DEFPROCScore
710 COLOUR3
720 CLS:IF WIN=FALSE PRINT"Yo
u failed to save England!":FOR T
=15 TO 1 STEP-1:SOUND 0,-T,4,1:N
EXT:GOTO740
730 PRINT"WELL DONE! You save
d England!":FOR T=1 TO 150 STEP 1
0:SOUND1,-15,T,1:NEXT
740 S=S+100-M-INT(TIME/100):P
RINT:PRINT:PRINT"You scored: ";S
750 PRINT:PRINT:PRINT"ANOTHER
GO?":FORT=1 TO1000:NEXT:A$=GET$
:IF A$<>"N" THENRUN ELSE END
760 REM -INSTRUCTIONS-
770 DEFPROCINSTRUCT:X$=CHR$255
780 PRINTCHR$145"<_<10
($"
790 PRINTCHR$145"j5j5j=+$h7k5
s{4j7k4 k5 h7+$"
800 PRINTCHR$145""-!% s{
""-.%%%% _- ""-!"
810 PRINTCHR$131"-----
"
820 PRINTCHR$145"h<10 14
!"

```

ONE LAZY Sunday afternoon it happens — a bomb drops through your ceiling and on to the floor. The timer is ticking away. It reads T minus 60 seconds and counting. Just one minute between you and the complete destruction of England.

Can you stop the clock by selecting the correct colour combination with a series of blasts to the organic brain of the bomb? Time will tell.

Use the Z and / keys to move left and right and the space bar to fire the blaster. Andrew Wills of Aylesbury, Bucks, provided this adventure.

```

830 PRINTCHR$145"j=n1 j5 s{4(
ws!""X$"* hw{4j=+$"
840 PRINTCHR$145"*-! _- ""-.%
(,.,! +, ""-, *%"
850 PRINTCHR$131"-----
"
860 PRINTCHR$131"A bomb. set t
o destroy England in"
870 PRINTCHR$131"one minute,ha
s landed in your living"
880 PRINTCHR$131"room.You must
de-activate it by sending";
890 PRINTCHR$131"blasts to its
organic brain.Blasting"
900 PRINTCHR$131"one of the ni
ne sectors of its brain"
910 PRINTCHR$131"affects not o
nly that sector but others";
920 PRINTCHR$131"as well.Each
sector can have either a"
930 PRINTCHR$131"red or a yell
ow status.To de-activate"
940 PRINTCHR$131"you must achi
eve this status:-Y Y Y"
950 PRINT"-----
";CHR$131"Y";CHR$129"R
";CHR$131"Y"
-
960 PRINTCHR$131"The keys are:
Y Y Y"
-
970 PRINTCHR$129"Z-Move down R
ow marker"
980 PRINTCHR$129"/-Move down C
olumn marker"
990 PRINTCHR$129"SPACE-Fire an
Organic Blaster at the"
1000 PRINTCHR$129"intersection
of the Row and Column"
1010 PRINTCHR$129"markers."
1020 PRINTTAB(13);CHR$131"PRE
S SPACE":REPEAT:A=GET:UNTILA=32
1030 ENDPROC

```



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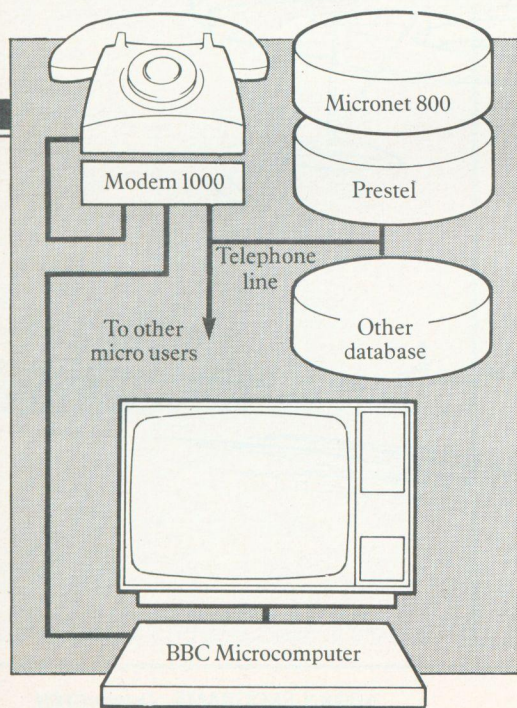
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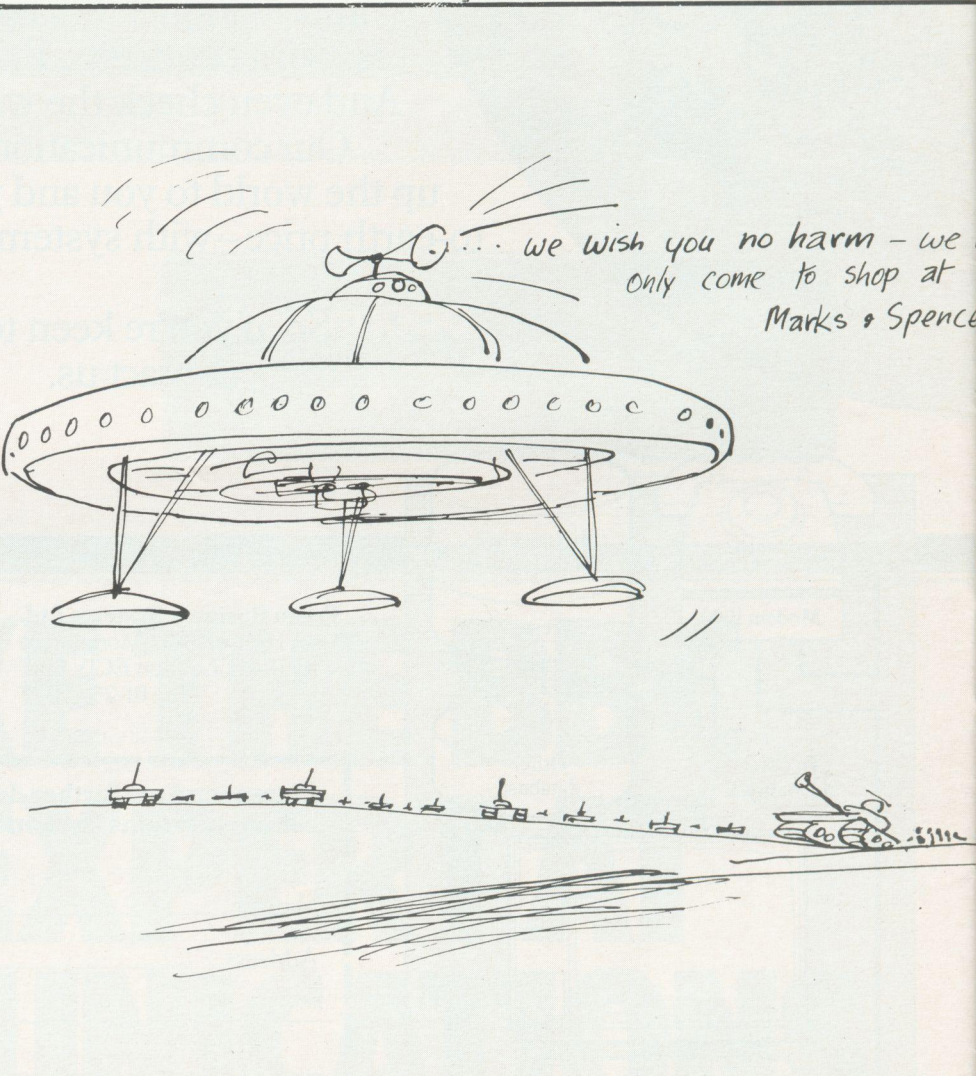
Tel: _____

ARGON

BEWARE the Argons. In this game for the Electron by Owain Griffiths of Halmer, Kent you must shoot down the invading spacecraft before it touches down and takes over the world. Use the Z and X keys to move your tank left and right and hit return to fire your laser cannon. **Argon Attack** also runs on the BBC B.

```
a grand total of ";SC%
400PRINT"Press space bar for n
ew game"
410A#=GET#:ENDPROC
420REM .....BOMB.....
.....
430
440DEFFPROCbomb
450L%=L%+1
460IFL%=29 THEN PRINTTAB(0,L%)
;SPC(20):bombflag=FALSE
470IF Y%=N% AND L%=29 THEN LI%
=LI%-1:SOUND1,-15,50,5:Y%=X%
480IF Q%=Y% AND L%=0%-1 THEN b
ombflag=FALSE:missileflag=FALSE:
Q%=29:L%=2:SC%=SC%+5
490ENDPROC
510REM .....INSTR.....
.....
520
530DEFFPROCinstr7
540PRINTCHR#141;CHR#130;"
AIR ATTACK"
550PRINTCHR#141;CHR#130;"
AIR ATTACK"
560PRINTCHR#134;" By
Owain Griffiths"
570PRINT"The idea of the game
is to shoot the "
580PRINT"argon before he reach
s the ground."
590PRINT"a warning will be mad
e when the ""Argon is near the
ground."
```

```
10
20REM *****
*****
30REM ** Air Attack
**
40REM ** By Owain Griffiths
**
50REM *****
*****
60
70ONERRORRUN
80PROCinit
90MODE7
100VDU23,0,8202;0;0;0;
110PROCinstr7
120MODE2
130VDU23,0,8202;0;0;0;
140PROCinstr2
150 REPEAT
160PROCdelete
170PROCupdate
180PROCprint_all
190PROCbulk
200 UNTIL LI%=0 0
R T%=29
210PROCEND
220RUN
230
240REM .....FIRE.....
.....
250
260DEFFPROCfire
270Q%=Q%-1
280IFQ%<=T%-1 THEN missileflag
=FALSE:Q%=29:PRINTTAB(Q%,Q%+1);"
"
290IF Q%=Y% AND L%=0%-1 THEN b
ombflag=FALSE:missileflag=FALSE:
Q%=29:L%=2:SC%=SC%+5
300IF Q%=X% AND T%=0% THEN SC%
=SC%+10:T%=1:X%=2:Q%=29:SOUND1,-
15,250,5:missileflag=FALSE:ENDPR
OC
310ENDPROC
320
330REM .....END.....
.....
340
350DEFFPROCEND
360VDU22,7
370*FX15,1
380COLOUR7
390PRINTTAB(0,7);" You scored
```



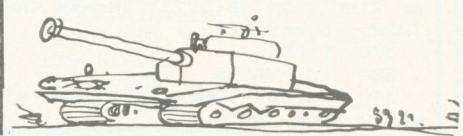
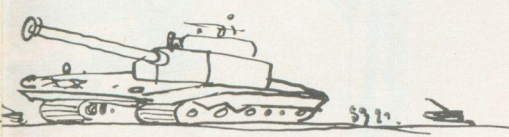
ATTACK

```

600PRINT"an extra man will be
awarded at 100."
610PRINT"Z      =left"
620PRINT"X      =right"
630PRINT"RETURN =fire"
640PRINT"Q      =sound off"
650PRINT"S      =sound on"
660PRINT"COPY   =pause"
670PRINT"DELETE =unpause"
680A#=GET#:ENDPROC
690DEFPROCinstr2
700PRINT"Argon  ";;:COLOUR3:PR
INTCHR$(240)':COLOUR7
710PRINT"Base   ";;:COLOUR2:PR
INTCHR$(241)':COLOUR7
720PRINT"missile";;:COLOUR5:PR
INTCHR$(242)':COLOUR7
730PRINT"Bomb   ";;:COLOUR6:PR
INTCHR$(243)
740A#=GET#:CLS:COLOUR1:PRINTTA
B(0,0);SPC(5);CHR$(244);CHR$(245
);CHR$(246);SC%;" ";CHR$(247);CH
R$(248);" ";LI%
750ENDPROC
760
770REM .....UPDATE.....
.....
780
790DEFPROCupdate
800IF T% MOD 2 =1 THEN X%=X%+1
ELSE X%=X%-1
810IF X%=1 OR X%=18 THEN T%=T%
+1:PRINTTAB(X%+1,T%-1);" "
820IF INKEY(-67)THEN N%=N%+1:P
RINTTAB(N%-1,30);" "
830IF INKEY(-98)THEN N%=N%-1:P
RINTTAB(N%+1,30);" "
840IFN%<=1N%=N%+1
850IFN%>=18N%=N%-1
860IF missileflag=TRUE THEN PR
OCfire
870IF bombflag=TRUE THEN PROCb
omb
880ENDPROC
890
900REM .....DELETE.....
.....
910
920DEFPROCdelete
930PRINTTAB(X%,T%);" "
940IF bombflag=TRUE PRINTTAB(Y
%,L%);" "
950IF missileflag=TRUE PRINTTA
B(Q%,O%);" "
960ENDPROC
970
980REM .....PRINT_ALL.....
.....
990
1000DEFPROCprint_all
1010COLOUR3:PRINTTAB(X%,T%);CHR
$#240
1020COLOUR2:PRINTTAB(N%,30);CHR
$#241
1030IF bombflag=TRUE COLOUR6:PR
INTTAB(Y%,L%);CHR$243
1040IF missileflag=TRUE COLOUR5
:PRINTTAB(Q%,O%);CHR$242
1050ENDPROC
1060
1070REM .....INIT.....
.....
1080
1090DEFPROCinit
1100missileflag=FALSE:bombflag=
FALSE:EXTRA=TRUE
110X%=2:T%=1:LI%=3:SC%=0:N%=9:
O%=30:Y%=28:L%=2:Q%=7
1120VDU23 240 28 62 107 107 119
85 73 99
1130VDU23 241 0 0 0 8 8 62 127
127
1140VDU23 242 8 8 28 28 28 28 2
0 20
1150VDU23 243 153 90 60 60 60 6
0 24 0
1160VDU23 244 0 0 0 238 136 232
40 238
1170VDU23 245 0 0 0 238 170 172
170 234
1180VDU23 246 0 0 0 224 128 192
128 224
1190VDU23 246 0 0 0 224 128 192
128 224
1200VDU23 247 0 0 0 219 170 139
138 139
1210VDU23 248 0 0 0 209 25 149
19 209
1220ENDPROC
1230
1240REM .....BULK.....
.....
1250
1260DEFPROCbulk
1270VDU19,0,0;0;
1280IF INKEY(-106) THEN PROCpau
se
1290IF O%<=T%-1 THEN missileflag
=FALSE:O%=29:PRINTTAB(O%,O%+1);"
"
1300IF SC%>=100 AND EXTRA=TRUE T
HEN LI%=LI%+1:EXTRA=FALSE
1310IFT%>=26 THEN PROCsound
1320COLOUR1:PRINTTAB(0,0);SPC(5
);CHR$(244);CHR$(245);CHR$(246);
SC%;" ";CHR$(247);CHR$(248);" ";
LI%
1330IF INKEY(-82)THEN*FX210,0
1340IF INKEY(-17)THEN*FX210,1
1350A=RND(25):IFA=1 AND bombfla
g=FALSE THEN bombflag=TRUE:Y%=X%
:L%=T%:SOUND1,-15,100,5
1360IF INKEY(-74) AND missilefla
g=FALSE THEN missileflag=TRUE:Q%
=N%:SOUND1,-15,120,5
1370ENDPROC
1380DEFPROCpause
1390REPEAT
1400UNTIL INKEY(-90)
1410ENDPROC
1420DEFPROCsound
1430*fx210,0
1440SOUND1,-15,RND(200),1
1450VDU19,0,RND(7);0;
1460ENDPROC

```

have
r...



INLAY P

AN EXCELLENT utility is provided for BBC users with a printer by M Jackson of Halesowen, W Midlands. Using it you can design personalised cassette insert cards, detailing the contents of each side of the enclosed tape.

The program was written with the Canon 1080A printer in mind but works equally well on the Star/Epson printers.

```

10 ON ERROR PROCreport
20 PROCinit:PROCmenu
30 DEF PROCinit
40 VDU23;8202;0;0;0;
50 DIM A$(38)
60 DIM title$(2)
70 DIM detail$(2)
80 DIM dolby$(2)
90 C$=""
100 ENDPROC
110 DEF PROCcass
120 side=1
130 input$="length of cassette
eg C60, C120"
140 PROCinput(11)
150 IFin$="" THEN C$=C$ ELSE C$
=in$
160 ENDPROC
170 DEF PROCmenu
180 ON ERROR PROCreport
190 CLS
200 PRINTTAB(2,2)"CASSETTE IN
DEX LABEL MENU";
210 IFC$<>" THEN PRINT" FOR"
220 PRINTTAB(12);C$
230 PRINTTAB(3,5);"<E>NTER det
ails""TAB(3);"<A>MEND/VIEW pres
ent details""TAB(3);"<P>RINT fu
ll index card""TAB(3);"<T>ITL
E only to printer""TAB(3);"<S>AVE
entry to Tape/Disk""TAB(3);"<L
>OAD entry from Tape/Disk""";
240 PRINTTAB(4)"PLEASE SELECT
OPTION"
250 x$=GET$
260 IFx$="E" OR x$="e" THEN PRO
Cass:PROCside:PROCTitle:PROCTra
ck:PROCscreenprint
270 IFx$="A" OR x$="a" THEN PRO
Cass:PROCside:PROCscreenprint
280 IFx$="P" OR x$="p" THEN PR
OCpprint
290 IFx$="T" OR x$="t" THEN PR
OCtprint
300 IFx$="S" OR x$="s" THEN PR
OCsave
310 IFx$="L" OR x$="l" THEN PR
OCload
320 GOTO190
330 ENDPROC
340 DEF PROCside
350 CLS
360 PRINTTAB(3,5)"Enter/View i
nformation for""TAB(15)"SIDE 1
or SIDE 2 ?""TAB(5,23)"JPress <RE
TURN> to abort["
370 x$=GET$
380 side=VALx$
390 IFside<>0AND side<>1AND si
de<>2 THEN 360

```

```

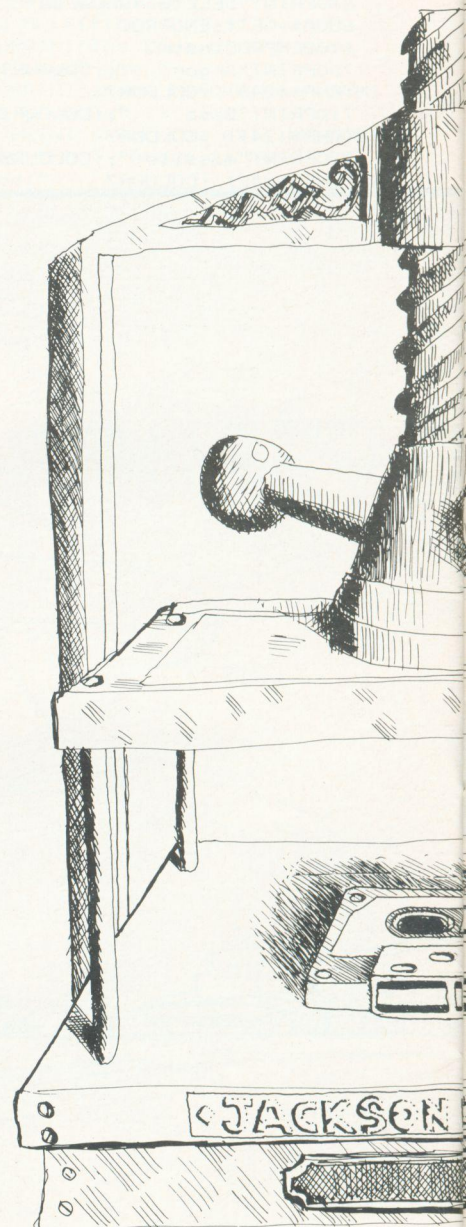
400 IFside=0 THEN PROCmenu
410 IFside=1 THEN beg=1 ELSE b
eg=20
420 ENDPROC
430 DEF PROCTitle
440 ti=1
450 CLS
460 input$="new Title (max 26
chars)":PROCinput(26)
470 IFin$="" THEN title$(side)=
title$(side) ELSE title$(side)=i
n$
480 input$="Details for SIDE "
+STR$(side)+" (max 65 chars)":PR
OCinput(65)
490 IFin$="" THEN detail$(side)
=detail$(side) ELSE detail$(side)
=in$
500 input$="DOLBY for SIDE "+S
TR$(side)+" (max 3 chars)":PROCi
nput(3)
510 IFin$="" THEN dolby$(side)=
dolby$(side) ELSE dolby$(side)=i
n$
520 ENDPROC
530 DEF PROCtrack
540 FORtrack=beg TO beg+18
550 input$="Text (max 31 chars
)":PROCinput(31)
560 IFin$="" THEN A$(track)=A$
(track) ELSE A$(track)=in$
570 NEXT
580 ENDPROC
590 DEF PROCinput(length)
600 in$=""
610 IFside=1 THEN asc=64 ELSE
asc=45
620 CLS
630 IFlength=26 THEN PRINT TAB
(0,5)"SIDE ";side;" existing Tit
le is""title$(side)";
640 IFlength=65 THEN PRINT TAB
(0,5)"SIDE ";side;" existing Det
ails are""detail$(side)";
650 IFlength=31 THEN PRINT TAB
(0,5)"SIDE ";side;" TRACK ";CHR$
(track+asc);" existing Text is""
A$(track)";
660 IFlength=3 THEN PRINT TAB(
0,5)"SIDE ";side;" existing DOLB
Y detail is""dolby$(side)";
670 IFlength=11 THEN PRINT TAB
(0,5)"Existing type is""C$";
680 PRINT"Enter ";input$;"or
press <RETURN> if OK"
690 z$=GET$
700 IF ASC z$=13 THEN ENDPROC
710 IF ASC z$=127 THEN in$=LEF
T$(in$,LENin$-1) ELSE in$=in$+z$
720 IF LEN in$>length THEN in$
=LEFT$(in$,length):VDU7
730 PRINTTAB(0,16);in$;" "
740 GOTO690
750 ENDPROC
760 DEF PROCscreenprint
770 CLS
780 PRINT title$(side):TAB(31,
0);"DOLBY ";dolby$(side):TAB(0,1
);detail$(side):TAB(31,2);"SIDE
";side;
790 IFside=1 THEN beg=1 ELSE b
eg=20
800 IFside=1 THEN asc=64 ELSE
asc=45
810 FORtrack=beg TO beg+18
820 VDUtrack+asc;

```

```

830 PRINT" ";A$(track)
840 NEXT
850 PROCcheck
860 ENDPROC
870 DEF PROCcheck
880 ti=0
890 PRINT"Enter track to amend
-<T> for Title""or <RETURN> if
OK";
900 x=GET
910 IFx=84 OR x=116 THEN PROCT
itle
920 IFx>90 THEN x=x-32

```



RINTER

```

930 IFx=13 THEN ENDPROC
940 IFside=1 THEN track=x-64 ELSE track=x-45
950 IFtrack<1 OR track>side*19 THEN 990
960 IFTi=1 THEN 990
970 input$="Text (max 31 chars)":PROCinput(31)
980 IFin$="" THEN A$(track)=A$(track) ELSE A$(track)=in$
990 PROCscreenprint
1000 ENDPROC
1010 DEF PROCpad

```

```

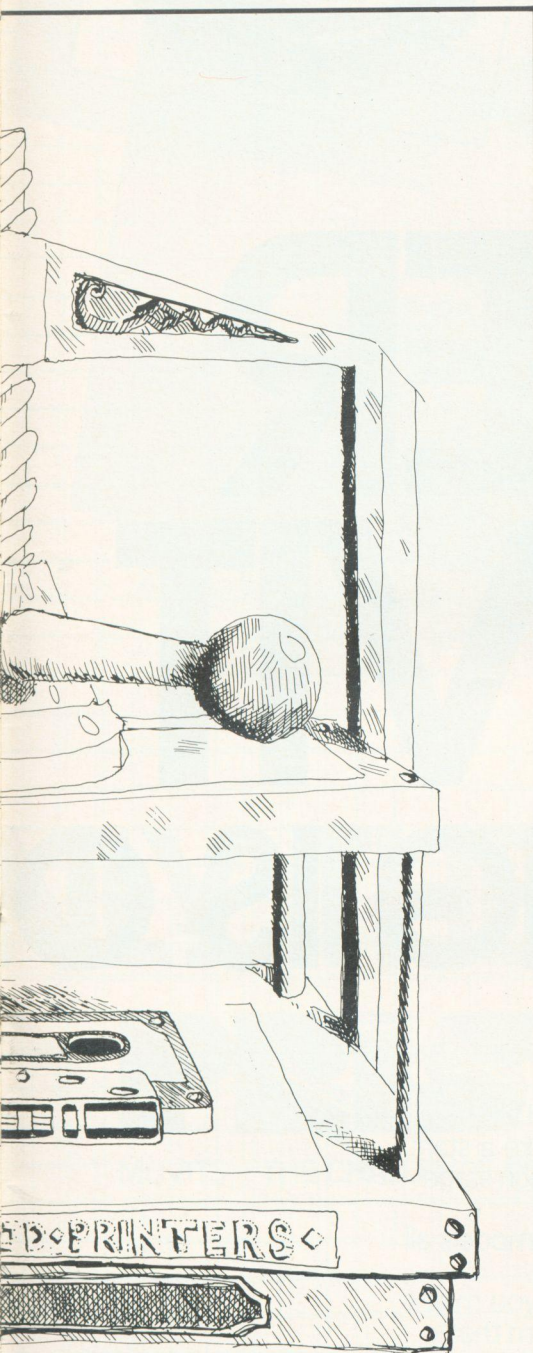
1020 FORtrack=1TO38
1030 A$(track)=A$(track)+STRING$(32-LENA$(track)," ")
1040 NEXT
1050 FORside=1TO2
1060 title$(side)=title$(side)+STRING$(26-LENTITLE$(side)," ")
1070 detail$(side)=detail$(side)+STRING$(65-LENDetail$(side)," ")
1080 NEXT
1090 ENDPROC
1100 DEF PROCpprint
1110 PROCpad
1120 VDU2
1130 *FX6,2
1140 VDU1,27,1,51,1,14:REM line space
1150 VDU1,27,1,15:REM Condensed print
1160 VDU1,27,1,85,1,1:REM unidirectional print
1170 PRINT"SIDE 1 DOLBY ":dolby$(1);TAB(34);"SIDE 2 DOLBY ":dolby$(2)
1180 VDU1,27,1,51,1,18:REM line space
1190 PRINT STRING$(65,"-");" "
1200 VDU1,27,1,48:REM line space
1210 FORtrack=1TO19
1220 PRINT A$(track);"! ":A$(track+19);" !"
1230 NEXT
1240 PRINT STRING$(65,"-");" "
1250 PRINT"SIDE 1: ";
1260 VDU1,27,1,14:REM Enlarged print with self cancellation
1270 VDU1,27,1,71:REM Double strike
1280 PRINTtitle$(1)
1290 VDU1,18:REM Cancel Condensed print
1300 VDU1,27,1,72:REM Cancel Double strike
1310 PRINT TAB(38-LEN C$);C$
1320 VDU1,27,1,15:REM Condensed print
1330 PRINT"SIDE 2: ";
1340 VDU1,27,1,14:REM Enlarged print with self cancellation
1350 VDU1,27,1,71:REM Double strike
1360 PRINTtitle$(2)
1370 VDU1,27,1,72:REM Cancel Double strike
1380 PRINT STRING$(65,"-");" "
1390 PRINT"SIDE 1: ";TAB(67)"!";detail$(1);" ";TAB(67)"!";"SIDE 2: ";TAB(67)"!";detail$(2);" "
1400 PRINTTAB(67);"! "
1410 PRINT STRING$(65,"*");" "
1420 PRINT STRING$(65,"*");" "
1430 VDU3
1440 ENDPROC
1450 DEF PROCsave
1460 PROCpad
1470 ON ERROR PROCreport
1480 PRINT"SAVE TO <T>APE OR <D

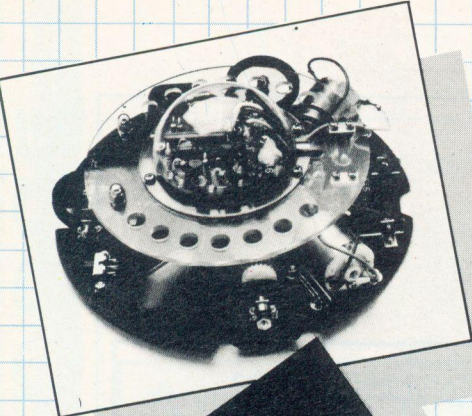
```

```

>ISK ?";:x$=GET$:PRINTx$
1490 IFx$="T"ORx$="t"THEN*TAPE
1500 IFx$<>"T"ANDx$<>"t"THEN*DISK
1510 INPUT"ENTER FILE NAME TO SAVE ":x$
1520 ch%=OPENOUT(x$)
1530 FORx=1TO38
1540 PRINT#ch%,A$(x)
1550 NEXT
1560 FORx=1TO2
1570 PRINT#ch%,title$(x),detail$(x),dolby$(x)
1580 NEXT
1590 PRINT#ch%,C$
1600 CLOSE#ch%
1610 ENDPROC
1620 DEF PROCload
1630 ON ERROR PROCreport
1640 PRINT"LOAD FROM <T>APE OR <D>ISK ?";:x$=GET$:PRINTx$
1650 IFx$="T"ORx$="t"THEN*TAPE
1660 IFx$<>"T"ANDx$<>"t"THEN*DISK
1670 INPUT"ENTER FILE NAME TO LOAD ":x$
1680 ch%=OPENIN(x$)
1690 FORx=1TO38
1700 INPUT#ch%,A$(x)
1710 NEXT
1720 FORx=1TO2
1730 INPUT#ch%,title$(x),detail$(x),dolby$(x)
1740 NEXT
1750 INPUT#ch%,C$
1760 CLOSE#ch%
1770 ENDPROC
1780 DEF PROCreport
1790 ON ERROR OFF
1800 CLOSE#0:VDU3
1810 REPORT
1820 PRINT"Error code number ";ERR;" at Line number ";ERL
1830 PRINT"PRESS <ESC> TO STOP PROGRAM" "PRESS <M> FOR MENU"
1840 x$=GET$
1850 IF x$="M" THEN PROCmenu
1860 GOTO1810
1870 ENDPROC
1880 DEF PROCtprint
1890 VDU2
1900 *FX6,2
1910 VDU1,27,1,15:REM Condensed Print
1920 VDU1,27,1,85,1,1:REM unidirectional print
1930 VDU1,27,1,50:REM line space 1/6 inch
1940 PRINT"SIDE 1: ";
1950 VDU1,27,1,14:REM Enlarged print with self cancellation
1960 VDU1,27,1,71:REM Double strike
1970 PRINTtitle$(1)
1980 VDU1,27,1,72:REM Cancel Double strike
1990 PRINT"SIDE 2: ";
2000 VDU1,27,1,14:REM Enlarged print with self cancellation
2010 VDU1,27,1,71:REM Double strike
2020 PRINTtitle$(2)
2030 VDU1,27,1,72:REM Cancel Double strike
2040 VDU3
2050 ENDPROC

```

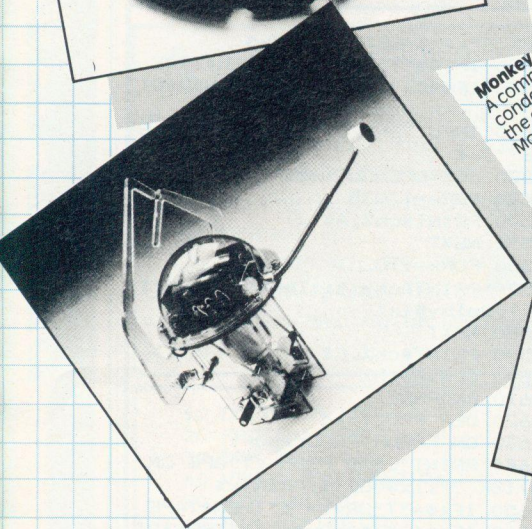




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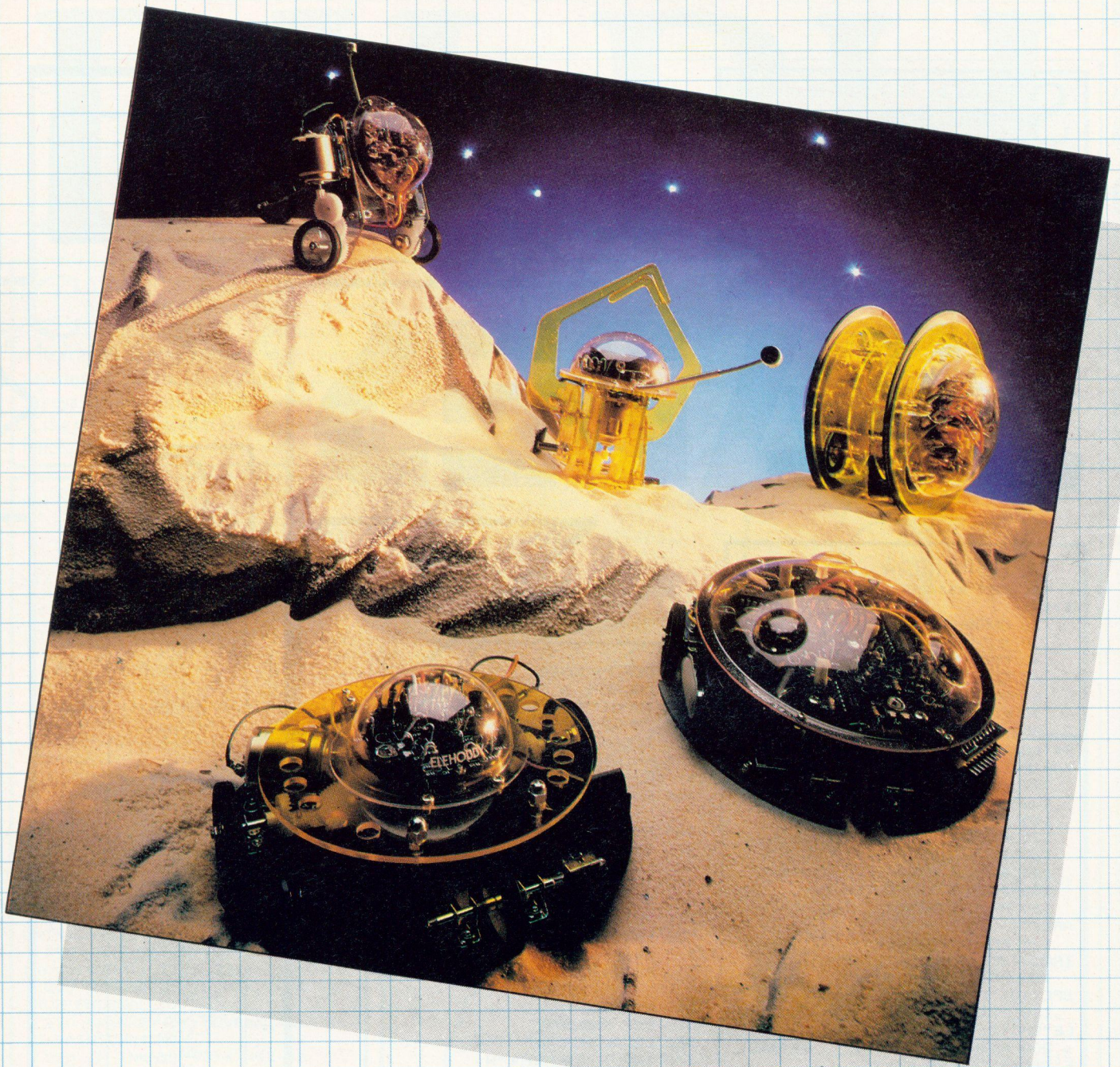
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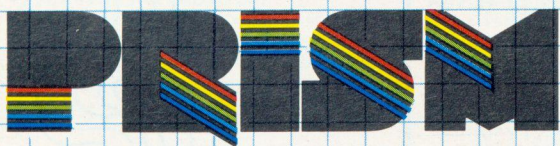
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House, 18–29 Mora Street, London EC1V 8BT.

SHAPES by K McIntyre of Coppington, Northumberland will calculate the area of a variety of shapes and give the answer in any units of measurement. The shapes covered are circles, squares, rectangles, triangles, parallelograms and trapeziums. **Shapes** will run on both the BBC and Electron.

SHAPES

```

0 *KEY 10 D. IM VDU14:ML:IM
10 REM ***AREAS by K.McINTYRE
***
20 ONERRORRUN
30 MODE7
40 PROCCHOICE
50 END
60 DEFPROCCHOICE:CLS
70 FORX=4T05
80 PRINTTAB(1,X);CHR$(&8D);CHR$(&86);"AREAS: Circular and Regular Polygons";CHR$(&8D)
90 NEXT
100 *KEY 0 CIRCLE:M
110 *KEY 1 SQUARE:M
120 *KEY 2 RECTANGLE:M
130 *KEY 3 TRIANGLE:M
140 *KEY 4 PARALLELOGRAM:M
150 *KEY 5 TRAPEZIUM:M
160 PRINT:PRINT" THE SHAPES ARE:"
170 PRINT:PRINTCHR$(&B1);" CIRCLE"SPC(10)"PRESS KEY0"
180 PRINTCHR$(&B4);" SQUARE"SPC(10)"PRESS KEY1"
190 PRINTCHR$(&B2);" RECTANGLE"SPC(7)"PRESS KEY2"
200 PRINTCHR$(&B5);" TRIANGLE"SPC(8)"PRESS KEY3"
210 PRINTCHR$(&B3);" PARALLELOGRAM"SPC(3)"PRESS KEY4"
220 PRINTCHR$(&B6);" TRAPEZIUM"SPC(7)"PRESS KEY5"
230 PRINT:PRINT
240 INPUT" NAME OF SHAPE";A$:IF ASC(A$)<65 OR ASC(A$)>90 THEN PROCCHOICE
250 INPUT" TYPE OF UNITS eg, mm's,cm's,metres";ZX$
260 IF A$="CIRCLE" THEN PROCIRCLE
270 IF A$="SQUARE" OR A$="RECTANGLE" THEN PROCRECT
280 IF A$="TRIANGLE" THEN PROCTRI
290 IF A$="PARALLELOGRAM" THEN PROCPPAR
300 IF A$="TRAPEZIUM" THEN PROCTRAP
310 ENDPROC
320 DEF PROCIRCLE
330 LOCAL R
340 INPUT"Radius="R
350 CIRCAREA=PI*R*R
360 PRINT "AREA=";CIRCAREA;" ";ZX$;" " "squared"
370 FORQ%=0 TO 50000:NEXT:GOTO 40
380 ENDPROC

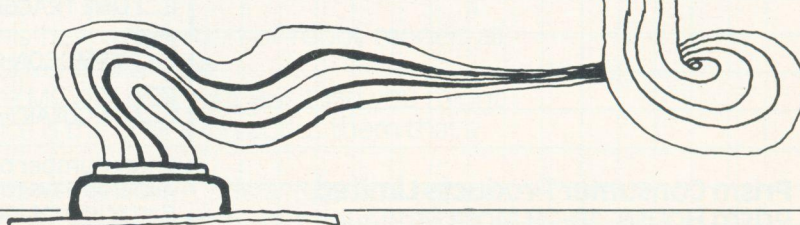
```

```

390 DEF PROCRECT
400 LOCAL L,W
410 INPUT"THE LENGTH="L
420 INPUT"THE WIDTH="W
430 RECAREA=W*L
440 PRINT "AREA=";RECAREA;" ";ZX$" squared"
450 FORQ%=0 TO 50000:NEXT:GOTO 40
460 ENDPROC
470 DEF PROCTRI
480 LOCAL B,H
490 INPUT"BASE LINE LENGTH="B
500 INPUT"HEIGHT="H
510 TRIAREA=(B*H)/2
520 PRINT "AREA=";TRIAREA;" ";ZX$;" squared"
530 FORQ%=0 TO 50000:NEXT:GOTO 40
540 ENDPROC
550 DEF PROCPPAR
560 LOCAL H,B
570 INPUT "HEIGHT="H
580 INPUT "BASE="B
590 PARAREA=H*B
600 PRINT "AREA=";PARAREA;" ";ZX$;" squared"
610 FORQ%=0 TO 50000:NEXT:GOTO 40
620 ENDPROC
630 DEF PROCTRAP
640 LOCAL T,B,P
650 INPUT "LENGTH OF TOP PARALLEL="T
660 INPUT "LENGTH OF BOTTOM PARALLEL="B
670 INPUT "PERPENDICULAR HEIGHT="P
680 TRAPAREA=0.5*(T+B)*P
690 PRINT "AREA=";TRAPAREA;" ";ZX$;" squared"
700 FORQ%=0 TO 50000:NEXT:GOTO 40
710 ENDPROC

```

32	30	+
33	31	
34	32	
35	33	
36	34	
37	35	
38	36	
39	37	
40	38	
41	39	
42	40	
43	41	
44	42	
45	43	
46	44	
47	45	
48	46	
49	47	
50	48	
51	49	
52	50	
53	51	
54	52	
55	53	
56	54	
57	55	
58	56	
59	57	
60	58	
61	59	
62	60	



DILPH

CAN YOU help Dilph the Centipede? Dilph loves to gorge himself on juicy green mushrooms. The trouble is they are only to be found growing in minefields. Using the Z and X keys to move left and right, steer clear of the mines and watch for those electric fences.

```

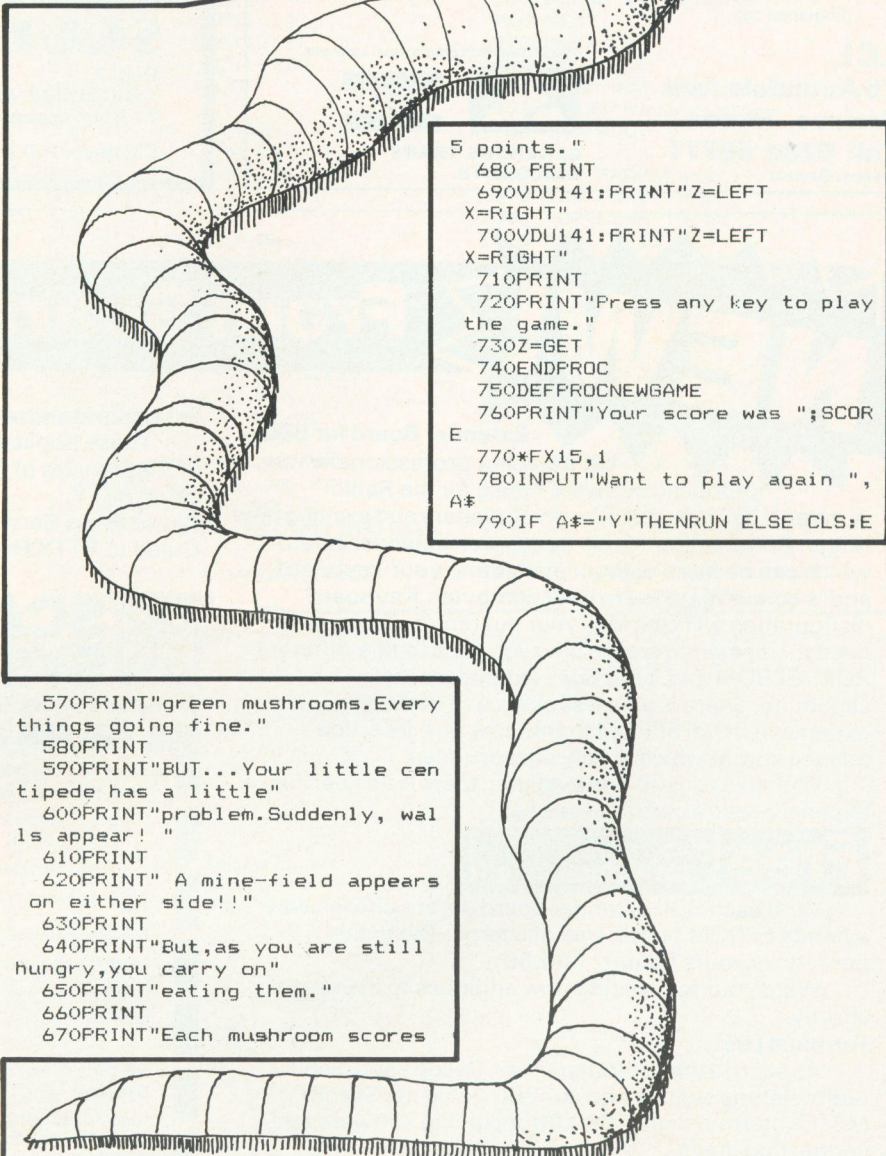
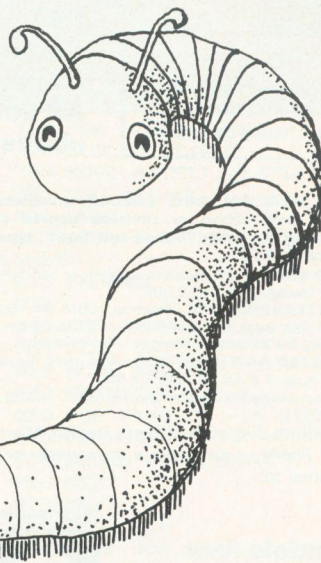
10 REM * CATATAK by Neil Benn
un '84
20 REM
30 MODE7:PROCINS
40 INPUT"Do you want snow (Y/
N)",A$
50 MODE 2
60 IF A$="Y" THEN MODE2:VDU19
,0,7;0;19,4,1;0;
70 IF A$="N"THEN GOTO 80
80 YUP=TRUE
90 SCORE=0
100 VDU23,240,0,60,126,126,126
,60,24,24
110 VDU23,241,0,56,124,124,124
,124,56,0
120VDU23,255,255,255,255,255,2
55,255,255,255
130 XZ=500:YZ=500
140 GCOL0,3
150 VDU23,1;0;0;0;0;
160 STACK=(RND(19)*64)+128
170 FORA=1TO5:NEXTA:VDU30,11
180 RZ=RND(3):IF RZ=2 THEN GCO
LO,3:MOVESTACK,964:PRINTCHR#240:
PRINTCHR#240
190 VDU4,23,1;0;0;0;0;:PRINTTA
B(0,0):VDU11,11,5,23,1;0;0;0;0;
200 MZ=RND(5):IF MZ=2 AND YUP=
TRUE PROCWALL
210 A=INKEY(0):MOVEX%,Y%:GCOL3
,5:PRINTCHR#241
220 IF INKEY(-98)X%=X%-16
230 IF INKEY(-67)X%=X%+16
240 IF POINT(X%,Y%)=3 SCORE=SC
ORE+5:SOUND1,-15,0,1:SOUND1,-15,
50,2
250 IF POINT(X%,Y%)=1 PROCDEAD
260 IF X%<0 PROCDEAD
270 IF X%>1279 PROCDEAD
280 YUP=TRUE
290 GOTO160
300 DEFPROCWALL
310 GCOL1,1
320 WOT=RND(30)
330IFWOT=25ORWOT=22ORWOT=18ORW
OT=2VDU4:PRINTTAB(0,0)''''
340IF WOT=25ORWOT=22VDU4:COLOU
R1:PRINTTAB(0,0)';CHR#255;CHR#2
55;CHR#255;" ";CHR#255;CHR
#255;CHR#255;CHR#255;CHR#255;CHR
#255;CHR#255;CHR#255;CHR#255;CHR
#255;
350IF WOT=18OR WOT=2VDU4:COLOU
R1:PRINTTAB(0,0);';CHR#255;CHR#
255;CHR#255;CHR#255;CHR#255;CHR#
255;CHR#255;CHR#255;CHR#255;CHR#
255;" ";CHR#255;CHR#255;CHR#
255;CHR#255;CHR#255
360 YUP=FALSE
370VDU5
380VDU23,1;0;0;0;0;
390 ENDPROC
400DEFFPROCDEAD

```

```

410 FORX=1 TO 2
420FORI=1TO16
430VDU19,0,I,0,0,0,:SOUND0,-15
,I,1
440NEXTI
450 NEXT
460VDU4:PRINTTAB(0,0)"YOU'VE S
NUFFED IT!!"
470VDU23,1;0;0;0;0;
480PROCNEWGAME
490ENDPROC
500DEFFPROCINS
510VDU23,1;0;0;0;0;
520VDU141:PRINT" *** CATAP
ILLATTAK ***"
530VDU141:PRINT" ***CATAP
ILLATTAK ***"
540PRINT
550PRINT"You are gorging yours
elf on a field of"
560 PRINT

```



```

5 points."
680 PRINT
690VDU141:PRINT"Z=LEFT
X=RIGHT"
700VDU141:PRINT"Z=LEFT
X=RIGHT"
710PRINT
720PRINT"Press any key to play
the game."
730Z=GET
740ENDPROC
750DEFFPROCNEWGAME
760PRINT"Your score was ";SCOR
E
770*FX15,1
780INPUT"Want to play again ",
A$
790IF A$="Y"THENRUN ELSE CLS:E

```

```

570PRINT"green mushrooms.Every
things going fine."
580PRINT
590PRINT"BUT...Your little cen
tipede has a little"
600PRINT"problem.Suddenly, wal
ls appear!"
610PRINT
620PRINT" A mine-field appears
on either side!!"
630PRINT
640PRINT"But,as you are still
hungry,you carry on"
650PRINT"eating them."
660PRINT
670PRINT"Each mushroom scores

```


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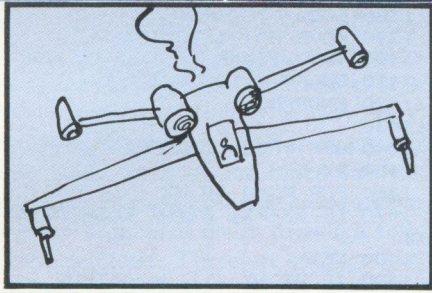
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STAR WARS

IN STAR WARS for the Electron and BBC by G Woolridge of Handsworth, Birmingham you must manoeuvre your sights around the space scanner, picking out enemy craft and blasting them to the other side of the universe before they get you. When you think you have got rid of them another wave of marauding attackers arrives. Use the Z, X, : and / keys to move your sights and RETURN to fire.



```

50 *TV 255
60 MODE 2
70 PROCinitialise
80
90 REPEAT
100 PROCnew_wave
110 PROCscreen
120 REPEAT
130 FOR F%=0 TO N%
140 PROCsights
150 PROCalien(F%)
160 IF all_dead OR fuel_gone F
% =N%
170 NEXT
180 UNTIL all_dead OR fuel_gon
e
190 IF all_dead fuel_gone=FALS
E
200 UNTIL fuel_gone
210 GCOL 0,7 :MOVE 300,512
220 PRINT "No Fuel Left"
230 GCOL 0,6 :MOVE 400,450
240 PRINT "Game Over"
250 GCOL 0,15 :MOVE 100,300
260 PRINT "Space_bar to start"
270 *FX 15
280 REPEAT UNTIL GET=32
290 RUN
300 END
310
320 DEF PROCinitialise
330 dif%=11
340 DIM A%(dif%),U%(dif%),C%(d
if%),G%(dif%)
350 XN%=64 :XM%=1215 :YN%=64 :
YM%=880
360 wave%=0 :N%=0 :@%=0 :I%=16
370 S%=0 :sight%=128 :alien%=1
29
380 VDU 23,sight%,231,129,129,
24,24,129,129,231
390 VDU 23,alien%,102,195,165,
153,153,165,195,102
400 ENVELOPE 1,1,0,0,0,0,0,0,1
26,-10,-5,-1,126,126
410 ENVELOPE 2,1,5,1,0,-1,-1,-
1,126,-50,-10,-1,126,80
420 *FX 229,1
430 ENDPROC
440
450 DEF PROCnew_wave
460 wave%=wave%+1
470 IF wave%<6 N%=wave%*2 :PT%
=(wave% DIV 2)*25+25 ELSE PT%=10
0

```

```

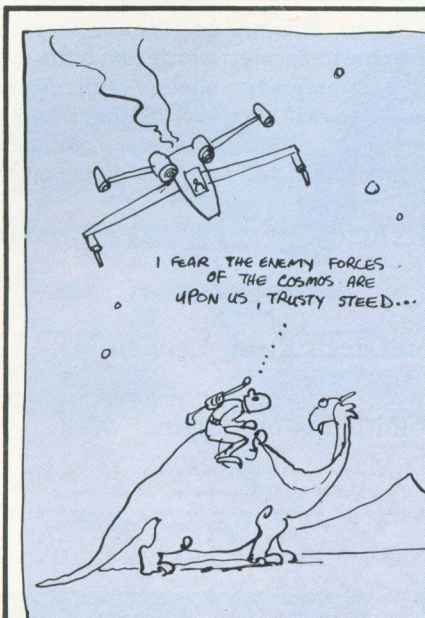
480 FOR F%=0 TO N%
490 REPEAT
500 C%(F%)=RND(6)
510 UNTIL C%(F%)<>3
520 A%(F%)=RND(1279)
530 U%(F%)=RND(1023)
540 G%(F%)=TRUE
550 NEXT
560 X%=608 :Y%=480
570 all_dead=FALSE
580 fuel_gone=FALSE
590 ENDPROC
600
610 DEF PROCscreen
620 VDU 23;8202;0;0;0;16,4,17,
7
630 PRINT TAB(1,1) "Score : "
640 PRINT TAB(1,3) "Fuel : "
650 COLOUR 2 :PROCscore(0)
660 COLOUR 5 :PROCfuel(0)
670 VDU 5 :GCOL 0,6
680 MOVE XN%-8,YN%-32
690 DRAW XN%-8,YN%+4
700 DRAW XM%+64,YN%+4
710 DRAW XM%+64,YN%-32
720 DRAW XN%-8,YN%-32
730 VDU 24,XN%;YN%-28;XM%+56;Y
M%:
740 PROCstart_wave(wave%)
750 PROCstars

```

```

760 FOR F%=0 TO N%
770 GCOL 0,C%(F%)
780 MOVE A%(F%),U%(F%)
790 VDU alien%
800 NEXT
810 GCOL 0,3 :MOVE X%,Y% :VDU
sight%
820 ENDPROC
830
840 DEF PROCstart_wave(W%)
850 GCOL 0,7
860 MOVE 480,512
870 PRINT"Wave " W%
880 FOR F%=0 TO -15 STEP -1
890 FOR G%=0 TO 1
900 SOUND 0,F%,100+G%,1
910 NEXT
920 NEXT
930 GCOL 0,0
940 MOVE 480,512
950 PRINT"Wave " W%
960 ENDPROC
970
980 DEF PROCstars
990 FOR F%=0 TO 3
1000 FOR C%=8 TO 15
1010 GCOL 0,C%
1020 A%=RND (XM%-XN%)+XN%
1030 U%=RND (YM%-YN%)+YN%
1040 PLOT 69,A%,U%
1050 NEXT
1060 NEXT
1070 *FX 10,20
1080 *FX 9,20
1090 ENDPROC
1100
1110 DEF PROCsights
1120 GCOL 3,3 :D%=0 :E%=0
1130 IF INKEY(-67) D%=I%
1140 IF INKEY(-98) D%=-I%
1150 IF INKEY(-73) E%=I%
1160 IF INKEY(-105) E%=-I%
1170 MOVE X%,Y% :VDU sight%

```

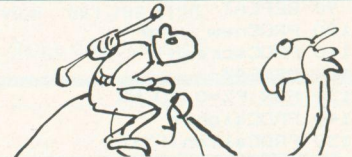


STAR WARS

```

1180 X%=X%+D% :Y%=Y%+E%
1190 IF X%<XN% X%=XN% ELSE IF X
%>XM% X%=XM%
1200 IF Y%<YN% Y%=YN% ELSE IF Y
%>YM% Y%=YM%
1210 MOVE X%,Y% :VDU sight%
1220 IF NOT INKEY(-74) ENDPROC
1230 SOUND 1,2,100,1
1240 PROCfuel(-1) :hit=FALSE
1250 FOR P%=0 TO N%
1260 IF G%(P%) AND A%(P%)+16>=
X% AND A%(P%)<=X%+16 AND U%(P%)-
16<=Y% AND U%(P%)>=Y%-16 hit=P%+
1 :P%=N%
1270 NEXT
1280 GCOL 3,7 :MOVE XN%,512
1290 DRAW X%+32,Y%-16 :DRAW XM%
+64,512
1300 IF hit PROChit(hit-1)
1310 GCOL 3,7 :MOVE XN%,512
1320 DRAW X%+32,Y%-16 :DRAW XM%
+64,512
1330 ENDPROC
1340
1350 DEF PROChit(P%)
1360 G%(P%)=FALSE
1370 PROCscore(wave%*10)
1380 GCOL 3,C%(P%)
1390 MOVE A%(P%),U%(P%)
1400 VDU alien%
1410 SOUND 0,1,100,1
1420 ENDPROC
1430
1440 DEF PROCalien(F%)
1450 D%=0
1460 FOR P%=0 TO N%
1470 IF G%(P%) P%=N% ELSE D%=D%
+1
1480 NEXT
1490 IF D%>N% all_dead=TRUE
1500 IF NOT G%(F%) ENDPROC
1510 GCOL 3,C%(F%)
1520 MOVE A%(F%),U%(F%) :VDU al
ien%
1530 A%(F%)=A%(F%)+32*(RND(3)-2
)
1540 U%(F%)=U%(F%)+32*(RND(3)-2
)
1550 IF A%(F%)<XN% A%(F%)=XM% E
LSE IF A%(F%)>XM% A%(F%)=XN%
1560 IF U%(F%)<YN% U%(F%)=YM% E
LSE IF U%(F%)>YM% U%(F%)=YN%
1570 MOVE A%(F%),U%(F%) :VDU al
ien%
1580 ENDPROC
1590
1600 DEF PROCscore(P%)
1610 COLOUR 2 :VDU 4
1620 S%=(S%+P%) MOD 1000000
1630 S%=STRING$(6-LEN(STR$S%),"
0")
1640 PRINT TAB(8,1) S$ S% CHR$(
5)
1650 ENDPROC
1660
1670 DEF PROCfuel(P%)
1680 COLOUR 5 :VDU 4
1690 PT%=PT%+P%
1700 S%=STRING$(3-LEN(STR$PT%),
"0")
1710 PRINT TAB(8,3) S$ PT% CHR$(
5)
1720 IF PT%=0 fuel_gone=TRUE
1730 ENDPROC

```



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Jeremy Richards' programming series guides you through the first steps in creating animated graphics

Moving pictures

THE BIGGEST attraction of home computers is in the graphics and animation produced by them. As an owner of an Electron or BBC computer, you have at your fingertips a machine with many graphical commands to use. This month I introduce the subject of graphics, which in itself is worthy of a book, and show how to create simple but effective graphics on your screen.

The place to start is with the different screen modes available to the user. BBC owners have a range of eight modes from which to choose, Electron users seven. The screen mode missing from the Electron is MODE 7, which is often referred to as the teletext mode. By teletext mode I mean that the display is compatible with the teletext screen display of systems such as Ceefax and Prestel. On the BBC that also occupies the least memory — 1K — and is therefore often used.

The other seven modes, numbered from 0 to 6, are the same on both Electron and BBC. They are shown with their respective display sizes, number of colours and memory usage:

MODE 6, 40×25 text, two colours, 8K; MODE 5, 20×32 text, 160×256 resolution, four colours, 10K; MODE 4, 40×32 text, 320×256 resolution, two colours, 10K; MODE 3, 80×25 text, two colours, 16K; MODE 2, 20×32 text, 160×256 resolution, four colours, 20K; MODE 1, 40×32 text, 320×256 resolution, four colours, 20K; MODE 0, 80×32 text, 640×256 resolution, two colours, 20K.

To change modes you type MODE followed by the number of the screen mode you wish to use. Try it and you will notice that the size of the cursor alters depending on the screen display mode you are using. The smaller the cursor, the greater the screen resolution — compare MODE 0 and MODE 5.

It is all very well changing between screen displays but how do we create graphics? Acorn thoughtfully has left room in the character set of the computer for users to design their characters. If you are not sure what I mean by character set, type-in program one.

Program 1
10 FOR x=32 to 126
20 PRINT CHR\$(x);

30 NEXT
What is the program doing? It is printing-out some of the internal character set which is represented inside the machine firmware as an ASCII number — ASCII stands for American Standard Code for Information Interchange. It is one of the few standards virtually every computer implements and is about the only thing different machines have in common. It allows the machine to have a set of numbered codes to assign to a given character. Therefore typing:

PRINT CHR\$(65)
will produce the letter A. Program one prints-out all the characters between 32 and 126. You will no doubt have worked out that it is the command CHR\$ which tells the machine which character to print. Characters 224 to 255 have been left undefined and you can create your own characters. To do that we use the VDU23 command. Type-in program two.

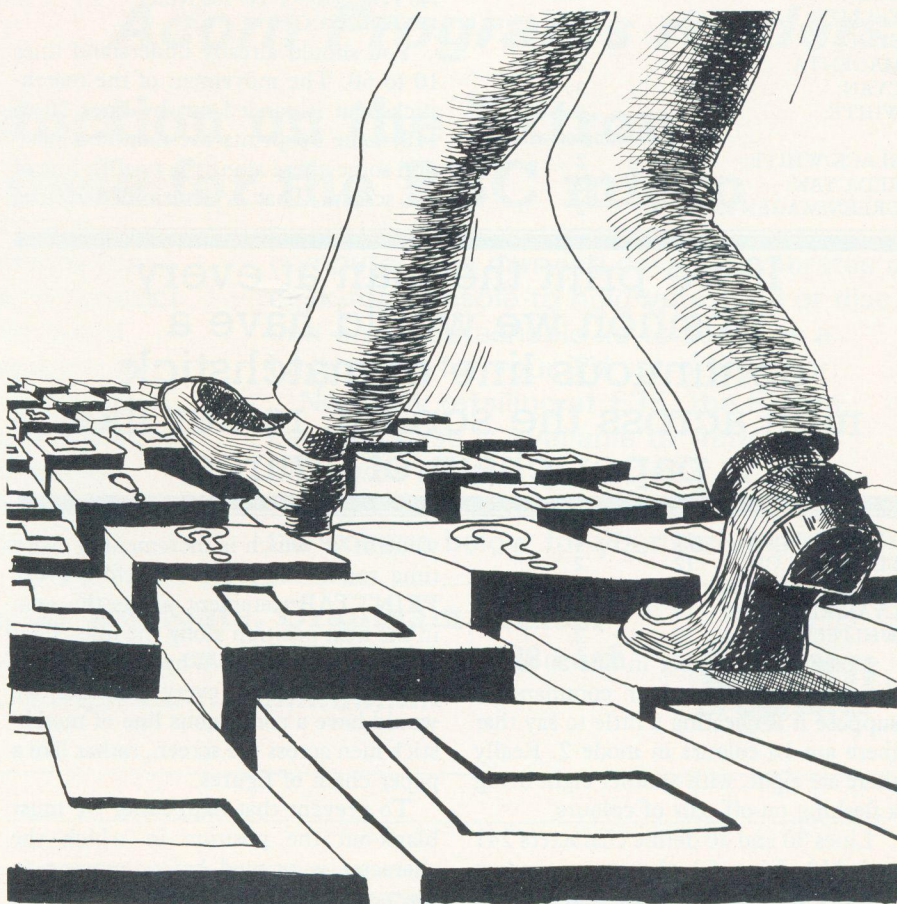
Program 2
10 MODE 2
20 VDU23,240,28,28,28,8,127,8,20,34

30 PRINTTAB(10,10);CHR\$(240)
As you can see, we have created a simple matchstick-man-type figure. The clever work is all in line 20. The character to be created is assigned to one of the available user-definable figures — 224 to 255. In the case of this program I have used character 240. The remaining eight figures define the shape of the figure. Imagine an eight by eight grid. Each column of the grid has a number assigned to it; from left to right they read:

128 64 32 16 8 4 2 1
To create the figure you should draw an eight by eight grid and then draw the required figure. Every box in the grid you fill should then be added. So if you draw a line in the top row of the grid, the VDU23 statement will read:
VDU23,245,255,0,0,0,0,0,0,0.

The 245 refers to the character to be defined and the remaining eight figures each row, working from top to bottom. Therefore the top row is 255 because

continued on page 48



continued from page 47

every square is filled. That is because, working from right to left:

$$1+2+4+8+16+32+64+128=255$$

To understand that try drawing a few simple figures and working out the VDU23 command.

All well and good, but the figure is small. We can, however, make figures better by joining more than one CHR\$ command. So, for instance, on a seasonal note, create a Christmas tree. To do that I use two user-definable characters, 241 and 242. Draw two 8x8 grids, side by side. Then draw half of the tree in one box and the other half in the second. I have done that in program three and you can fill the squares according to the numbers I have used.

Program 3

```
10 MODE 2
20 COLOUR 2
30 VDU23,241,1,2,6,12,24,127,3,3
40 VDU23,242,128,64,48,24,12,255,192,192
50 X=RND(20):Y=RND(32)
60 PRINTTAB(X,Y);CHR$(241);CHR$(242)
70 GOTO 50
```

If you run the program you will see the screen fill with Christmas trees. I have used MODE 2 which gives 16 colours from which to choose. Line 20 uses the COLOUR command, which assigns the drawing colour. In this case I have used 2, which is the code for green. The colour codes are:

BLACK:	0	Modes: 0,1,2,3,4,5,6
RED:	1	0,1,2,3,4,5,6
GREEN:	2	1,2,5
YELLOW:	3	1,2,5
BLUE:	4	1,2,5
MAGENTA:	5	2
CYAN:	6	2
WHITE:	7	2
		Flashing colours
BLACK/WHITE:	8	2
RED/CYAN:	9	2
GREEN/MAGENTA:	10	2

'If we print the man at every position we would have a continuous line of matchstick men across the screen, rather like a paper chain of figures'

YELLOW/BLUE:	11	2
BLUE/YELLOW:	12	2
MAGENTA/GREEN:	13	2
CYAN/RED:	14	2
WHITE/BLACK:	15	2

Change the number in line 20 to see the effect of the colour command. I suppose it is cheating a little to say that there are 16 colours in mode 2. Really there are eight, with another eight being a flashing on-off pair of colours.

Lines 30 and 40 define characters 241 and 242. Line 50 chooses a random number for the X,Y plot and line 60

prints the two characters at the given screen site, which is defined by the PRINTTAB statement.

Note how the two characters are placed next to each other, the commands being separated by a semi-colon. Line 70 causes the program to return to line 50 where a tree is printed at a new position. Also note that once a character has been defined it is unnecessary to re-define it every time you need to use the character.

We have now displayed a very simple piece of graphics but what about moving graphics? That is not difficult. Let us make use of everything we have done so far. Before typing-in program four, see if you can write a program to make the little matchstick man move from left to right in front of the Christmas tree. Make use of characters 240 to 242 which we have already defined. Once you have tried that, type-in program four.

Program 4

```
10 VDU23,240,28,28,28,8,127,8,20,34
20 MODE 2
30 COLOUR 2
40 VDU23,241,1,2,6,12,24,127,3,3
50 VDU23,242,128,64,48,24,12,255,192,192
60 PRINTTAB(10,10);CHR$(241);CHR$(242)
70 FOR x=0 TO 19
80 VDU23,1,0;0;0;0;
90 PRINTTAB(x,12);CHR$(240):PROCdelay
100 PRINTTAB(x,12);" "
110 NEXT
120 END
130 DEFPROCdelay
140 FOR delay=1 TO 200:NEXT
150 ENDPROC
```

You should already understand lines 10 to 60. The movement of the matchstick man is carried out by lines 70 to 110. Line 90 prints the man at a position somewhere along the twelfth line of the screen. That is determined by the



line 100 does but even that is not sufficient. Because of the speed of the machine we would see nothing, so a delay procedure — PROCdelay — is called between the two printing commands. That causes the computer to pause for a short time before overprinting the figure with a space. By doing that we can create the effect of a moving object.

There are, of course, more graphics commands. The three main Basic keywords to consider are DRAW, MOVE and PLOT. Program five shows a short example of their use.

Program 5

```
10 MODE 4
20 MOVE 400,400
30 DRAW 400,100
40 DRAW 100,100
50 DRAW 100,400
60 DRAW 400,400
70 PRINTTAB(10,10); "Press SPACEBAR to continue"
80 REPEATUNTILGET=32
90 MOVE 100,100
100 PLOT81,0,300
```

The program draws a square and then fills-in one half of the square — a triangle. The MOVE command moves the graphics cursor to a point on the screen. The draw command then draws a line between two specified points on an X-Y axis. The PLOT81 command in line 100 causes a triangle to be filled-in between the points specified, i.e., 0,300. There are many PLOT commands, some of which are summarised:

PLOT number:	Effect:
0	Move relative to last point
16-23	Use a dotted line
64-71	Single point plotting
72-79	Horizontal line fill
80-87	Plot and fill triangle
88-95	Horizontal blanking of line

Experiment with those numbers to see the effects you can create. A fuller list of plotting commands can be found in the user guides.

The commands I have described are the basis for the outstanding graphics capabilities of the Acorn machines. Try to create your own moving graphics programs. As a test, why not draw a house on the screen with a man walking into the house? Or devise a series of characters which show a man in the different stages of walking, therefore giving the impression of movement. I will return to the subject of more advanced graphics later in the series.

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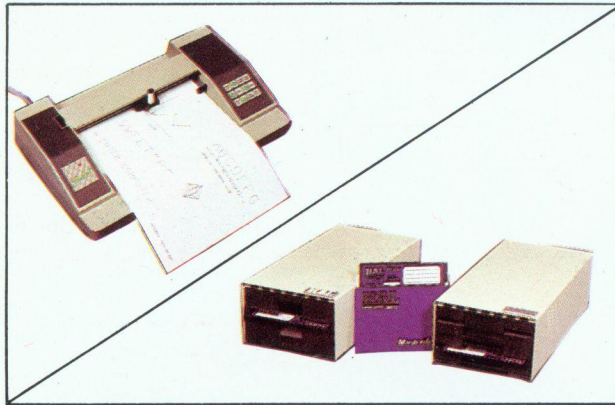
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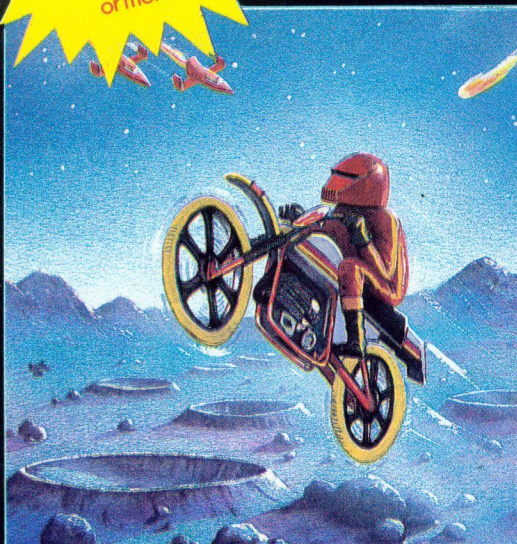
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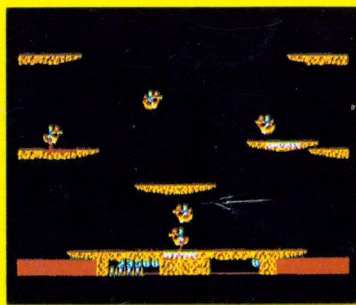
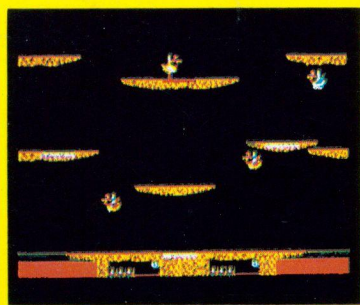
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