

Home Computing WEEKLY

An Argus Specialist Publication

Britain's brightest weekly, packed with reviews and listings

No. 56
April 3-9, 1984

40p

WIN
400 prizes of
Cosmic Cruiser,
a great new
game from



Software reviews for:
BBC, Spectrum,
Dragon, Atari,
Electron, Texas

Spectrum:
Three great
games to
type in

Two BBC/Electron listings: Brave the ancient curse and test your memory

VIC-20: Type in and play our two games for a life on the ocean wave

Commodore 64: Draw a starship...in just five seconds

AND:
Your letters,
U.S. Scene,
news



Chain stores take Amstrad

Rumbelows is to stock Amstrad's sub-£200 micro in its 380 stores, but W.H. Smith has no plans to put it on the shelves.

The new computer, using the new MSX standard shared by several major Japanese makers, is due to be officially launched next week.

The price has not been finally decided but it will include a keyboard and tape deck in one unit and a green screen monitor and power supply in another. A colour monitor will cost £50 extra.

It will have 64K of RAM, a Z80B processor running at a fast 6MHz and a baud rate switchable between 2,400 and 300.

Rumbelows already stocks the Spectrum, VIC-20, Continued on page 5

'Stamp out counterfeits'

One of the first acts of a new trade association of software distributors will be to draw up a code of practice to protect customers, dealers and software houses.

Chairman Bob Simpson, of PCS Distribution, said: "There are one or two people coming into the market whose form of trading is not wholly acceptable."

"So the Guild of Software Distributors has been formed to Continued on page 5

NEW RELEASE



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Win as many gold medals as you can. That's the challenge in one of four new games just out from CRL. Olympics, an arcade game called Orpheus, an arcade-adventure titled Great Detective and another arcade game, Pandamonium, all cost £5.95 for the Spectrum. Test Match, for the BBC, and Omega Run, for the Commodore 64, cost £7.95 and were originally launched for the Spectrum.
CRL, 9 Kings Yd, Carpenter's Rd, London E15 2HD

○ ○ ○

Wood Green School, Witney, Oxon, is holding its second South of England Personal Computer Fair on June 10.

○ ○ ○

Computer Games is offering a free tape deck, usual price £39, with the £150 Sord M5 computer.

○ ○ ○

Spectrum peripherals, the Microdrive and Interface 1, go on sale through retailers — including W.H. Smith, Boots and Menzies — this month at £49.95 each. Cartridges cost £4.95.

○ ○ ○

Oric is offering a £60 upgrade ROM to Oric 1 users this month. The new 101 ROMs, for 16K or 48K models, are used in Oric's new Atmos. Oric has also denied a report that the 48K Atmos was being recalled to replace the ROM, or any other chip. Oric owners who want the upgrade ROM are being asked to send their computer with £60, but without power supply or leads, to:
Oric Assembly Unit 1, Hampton Farm Industrial Estate, Hampton Rd West, Hanworth, Middx

○ ○ ○

Timebomb, an arcade game for the Spectrum, incorporates speech for those with the Currah Micro Speech unit. It costs £5.95 and is by CDS.
CDS, 10 Westfield Cl, Tickhill, Doncaster, S. Yorks DN1 9LA

Home Computing WEEKLY

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Editor:
Paul Liptrot
Designer:
Bryan Pitchford
Managing Editor:
Ron Harris
Chief Executive:
Jim Connell

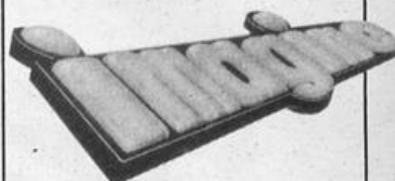
Divisional Advertisement Manager:
Coleen Pimm
Advertisement Manager:

Assistant Advertisement Manager:
Stuart Shield
Classified Advertising:
Debra Stuppel

Argus Specialist Publications Ltd.
No.1 Golden Square, London W1R 3AB. 01-437 0626

Home Computing Weekly is published on Tuesdays. Distribution by Argus Press Sales and Distribution Ltd, 12-14 Paul Street, London EC2A 4JS. Printed by Alabaster Passmore & Sons, Ltd, of London and Maidstone, Kent. Design and origination by MM Design and Print, 145 Charing Cross Rd., London WC2 0EE

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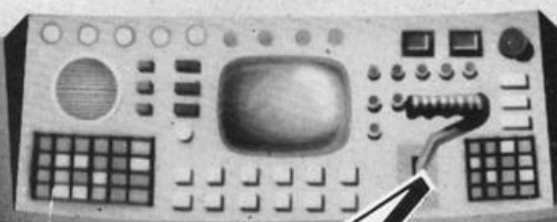
There are 400 prizes in this week's competition. You could be among the first to play Cosmic Cruiser, Imagine's great new release for four computers. Turn to the competition page now.



Quality tested programs for all these computers are in this week's issue of Home Computing Weekly.



...Beam us down to A&F Software!



	CM64	BBC	ELECTRON	DRAGON	SPECTRUM
CHUCKIE EGG	£7.90	£7.90	£7.90	£7.90	£6.90
CYLON ATTACK		£7.90	£7.90		
JUNGLE FEVER					£6.90
PHAROHS TOMB		£7.90	£7.90		



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From front page

establish a code of practice.

"We are not here just to sell to retailers and leave them to it. They need after-sales service."

He said there had been one or two cases of firms selling counterfeit products to shops and then disappearing, leaving the dealers to face the consequences.

Mr Simpson said: "We don't want people buying or selling counterfeit products. It's not only illegal, it's also damaging the reputations of software

houses, distributors and retailers."

The code of practice would ensure that guild members supplied goods of acceptable quality.

Mr Simpson said GOSD had a dialogue with the Guild of Software Houses and the Computer Trade Association. Chairman of the guild is Clive Digby-Jones, managing director of Websters, whose customers include Boots.

Membership of the association includes Tiger, Lightning, Prism, Limetree, Express, Pilonmist and Leisure Soft.

Guild of Software Distributors, c/o PCS Distribution, Unit 6, Scotshaw Brook, Branch Rd, Lower Darwen, Lancs BB3 0PR

'Prices up again' at Imagine

Prices of Imagine software are almost certain to go back up to £5.50, cancelling a £1.55 price cut.

Dealers and distributors, fearing a price war, reacted strongly when the drop was first announced.

Imagine was making a final decision as HCW was going to press. But operations director Bruce Everiss said: "It's almost 100 per cent certain it will be £5.50."

Pressed for a reason, he said: "We have decided to toe the line with the industry. As long as we get the sales it's not a reluctant decision."

Nick Alexander, chairman of the Guild of Software Houses, said: "It's absolutely ludicrous. I'm stunned. I'm glad to see the prices are going back up and that sanity has been restored."

"I'm sorry that all this furore has taken place. The confusion has not done anyone any good."

"Our members thought it was something that would go away and it has done so. The worry was that everyone was going to panic and slash their prices, causing a cash-flow problem."

And Bob Simpson, of PCS Distribution, said: "The price drop was a mistake. In the short term it can be attractive but in the long term it's not good for the business."

Imagine, whose latest game, Pedro, has entered the charts, planned its new price for its existing titles plus two new releases, BBC Bill and Cosmic Cruiser.

But future games will cost £15-£19. The first two at these prices will be Bandersnatch and Cyclapse for the Spectrum and the Commodore 64. Although still on cassette, they will be boxed along with other items essential for playing the games.

Amstrad

From front page

Commodore 64, Sharp 700 and the new Oric Atmos.

Buyer Steve Dowdle said: "We are looking at other models — we may look at Acorn, you never know."

Is there room for another computer? Mr Dowdle said: "Last year there was a lack of supply and this year doesn't seem as if it's going to be any different. It's now a problem of the availability of chips and Amstrad seems to have the buying power."

Industry sources say there have been 250,000 advance orders for Amstrad's Taiwan-made computer.

Stewart Binnie, merchandise controller for W.H. Smith, said: "We are happy with our range at the moment. We have plans for later in the year but they do not include Amstrad."

The industry believes that Amstrad's computer will do well in the company's traditional outlets for its hi-fi audio products. Amstrad has formed a company called Amsoft to produce software for its computer and has approached a number of independent software companies.

Briefly

Silversoft has launched a database for the BBC micro which will work with View, Acorn's word processing program, if needed. Viewbase will cost £24.99 for disc and manual and Silversoft says it can store 1,500 records on a LOOK disc and sort 1,000 records in 90 seconds.

Silversoft, 271-273 King St, London W6 9LZ

Winners

The solution to our Quicksilver spot the difference competition:

- 2 parts missing from helmet
- Screw missing from upper left arm
- Band omitted above left elbow
- Part missing from chess piece
- Colour different from lower part of body
- Part of bush on right missing
- Colour different on chess piece on right of board
- Bolt at right armpit changed
- Upright missing from white chess piece

Winners of £25-worth of vouchers: James Blair, Lancs; W. Belle, Birmingham; F.A. Beale, Dorset; D.B. Burke, Gwynedd; Mike Chippington, Berks; Michael Collett, Hendon; Mark Crowley, Herts; John Considine, N. Humbs; Suzanne Cotton, Ipswich; Keith Crozier, Scotland; Tommy Cunningham, Ireland; Ian Fletcher, Dorset; C.M. Gallagher, Northants; Satpal Grewal, Edmonton; Christopher Hall, N. Ireland; R.J. Hall, Derbyshire; Michael Hawton, Devon; Peter Hewett, Penge; A. Horrell, Bristol; Gary Jackson, N. Humbs; Terry John, W. Glam; Roger Knight, E. Sussex; Carol Lenz, Kirkcudbrightshire; Barry Llewellyn, Romford; Paul Loynes, W. Mids; David MacKenzie, Letchworth; John Middlemas,

Teachers are being invited to an Educational Computing and Software Fair on June 18 and 19 at John Taylor Teachers' Centre, Headingley La, Leeds LS6 1AA

Glasgow; Stuart Mitchell, Aldershot; Bryan Moiser, Hull; D. Nagle, Leigh-on-Sea; Andrew Norwood, Berks; A.C. Rowstron, Leeds; Martin Rowe, W. Sussex; Robert Stobie, Bolton; P. Shepherd, Notts; Michael Simcock, Stockport; Peter Wallace, Polegate; A.J. Willey, Newcastle-upon-Tyne; Stephen Weed, Bradford; Robert Wylie, Argyll. The prizes have been despatched.

A motherboard for the Spectrum is being launched at £14.95 this month by Currah. It adds two slots for peripherals, protects the Spectrum's edge connector and several can be stacked.

Currah, Graythorp Industrial Estate, Hartlepool, Cleveland

Phoenix sent a man dressed as a wizard to Home Computing Weekly with its latest two-tape game, The Sorcerer's Apprentice. Like other Phoenix products, players have to master an arcade game to discover the running code and clues to an adventure.

Phoenix, 116 Marsh Rd, Pinner, Middx

Cylindrical Software has produced an anagram-generating program, called Anagrams, for the BBC micro, costing £3.95.

Cylindrical, 3/177 College Rd, Moseley, Birmingham B13 9LJ

WANTED

PROGRAMS

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ASP SOFTWARE

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COMPETITION

There's more prizes than ever before in this week's competition — 400 copies of Imagine's latest game, Cosmic Cruiser. It's so new that it's not yet in the shops.

Four programmers — along with a team of musicians and graphic artists — have taken an idea by Imagine chairman Dave Lawson and turned it into a game which will test your skill and dexterity.

Cosmic Cruiser will be available for any Spectrum, Commodore 64, Dragon and BBC computers.

And we've got 100 for each micro to give away.

Cosmic Cruiser, which can be played with joystick or keyboard, is bound to hit the best-seller charts fast. And you could win one absolutely free.

Here's a taste of the scenario from Imagine:

‘A raiding party from the Rallom Empire has taken over one of earth's far-flung space stations. The only earth craft in the vicinity is an out-dated cosmic cruiser... and you are the pilot. A priority signal sends you on what could turn out to be a suicidal mission. You have been ordered to save the space station crew at all costs. As you hurtle toward your destiny a daring plan forms in your mind. The only chance you have is to use your exterior laser cannon to blast open the station portals, then, by making use of your body propulsion unit, you will have to pluck the crewmen from the station and transport them back to your cruiser. Your plan requires split-second timing and nerves of steel. As you transport your ward back to the cruiser you must make snap decisions. If you use your hand laser the blast will blow the crewman into space. Can you get back to your laser cannon in time to blast the Rallom fighters? Or will you have to secure the rescued crewman to a nearby satellite to allow you to move more quickly? You see the space station in the distance, the adrenalin pumps through your body... will you succeed?’

400 prizes: win Cosmic Cruiser from



Schizoids	Arcadia
Wacky Waiters	Leggit
Molar Maul	Zip Zap
Ah Diddums	Zzoom
Jumping Jack	Frantic
Catcha Snatcha	Stonkers
Bewitched	Alchemist
Cosmic Cruiser	Pedro

Send your entry to Imagine Competition, Home Computing Weekly, No.1 Golden Square, London W1R 3AB.

Closing date is first post on Tuesday April 24, 1984. Senders of the first 100 correct entries opened at random for each of the four computers will win the prizes. They will arrive from Imagine within 28 days of the results appearing in Home Computing Weekly.

The rules

Entries will not be accepted from employees of Argus Specialist Publications, Imagine Software and Alabaster Passmore & Sons. This restriction also applies to employees' families and agents of the companies. The rules include the guidance in the How to Enter section. The editor's decision is final and no correspondence will be entered into.

Imagine Competition

Entry Coupon

Name _____

Address _____

_____ post code _____

Number of titles found _____

Computer owned (Spectrum, Commodore 64, Dragon or

BBC): _____

How to enter

Study the word square and mark all the Imagine titles you find with a ball-point or semi-opaque felt-tip pen. Complete the coupon fully and clearly — if you are a winner it will be used as a label — and send word square and coupon to us.

Important: you must write on the back of your envelope the number of titles you found and the computer you own.

You may enter as many times as you wish provided each is on the official word square and coupon and in separate envelope. Please do not enclose anything else. Incomplete entries cannot be considered.

The software titles in the word square are drawn from this list of all Imagine's games:

Complete clearly and fully — if you are a prizewinner this will act as a label. Post to Imagine Competition, Home Computing Weekly, No.1 Golden Square, London W1R 3AB. Closing date: first post, Tuesday April 24, 1984. Follow carefully the advice in the How to Enter section, including writing the number of titles found and your computer on the back of your envelope.

B	A	E	G	L	F	C	M	D	L	Y	P	B	K	J	T
E	M	B	V	V	A	S	T	O	N	K	E	R	S	S	J
W	I	H	U	Z	A	C	E	A	K	X	D	U	Q	C	W
I	U	C	O	N	Y	H	Z	H	J	W	R	V	R	P	I
T	A	R	C	A	D	I	A	J	Z	T	O	I	T	D	K
C	T	D	T	S	X	Z	Z	I	F	H	S	S	I	Z	Y
H	S	G	R	Z	Z	O	O	M	F	I	G	R	Q	A	I
E	R	F	W	I	K	I	D	O	R	O	Y	T	U	V	G
D	J	E	Q	P	L	D	G	L	H	C	H	P	O	B	B
Q	K	P	M	Z	C	S	E	A	F	R	A	N	T	I	C
P	B	P	E	A	V	D	B	R	O	Y	P	I	O	Y	Z
T	O	O	B	P	U	D	K	M	X	L	G	N	X	N	H
N	N	C	V	G	S	A	J	A	D	G	M	O	M	R	G
H	J	W	X	W	N	R	K	U	E	L	B	L	S	E	C
I	U	U	G	D	F	M	A	L	C	H	E	M	I	S	T
A	H	D	I	D	D	U	M	S	C	E	T	F	H	W	X

You can rely on us for big competitions with prizes from the big names. Enter now and you could be one of the first to enjoy Imagine's Cosmic Cruiser, so new it's not in the shops yet.

Top Ten programs for the Dragon 32

- | | | |
|----|--------------------------|---------------|
| 1 | Chuckie Egg | A&F (-) |
| 2 | Kriegstiel | Beyond (-) |
| 3 | North Sea Oil | Shards (-) |
| 4 | Chocolate Factory | Minits (-) |
| 5 | Pedro | Imagine (-) |
| 6 | Mystery of the Java Star | Shards (-) |
| 7 | Eight Ball | Microdeal (3) |
| 8 | Ugh! | Softek (2) |
| 9 | Up Periscope | Beyond (-) |
| 10 | Hungry Horice | M.House (6) |

Top Ten programs for the VIC-20

- | | | |
|----|-------------------------|-----------------|
| 1 | Flight 015 | Ferranti |
| 2 | Crazy Kong | Davenport (-) |
| 3 | Emmet Attack | Interceptor (2) |
| 4 | Snooker | CBM (-) |
| 5 | Choc-o-bloc | Visions (-) |
| 6 | Snowman and Maths maze | Paramount (-) |
| 7 | Wizard and the Princess | CBM (-) |
| 8 | M.L.B.A.T.E.T. | M.House (1) |
| 9 | Jetpac | Llamasoft (-) |
| 10 | The Count | Ultimate (6) |
| | | Commodore (-) |

Top Ten programs for the ZX81

- | | | |
|----|-------------------|----------------|
| 1 | Crazy Kong | PSS (4) |
| 2 | Android | Quicksilva (-) |
| 3 | Skramble | Quicksilva (-) |
| 4 | Defenders | Quicksilva (-) |
| 5 | Invaders | Quicksilva (6) |
| 6 | Flight Simulation | Sinclair (1) |
| 7 | VU-File | Sinclair (-) |
| 8 | VU-Calc | Sinclair (-) |
| 9 | Hopper | PSS (5) |
| 10 | Football Manager | Addictive (2) |

Compiled by Websters. Figures in brackets are last week's positions

Top Ten programs for the Spectrum

- | | | |
|----|-------------------|----------------|
| 1 | Chequered Flag | Psion (1) |
| 2 | Atic Atac | Ultimate (2) |
| 3 | Scuba Dive | Durrell (10) |
| 4 | Ant Attack | Quicksilva (5) |
| 5 | Lunar Jetman | Ultimate (4) |
| 6 | Jetpac | Ultimate (-) |
| 7 | Flight Simulation | Psion (3) |
| 8 | The Hobbit | M.House (8) |
| 9 | Stonkers | Imagine (-) |
| 10 | Pool | CDS (-) |

Compiled by W. H. Smith. Figures in brackets are last week's positions

BEST SELLERS

Top 30

- | | | | |
|----|------------------------|-------------------|---------------------|
| 1 | Jet Set Willy | Software Projects | Spectrum (19) |
| 2 | Manic Miner | Software Projects | Spectrum (1) |
| 3 | 3D Ant Attack | Quicksilva | Spectrum (3) |
| 4 | Hunchback | Ocean | Spectrum/CBM 64 (3) |
| 5 | Atic Atac | Ultimate | Spectrum (4) |
| 6 | Chinese Juggler | Ocean | CBM 64 (9) |
| 7 | The Hobbit | M.House | Spectrum (6) |
| 8 | Eskimo Eddie | Ocean | Spectrum (12) |
| 9 | Bear Bovver | Artic | Spectrum (7) |
| 10 | Buga Boo (The Flea) | Quicksilva | Spectrum (11) |
| 11 | Snooker | Visions | VIC-20 (14) |
| 12 | Chuckie Egg | A&F | Spectrum (10) |
| 13 | Lunar Jetman | Ultimate | Spectrum (8) |
| 14 | Hobbit | M.House | CBM 64 (17) |
| 15 | Frogger | Microdeal | Dragon (13) |
| 16 | The King | Microdeal | Dragon (15) |
| 17 | Colossus | CDS | CBM 64 (26) |
| 18 | Pedro | Imagine | Spectrum (22) |
| 19 | Trashman | New Generation | Spectrum (30) |
| 20 | Chequered Flag | Psion | Spectrum (19) |
| 21 | Quarsar | Voyager | CBM 64 (28) |
| 22 | Hunchback | Superior | BBC (24) |
| 23 | Zzoom | Imagine | Spectrum (23) |
| 24 | Cuthbert in the Jungle | Microdeal | Dragon (20) |
| 25 | Blade Alley | PSS | Spectrum (-) |
| 26 | Harrier Attack | Durrell | Spectrum (21) |
| 27 | Penetrator | M.House | Spectrum (25) |
| 28 | Trooper Truck | Rabbit | CBM 64 (-) |
| 29 | Crazy Kong | Interceptor | CBM 64 (27) |
| 30 | Arcadia | Imagine | VIC-20 (25) |

Compiled by PCS Distribution (0254 691211) from a sample of 40 dealers in the U.K. and Northern Ireland. Chart is for sales in the fortnight ended March 23.

Top Ten programs for the Commodore 64

- | | | |
|----|---------------------|-----------------------|
| 1 | Manic Miner | Software Projects (2) |
| 2 | Colossus Chess | CDS (-) |
| 3 | Hideous Bill | Virgin (-) |
| 4 | Crazy Kong | Interceptor (-) |
| 5 | Intro to Basic Pt 1 | CBM (-) |
| 6 | Outback | Paramount (-) |
| 7 | Bumping Buggies | Bubble Bus (-) |
| 8 | Basic Adventure | Honeyfold (-) |
| 9 | Flying Feathers | Bubble Bus (-) |
| 10 | Chinese Juggler | Ocean (5) |

Compiled by Websters. Figures in brackets are last week's positions

A SUPERB RANGE OF GAMES SOFTWARE FOR SHARP MZ-7000 SERIES



FROGGER — £6.95

This most popular of arcade games has been totally recreated for the Sharp computer. Superb graphics and as fast as you like from beginner's level up to 'Superhuman'. Get each of four frogs over the busy motorway, then hop from boat to raft to log to crocodile until safely home sitting on a lily pad. Terrific fun.



BACKGAMMON — £7.95

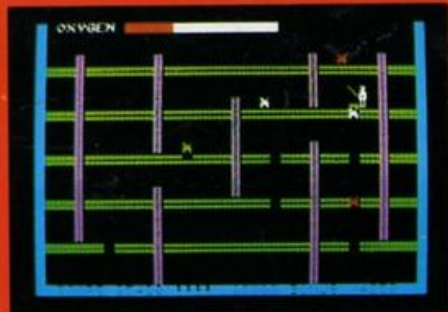
Now available for the MZ-700, this traditional board game can now be played against the computer. Simple to follow instructions for the beginner — higher levels available for the more experienced player.



CHESS — £9.95

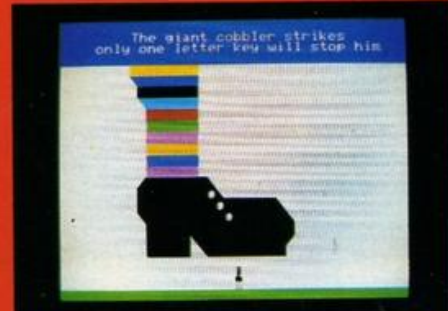
Suitable for the rank beginner through to the more experienced player, this Chess program may be used in three different ways.

1. As a referee between two players, checking for valid moves, CHECK and CHECKMATE situations.
 2. As an opponent with 14 levels of intelligence to match your skills.
 3. As a teaching aid when asked to play against itself or show you the best move if you get into difficulties.
- Long games may be saved on cassette for completion at a later time and a print-out of all moves made is available.



SPACE PANIC — £7.95

How long can you survive in the multi-storey building filled with alien bugs. This machine-code programme accurately simulates the arcade game where you climb ladders and dig holes to catch the aliens then fill them in again once they are caught. The red ones must fall through one floor, the green ones, two floors and white ones, three floors. Red aliens who have time to dig themselves out get rather cross and become green. PANIC!! Joy stick or keyboard control.



NIGHTMARE PARK — £6.95

If you have never played this type of game before, you're in for a treat. As you make your way along the intricate pathways to the exit, you are constantly given tasks to perform or games to play. Each of these must be successfully completed before you are allowed to continue. It takes a lot of doing. You must remain quick and alert at all times. A little luck is handy. Amazing graphics and sounds!!!



XANAGRAMS — £9.95

Not only a terrific spelling test but also a great game. You are asked to guess up to five words, represented by blocks on the screen in a crossword format. All the letters that you need are shown on the right of the screen in alphabetical order and the computer will give you the first letter if you ask it nicely. Suits almost any age with 3 skill levels and from 1 to 5 words to be guessed. Really habit-forming!!!



GALAXIANS — £7.95

A high-speed machine-code version of the popular arcade game where the massed space invaders must be cleared from the skies. After a few seconds they will begin to swoop and dive at you, showering you with scatter bombs as they go. The game becomes progressively more demanding as you kill more and more of the marauding aliens. Very entertaining — hours of fun!!! Joy stick or keyboard control.



FIGHTER COMMAND — £6.95

A mission flown completely on instruments where you are pursuing a fleet of ten enemy aircraft fleeing from you. They will show on your long range radar screen and you must manoeuvre your craft to get them within range of your missiles. If you get too near, they will fire at you and warp away to safety. You only have one chance to destroy incoming missiles with your lasers.



LIGHTNING PATROL — £3.95

Choose your rank in the RAF and you are immediately sent on a mission to catch and shoot down ten enemy Mirage jets that are fleeing after their attack on your airbase. You must manoeuvre your plane to get them in your gun-sights whilst they are weaving about the sky to avoid being hit. Limited ammunition and fuel available so efficiency and accuracy are all important to your completion of the mission. Promotion for the successful but poor performances can mean you are asked to leave the air force. Joy stick or keyboard control.

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Subhunt by Bryn Phillips

You control a submarine which must seek out and destroy the enemy convoy. You are armed with torpedoes, and equipped with sonar which is used to locate the enemy ships.

The ships are armed with depth charges, and if you get too close you will be attacked if you are foolish enough to reveal your presence.

The program is loaded in two parts. Charsub creates the user defined graphics, and gives the instructions for the game. On loading and running the main program a grid appears with your submarine in the top left.

You hear the sonar, and the delay between the signal and the echo indicates the proximity of the nearest ship.

How it works

20-100 draw grid
110-160 set constants and variables
170-190 print scoreboard
200-280 set ship locations
290-370 main loop
380-400 depth charge subroutine
410-550 score update and select option subroutine
560-660 move submarine subroutine
670-960 fire torpedo subroutine
970-1020 sink ship subroutine
1030-1070 detect nearest ship subroutine
1080 end
1090 DATA for torpedo

You have the choice of moving the submarine to any position on the grid (1. SAIL), or firing a torpedo (2. FIRE).

Depress either 1 or 2 until the computer responds by either asking for co-ordinates (SAIL) or direction (FIRE). Each torpedo has a range of two squares.

If you succeed in hitting a ship it appears, explodes and is then replaced by its score. As long as your score is positive you lose one point for each move.

If you fire a torpedo when you are on the same grid as a ship it will drop five depth charges. There's nothing you can do except grit your teeth and hope they miss.

Seek and destroy... sail and save

It's time your computer tasted the tang of the sea. Try these two programs for a life on the ocean wave. Both are in two parts for detailed graphics on the unexpanded VIC-20

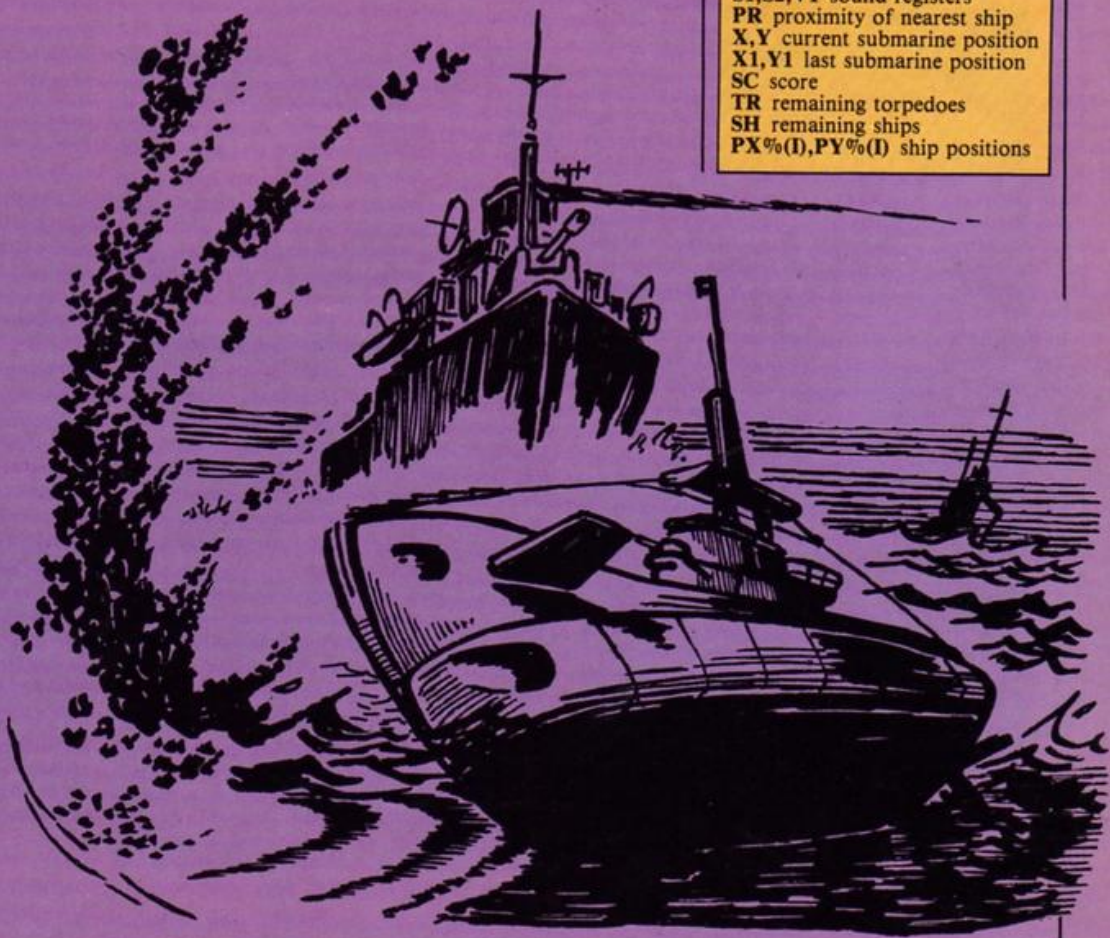
Hints on conversion

This game relies heavily on user-defined characters to simulate medium resolution graphics and sprite movement, features not directly available on the VIC-20. Direct conversion to other micros would be difficult, and in most cases it would be far easier to start from scratch using the ideas outlined in the text and making full use of the capacities of your particular computer.

There are 10 ships in the convoy, and you have 15 torpedoes. The odds are in your favour... seek and destroy!

Variables

T%(I,J) torpedo characters
D1-D5 ship and score characters
SB submarine character
P1 screen character location
P2 screen colour location
S1,S2,V1 sound registers
PR proximity of nearest ship
X,Y current submarine position
X1,Y1 last submarine position
SC score
TR remaining torpedoes
SH remaining ships
PX%(I),PY%(I) ship positions



```
0 REM
1 REM *** CATCH 'EM CHARSUB ***
2 REM
3 POKE52,28:POKE56,28
4 FORI=71680TO7531:PRINT:POKEI,C:NEXTI
5 DATA255,255,255,255,255,255,255,255,6,14,2,30,62,102,198,0
6 DATA252,254,194,252,198,254,252,0,126,254,192,192,192,254,126,0
7 DATA252,254,198,198,198,254,252,0,254,254,192,248,192,254,254,0
8 DATA254,254,192,248,192,192,192,0,126,254,192,222,198,254,126,0
9 DATA198,198,198,254,198,198,198,0,60,60,24,24,24,60,60,0
10 DATA254,254,24,24,216,248,112,0,198,204,216,240,216,204,198,0
11 DATA192,192,192,192,192,254,254,0,198,236,214,214,198,198,198,0
12 DATA198,198,230,214,236,198,198,0,124,254,198,198,198,254,124,0
13 DATA252,254,194,252,192,192,192,0,60,102,102,102,110,102,62,1
14 DATA252,254,194,252,216,204,198,0,124,254,192,252,6,254,124,0
15 DATA252,252,48,48,48,48,0,198,198,198,198,198,198,124,0
16 DATA198,198,198,198,198,108,56,0,198,198,198,198,214,238,198,0
17 DATA198,198,48,16,40,198,198,0,204,204,204,120,48,48,0
18 DATA254,254,28,56,112,254,254,0,255,255,168,87,88,47,16,15
19 DATA255,255,0,255,0,255,0,255,255,255,1,255,1,255,1,255
20 DATA192,64,64,96,112,120,120,120,0,0,24,24,6,30,58
21 DATA0,0,0,0,0,0,0,0,0,0,0,0,1,7,15,15
```

```
22 DATA0,0,0,126,255,255,255,255,0,0,0,0,126,224,240,240
23 DATA0,4,2,1,0,0,0,0,137,137,74,42,129,90,90,74
24 DATA16,32,64,128,0,0,0,0,63,24,24,24,40,40,108,0
25 DATA12,24,48,0,0,0,0,0,49,48,48,48,0,48,0
26 DATA0,24,24,0,126,90,90,137,74,44,248,31,52,82,145
27 DATA0,0,48,48,32,64,0,0,33,18,213,42,44,126,153
28 DATA0,0,0,0,48,48,0,170,85,0,0,0,0,0,0
29 DATA124,254,206,214,230,254,124,0,56,56,24,24,24,60,60,0
30 DATA254,254,6,254,192,254,126,0,252,254,6,124,6,254,252,0
31 DATA24,216,216,254,24,24,24,0,126,254,192,254,6,254,252,0
32 DATA126,254,198,254,198,254,124,0,254,254,6,12,24,48,96,0
33 DATA124,254,198,124,198,254,124,0,124,254,198,254,6,254,124,0
34 POKE198,3:POKE632,147:POKE633,131
READY
```


VIC-20 PROGRAMS

Listing 2 — Subhunt, main program

[illegible]

Listing 3 — sets up graphics for Catch 'em

```

10 POKE36879,0
19 REM[CLS][6 CSR RIGHT][RED]
20 PRINT "*****"
29 REM[6 CSR RIGHT][RED]
30 PRINT "***** SUBMUNT "
39 REM[6 CSR RIGHT][RED]
40 PRINT "*****"
49 REM[CSR DOWN][CSR RIGHT][WHT]
50 PRINT "MYYOU CONTROL A NUCLEAR SUB AND YOUR MISSION IS TO DESTROY THE"
59 REM[CSR RIGHT][CSR DOWN]
60 PRINT "ENEMY CONVOW. MYYOU HAVE SONAR WHICH CAN GIVE AN ESTIMATE"
69 REM[CSR RIGHT]
70 PRINT "NOF THE POSITION OF THE ENEMY."
79 REM[CSR RIGHT][CSR DOWN]
80 PRINT "MYIF YOU FIRE A TORPEDO DIRECTLY BENEATH A SHIP YOU WILL BE"
89 REM[CSR RIGHT]
90 PRINT "DEPTH CHARGED"
100 POKE52,28 POKE56,29:CLR
110 FOR I=7168707679 POKE I,PEEK(I+25600) NEXT
120 FOR C=7168707175 READ R:POKE C,A NEXT
130 FOR C=7336707423 READ R:POKE C,A NEXT
140 FOR C=7432707551 READ R:POKE C,A NEXT
150 FOR C=7632707679 READ R:POKE C,A NEXT
159 REM [CSR DOWN][2 CSR RIGHT][RVS ON][5 CSR RIGHT][CSR UP]
160 PRINT "X[PRESS R/S TO LOAD*****]AIN PROGRAM "
170 REM TORPEDO
180 DATA 0.0,0.0,40.16,16,16
190 REM GRID
200 DATA 16,16,16,255,16,16,16,16,16,16,16,16,16,16,16,16
210 DATA 16,16,16,240,16,16,16,16,0.0,255,16,16,16,16,16,16
220 DATA 16,16,16,255,0.0,0.0,16,16,16,240,0.0,0.0
230 DATA 16,16,16,31,0.0,0.0,0.0,31,16,16,16,16,16
240 DATA 0.0,240,16,16,16,16,0.0,255,0.0,0.0
250 DATA 16,16,16,16,16,16,16,16
260 REM SHIPS
270 DATA 0.0,0.0,62,127,62,0.0,16,56,60,255,254,124
280 DATA 36,0.06,56,60,235,198,116,0.46,42,42,42,46,0
290 DATA 238,42,42,42,234,138,238,0.28,42,42,234,42,238,0
300 REM TORPEDOES
310 DATA 16,16,16,144,112,144,16,16,16,16,16,24,22,24,16,16
320 DATA 0.0,128,96,128,0.0,0.0,0.0,8,8,0.0
330 DATA 16,16,16,17,22,17,16,16,16,16,16,16,112,16,16,16
340 DATA 0.0,1,6,1,0.0,0.0,16,16,16,16,255,0.0,0.0
350 DATA 0.0,255,16,16,16,16,16,16,255,0.0,0.0
360 DATA 0.0,0.16,16,16,40,16,16,16,16,16,16,16
370 DATA 16,16,16,255,0.0,0.0,0.0,255,40,16,16,16
380 DATA 40,16,16,0.0,0.0

```

Catch 'em by Matthew Solly

You're enjoying a day of sea fishing in your boat when parachutists start dropping from the sky.

You have three to rescue by moving your boat under them. You lost if they miss your boat — and if one lands on your head.

You control the boat with the keys Z for left and X for right. If you go off the edge of the screen you will reappear on the other side.

How it works

main program

11-33 main routine
1000-1050 initialise variables etc
2000-2495 instructions
3000-3020 print parachutist
4000-4001, 5000-5001 move boat
to other side
6000-6040 splash routine
8000-8030 play again?
9000-9010 man caught
10000-10010 rudder routine
11000-11030 splat routine

Listing 4 — Catch 'em, main program

```

10 DIMT%(4,4):POKE36869,255:POKE36879,8:POKE650,128
15 REM[CLR][WHT][CRSR DOWN][2 CRSR RIGHT]
20 PRINT"XXXXXXXXXX"
30 FORI=1TO7
35 REM[2 CRSR RIGHT]
40 PRINT"XXXX ← ← ← ← ← ← ← ←"
45 REM[2 CRSR RIGHT]
50 PRINT"XXXXUUUUUUUUUUUUUUUUUU"
60 NEXTI
65 REM[2 CRSR RIGHT]
70 PRINT"XXXX ← ← ← ← ← ← ← ←"
75 REM[2 CRSR RIGHT]
80 PRINT"XXXXTYTYTYTYTYTYTYTYTYTZ"
85 REM[GRN][HOME][2CRSRDOWN][CSRRIGHT](7*[2CRSRDOWN][CURSLEFT])
90 PRINT"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
95 REM[HOME]
100 PRINT"X 1 2 3 4 5 6 7 8 9"
110 FORI=1TO4:FORJ=1TO4:READT%(I,J):NEXTJ,I
120 D1=34:D2=35:S$=33
125 REM[HOME][18 CRSR DOWN]
130 S$="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
140 P1=8033:P2=38753:S1=36876:S2=36877:V1=36878:PR=2
150 X=1:Y=7:X1=1:Y1=7

```

Main variables

SC score
HI high score
FR, M1, M2, E, F fisherman
and boat
C1, C2, C3, R1, H, R2, L para-
chutist
S1, S2, S3, S4 sound channels
CO colour location
P test for parachutist
AS, KS inputs
W, D loops
C chances
Q colour of parachute
Y parachute position

● As usual, we have inserted REMs above lines holding control characters. These are only to help you type in the programs and must not be entered.

Make full use of abbreviations for keywords to save memory — they are listed in the manual.

With two-part games you type in the first, RUN, then enter NEW before typing in the second program.

Hints on conversion

This program should be fairly easy to convert for other computers. The special POKES are:

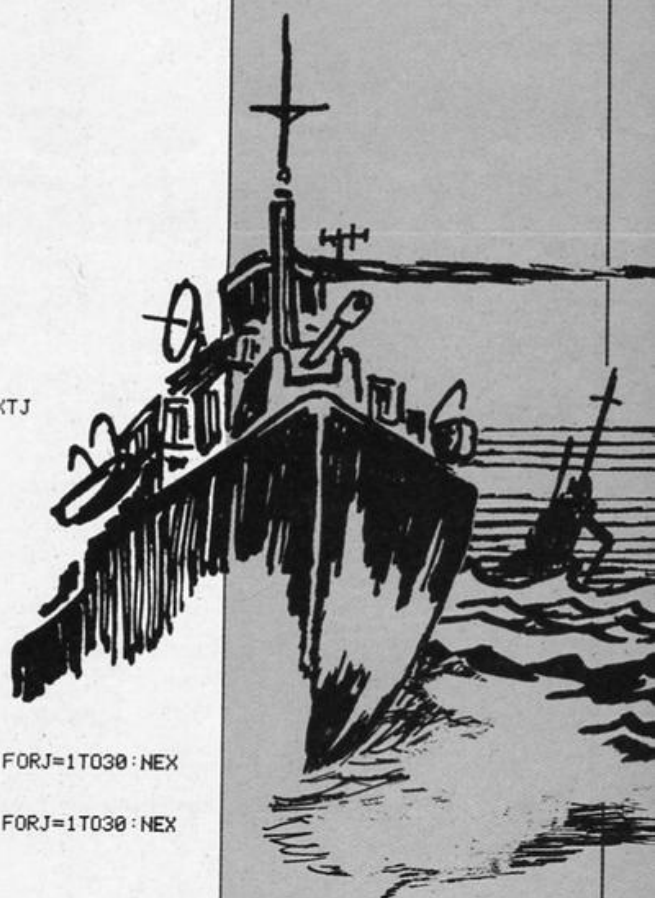
36879,25 sets screen to white
36878,15 sets volume full on
36874, 36875, 36876, 36876
sound channels
36869,255 high resolution mode
7680-8186 locations to memory-
mapped screen

VIC-20 PROGRAMS

```

160 SC=0:SH=10:TR=15
165 REMICRSR DOWN][2 CRSR RIGHT][YEL]
170 PRINTS$"SUBTROPICS"
175 REMIC2 CRSR RIGHT]
180 PRINT"SHIPS"
185 REMIC2 CRSR RIGHT]
190 PRINT"SCORE"
200 POKEP1+2*X-44*Y,SB
210 FORI=1TO10
220 PX(I)=INT(RND(1)*9)+1:PY(I)=INT(RND(1)*7)
230 IFI=1GOTO280
240 FORJ=1TOI-1
250 IF(PX(J)=PX(I))AND(PY(J)=PY(I))THENI=I-1
260 NEXTJ
270 IF(PX(I)=1)AND(PY(I)=7)THENI=I-1
280 NEXTI
290 GOSUB1030
300 GOSUB410
310 GOSUB460
320 IFQ$="1"THENGOSUB560:SC=SC-1:GOTO290
330 IFPR=0THENGOSUB380
340 IFQ$="2"THENGOSUB670
350 IFF=2THENGOSUB970
360 IFF=3THENDX=DX*2:DY=DY*2:GOSUB970
370 GOTO290
380 FORI=1TO5:POKEV1,15:POKES2,200:FORJ=1TO200:POKEV1,15-J/20:NEXTJ
390 POKEV1,0:POKES2,0:R=INT(RND(1)*15)+1:IFR=10THEN1080
400 FORJ=1TO100*NR:NEXTJ,I:RETURN
405 REMICRSR DOWN][7 CRSR RIGHT][3 CRSR LEFT]
410 PRINTS$"*****"TR
415 REM [7 CRSR RIGHT][3 CRSR LEFT]
420 PRINT"*****"SH
430 IFSC<0THENS=0
435 REM [7 CRSR RIGHT][3 CRSR LEFT]
440 PRINT"*****"SC
450 IFSH=0ORTR=0THEN1080
455 REMICRSR DOWN][11 CRSR RIGHT][RED]
460 PRINTS$"*****SELECT"
465 REM [12 CRSR RIGHT][WHT]
470 PRINT"*****1 SAIL"
475 REM [12 CRSR RIGHT]
480 PRINT"*****2 FIRE"
490 FORI=1TO5:POKES1,150:POKEV1,18-3*I:FORJ=1TO30:NEXTJ:POKEV1,0:FORJ=1TO30:NEXTJ,I
500 POKES1,0:FORI=1TO100*PR:NEXTI
510 FORI=1TO5:POKES1,230:POKEV1,18-3*I:FORJ=1TO30:NEXTJ:POKEV1,0:FORJ=1TO30:NEXTJ,I
520 POKES1,0:POKEV1,0
530 FORI=1TO75*PR:NEXTI
540 GETQ$:IFVAL(Q$)>20RVAL(Q$)<1THEN490
550 RETURN
555 REM [CRSR DOWN][RED][11 CRSR RIGHT]
560 PRINTS$"*****COORD"
565 REM[WHT][12 CRSR RIGHT][CRSR DOWN][7 CRSR LEFT][CRSR UP][2CRSR LEFT]
570 PRINT"*****1*****"
580 GETA$:IFA$=""THEN580
590 IFASC(A$)>72ORASC(A$)<65THEN580
600 Y=72-ASC(A$)
610 PRINTA$
615 REMIC3 CRSR RIGHT]
620 PRINT"*****19"
630 GETA$:IFVAL(A$)<10RVAL(A$)>9THEN630
640 PRINTA$:X=VAL(A$)
650 POKEP1+2*X1-44*Y1,32:POKEP1+2*X-44*Y,SB
660 X1=X:Y1=Y:RETURN
665 REMICRSR DOWN][11 CRSR RIGHT][RED]
670 PRINTS$"*****DIRECTION"
675 REM [13 CRSR RIGHT][WHT][CRSR DOWN][7 CRSR LEFT]
680 PRINT"*****F1< F3?*****F5* F7."
690 DX=0:DY=0
700 GETF$:IFF$=""THEN700
710 IFF$="N"THENDY=1:M=3:GOTO760
720 IFF$="S"THENDY=-1:M=4:GOTO760
730 IFF$="E"THENDX=1:M=1:GOTO760
740 IFF$="W"THENDX=-1:M=2:GOTO760
750 GOTO700
760 POKEV1,5:POKES1,180
770 TR=TR-1

```



```

780 F=4
790 FORI=1TO10
800 IF(PX(I)=0)AND(PY(I)=0)THEN820
810 IF(PX(I)=X+2*DX)AND(PY(I)=Y+2*DY)THENF=3:K=I
820 NEXTI
830 FORI=1TO10
840 IF(PX(I)=0)AND(PY(I)=0)THEN860
850 IF(PX(I)=X+DX)AND(PY(I)=Y+DY)THENF=2:K=I
860 NEXTI
870 T1=-1
880 FORI=1TOF
890 T1=T1+2:IFT1>3THENT1=1
900 X2=2*X+I*DX:Y2=2*Y+I*DY
910 PO=P1+X2-22*Y2:PK=PEEK(PO):POKE(PO),T2(M,T1)
920 POKEV1,10
930 FORJ=1TO200:NEXTJ:POKEPO,T2(M,T1+1)
940 FORJ=1TO200:NEXTJ:POKEPO,PK:POKEV1,5
950 NEXTI:POKEV1,0:POKES1,0
960 RETURN
970 PO=P1+2*(X+DX)-44*(Y+DY):POKEPO+30720,2
980 POKES2,200:POKEV1,15
990 POKEPO,D1:FORI=1TO1000:NEXT:POKEPO,D2:FORI=1TO2000:NEXT
1000 IFINT(RND(1)*10)=5THENF=4
1010 POKEPO,34+F:SC=SC+(F-1)*10:POKES2,0:POKEV1,0
1020 PX(K)=0:PY(K)=0:K=0:SH=SH-1:RETURN
1030 PR=8
1040 FORL=1TO10
1050 IFPX(L)=0ANDPY(L)=0THEN1070
1060 PP=ABS(X-PX(L))+ABS(Y-PY(L)):IFPR>PPTHENPR=PP
1070 NEXTL:RETURN
1075 REM [HOME][CRSR DOWN][CRSR UP]
1080 PRINT"END OF GAME":END
1090 DATA39,40,41,42,43,44,45,46,47,58,59,60,61,62,63,0
READY.

```



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Geography Educational Quiz 48K Spectrum £5.95

Thor, Erskine Industrial Estate,
Liverpool L6 1AP

Sometimes I feel sorry for geography. Everyone always seems to think it's about capital cities, flags, countries and rivers. It isn't! To assume you know geography because you can regurgitate endless, almost random, facts is silly. Thus educational software based on that premise is equally naive.

Having said that, this is an entertaining game. Up to four players can join in a race to amass 100 points. Questions are posed and wrong answers produce extra clues. The more clues provided, the less points

you get for a question. Add to that mystery questions and special "no clue" questions and the result is fun. The mystery questions are particularly rotten. They come in three parts and are worth 20 points if you get them all correct. If not, you lose 20 points!

The concept of a quiz is pretty boring, as demonstrated by the Questor series from Computeristic. Thor has recognised this and much thought has obviously gone into screen presentation and sound. They're lively, imaginative and hold attention.

D.M.

instructions	95%
ease of use	95%
display	95%
value for money	80%



3D Spell 48K Spectrum £5.95

Camel Micros, 33A Commercial
Rd, Weymouth

The 3D graphics are superb, streets ahead of many so called 3D games. A fully animated man belts around a track at your command. In the distance, a hoarding which has flashed up a word, waits to receive the correct letters. On either side of the track, closer to you, two smaller hoardings show a letter of the alphabet. Run clockwise and the letters advance towards Z, anti clockwise and the reverse happens. When you reach the letter you need, you either pause or press the S key depending on the level chosen. Getting the

right letter depends on nifty footwork and avoiding a spider on higher levels.

Quite a stunning visual experience and very addictive. There are four speeds and a similar number of word difficulty levels. Up to 1,000 words can be catered for. Will it teach your child to spell? No, it can't! This isn't spelling.

At best, it's word recognition and short term recall training. Even so, it's worth it. Recommended, though I wish Camel had given instructions on the inlay card as well as in the program.

D.M.

instructions	75%
playability	90%
graphics	100%
value for money	90%



German Master A & B BBC £9.95 each

Kosmos, 1 Pilgrims Close,
Harlington, Beds LU5 6LX

Let's state straight away that this is a vocabulary drilling program and therefore will be derided by some as uninventive and boring. I have said the same but, in language learning, drill or rote learning has a major role.

You do need to know what the words are before you can use them properly and for this reason these programs will be valuable to those just starting or struggling. It's rather like having a patient brother/sister to help you with your vocabulary homework just when you like.

The other things which set

these programs above some others are: the ability to program in your own data sets and the use of colour to signify gender. Each package consists of a loader followed by 16 data files of words within broad subject bands such as "Family", "Furniture" and "Numbers". The difference between 'Level A' and 'Level B' is simply the data files enclosed.

Nearly £20 is a lot for the two data file sets and the loader. Most would prefer to pay, say £15 for a complete package. D.C.

instructions	90%
ease of use	90%
graphics	N/A
value for money	65%



Marks for software exercises

Quiet at the back of the class
as our examiners study new
teaching programs

Questor 48K Spectrum £7.95 each

Computeristic, 205 Wells Rd,
Knowle, Bristol BS4 2DF

A series of tapes on geography, sport and general knowledge — and arguably the worst I've ever seen.

Sterile questions are presented in a boring way; get them wrong and the first letter of the answer appears. Get them wrong again and half the answer appears. This is supposed to motivate your child to learn. There's more bad news. Type "common market" instead of "the common market" and you're wrong again. To cap it all, at least one of the answers in Geography is incorrect.

What do you get? Each tape

holds the same master program, separately loaded character arrays of questions dependent on subject, and a program to allow you to set your own questions and answers. In other words, having bought one program, if you buy a second, all you get is flashy packaging and three character arrays. Everything else is the same as on the first tape.

You could write this yourself. I could recommend buying just one. Then you'd have the master programs. But to be honest, my sons found it so boring and difficult to read that I can't even suggest that.

D.M.

instructions	95%
ease of use	50%
display	10%
value for money	10%



The Solar System Spectrum £3.50

Eagle Soft, 7 Chatsworth Gdns,
Scarborough, N. Yorks

Unashamedly amateurish in its presentation — hand-drawn, black and white inlay card, EMI cassette and genuine ZX Printer instructions — this comes at an equally "down to earth" price.

Three separate blocks of code allow use on 16K Spectrums. The Solar System gives details of each member of the system with a very simple graphic representation showing relative size, using the Spectrum's PLOT and DRAW commands. Planetary Quiz puts you in the hot seat. You have to identify the planet from the

description given. Planet Finder gives you lots of information on each planet.

All three are in glorious black and white and each one must be loaded by separate commands. The notes make it clear that the information has come from astronomy text books. That being so, the data will be quickly out-dated, but Eagle Soft promises an upgrade sheet.

D.M.

instructions	70%
ease of use	70%
display	40%
value for money	65%



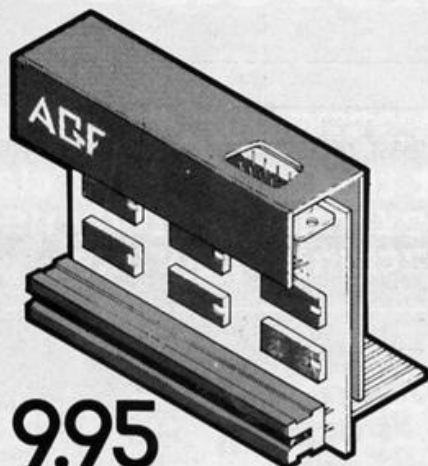
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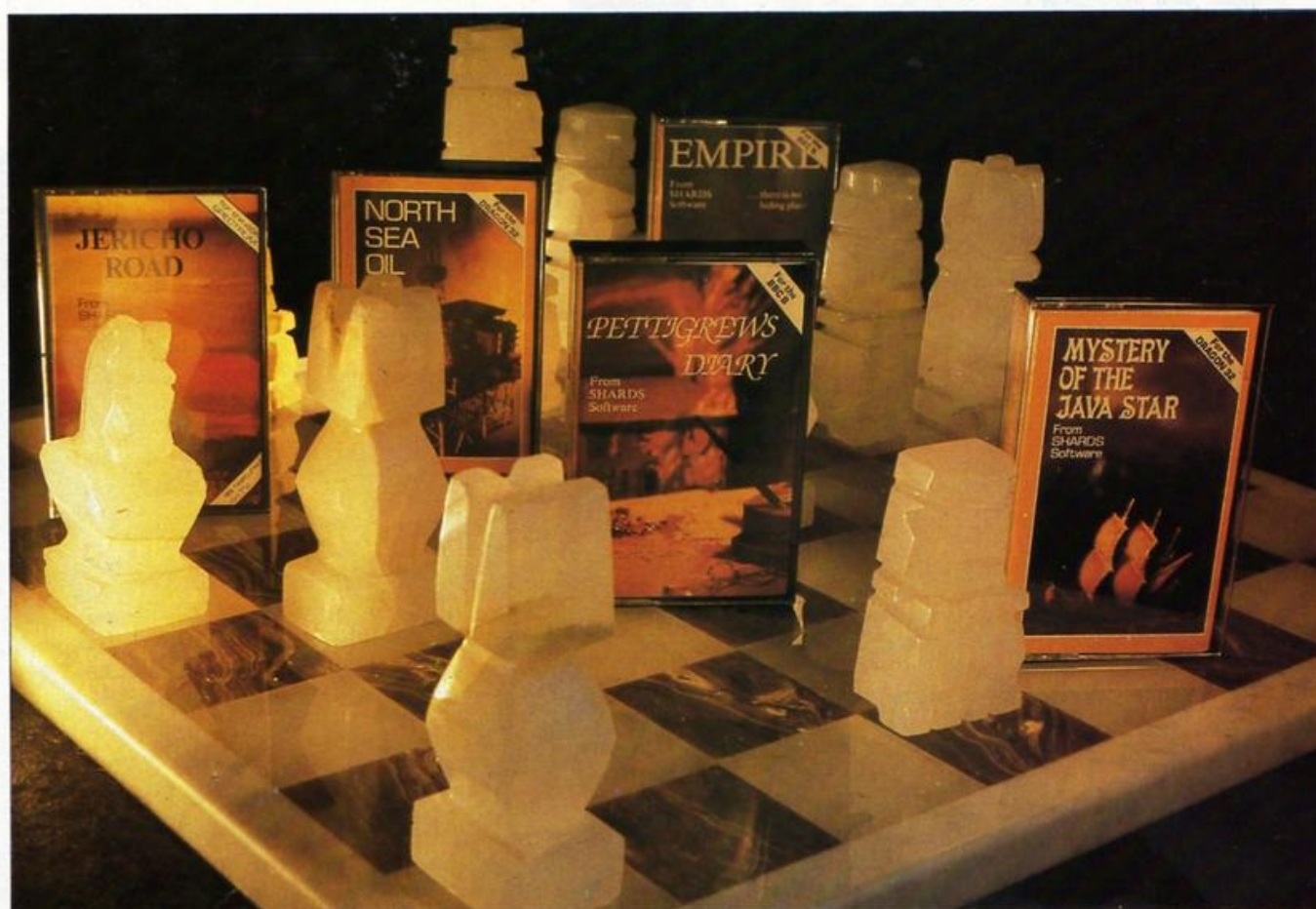
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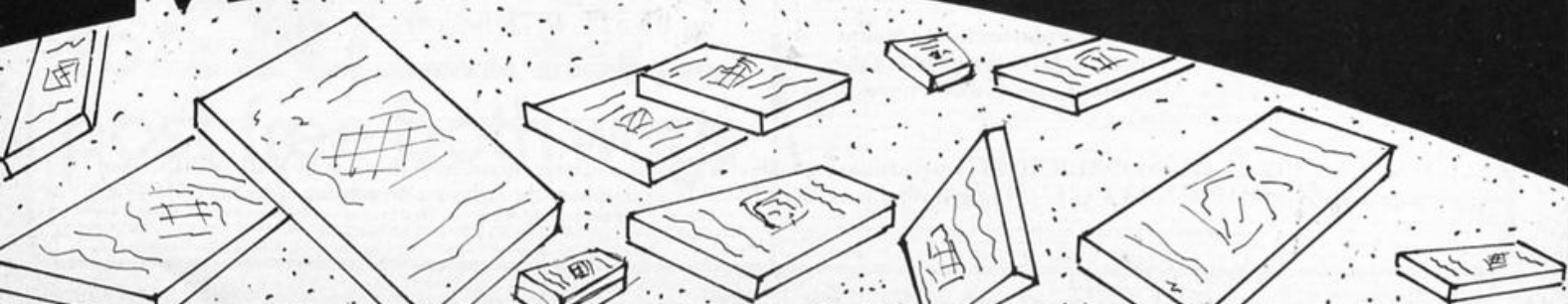
U.F.O. £4.95

Blast the aliens as they appear from hyper-space, features 3 levels of play, refuel etc.

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All games described here run on the UNEXPANDED TEXAS T199/4a.



Molecule 32K BBC £6.90

Bridge, 36 Fernwood, Marple
Bridge, Stockport, Cheshire

The inlay may not be very striking but in fact it is one of the best I have come across. There are loads of instructions, which come in very useful. The only problem is they are in very small type and unless you have read the instructions in the program itself, They are very difficult to understand.

The program instructions are very good and tell you exactly what to do in this complicated game.

A new virus is decimating the world's population. You must discover the structure of its molecule so a vaccine can be made. You do this by firing

photon rays in an 8 x 8 grid. Each time you fire different coloured markets appear. The atoms which cause these reactions are hidden within the grid. Using your results you must locate them.

After three goes I managed to locate all the atoms. But, I think I was pretty lucky. I don't think this game is particularly addictive. I feel it is aimed at the more scientific. It requires a lot of concentration. At £6.90 it doesn't really compare with the better BBC software. **D.B.**

instructions	90%
playability	50%
graphics	30%
value for money	60%



Sea Wolf 32K BBC £6.95

Optima, 36 St. Petersgate,
Stockport SK1 1HL

It took me a while to decide what type of game this is. You command a submarine trying to sink shipping in order to improve your rank. You are well advised to start as a rating and work slowly up to commander.

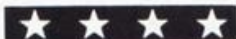
So this is a strategy game where you must weigh up the odds and decide if you are going to run or stand. You must balance the damage you have already suffered with your kills so far and energy left.

It was only when I examined the screen in detail that I realised this is Star Trek on water. You have short and long range scans,

computer and damage reports and nasty enemies.

Don't think, though, that it must be old hat. The game is good fun and involving with plenty of action but not all of the dexterity type. You need good reactions, but strategy counts for a great deal. The screen is particularly attractive and well detailed and, although it would have been nice to have colour, the high resolution makes up for the loss. I would like to be able to turn off the rather too realistic, sound though. **D.C.**

instructions	85%
playability	95%
graphics	90%
value for money	80%



Omega Probe 32K BBC £6.95 Disc £8.95

Optima, 36 St Petersgate, Stock-
port SK1 1HL

There is definitely a vogue at present for 3D space shoot-up games. I'm constantly being asked if I've seen this one or that one at the local BBC club and this is another version. It has a great deal in common with Planetoid, the alien shapes being very much the same.

There is an element of speed involved which makes the game interesting rather than difficult. Clearing a sheet simply makes things faster and more difficult; there are no real surprises that I have found.

The only real criticism I have is of the 3D graphics — they are

not truly 3D at all. You do appear to be flying through space in the way the background moves. But the aliens and indeed your ship are only 2D, i.e. they move left, right, up and down but not in or out of the screen with the change in size that would demand. The bullets too, only fly towards top of the screen never into it.

This is a good, fast and colourful game which is attractively priced and packaged. **D.C.**

instructions	65%
playability	85%
graphics	80%
value for money	85%



Sea, space and strategy star-rated

Our reviewers report back
from the oceans, space... and a
farm yard

Eagle 32K BBC £7.95

Salamander, 17, Norfolk Rd,
Brighton, Sussex BN1 3AA

A very well presented and clearly explained game. Full loading instructions are included along with a good description.

You are able to move left, move right, apply thrust and activate the shield. You must guide your Eagle spacecraft through the hazards of the four moons of the planet Thrug.

You are a Intergalactic Geologist in search of rare trace elements. Each of the moons consists of five screens, and four iridium pods can be seen at the beginning of every screen. It is not necessary, but if they are collected a hefty bonus can be expected at the end of that

screen. One bug I have noticed is that sometimes, when you collide with a Meteor, instead of being drained of your energy it can be mistaken for a pod and you are given bonuses.

You only have the one life and that ends when shield power is exhausted. This is used up in one of two ways: by operating it manually causing a steady drain or by hitting a hazard.

Graphics are great, sound is sufficient, but I have played more addictive games on the Beeb. **M.B.**

instructions	80%
playability	70%
graphics	80%
value for money	60%



Chuckie Egg 32K BBC £7.90

A and F, Unit 8, Canal Side
Industrial Estate, Woodbine St
East, Rochdale, Lancs OL16 5LB

I don't know about you, but a game based on a farmer collecting eggs without being savaged by ducks (including a crazy duck) did not sound like a worthwhile investment. But it is.

The game is Kong-like, with ramps, ladders, elevators and holes to negotiate, each successive level increasing the hazards. The villainous ducks wander round eating corn and do not pay much attention to you until it's all gone. But when it is they home in and give you a nasty peck, which is fatal. The graphics are smooth and convincing. The jump feature is great, worth watching for its own

sake, though it takes a bit of practice.

Control is by keyboard but you can specify the keys, always a good feature. My three year old can just about manage, and he thinks it the best thing since Postman Pat. I agree with him.

I would have liked clearer instructions — it takes a few games to get the idea of what is going on and how to control it — but generally this is a well thought out novelty, just as exciting as blasting user-defined graphics. **N.W.**

instructions	70%
playability	85%
graphics	95%
value for money	80%



LETTERS

Left, jump

I write to tell you about Hunchback for the 48K Spectrum.

In the second phase of Hunchback there is a rope swing, from which you (as the Hunchback) are meant to swing across, to avoid the Threatening Knight. However, as the knight climbs up the wall, if you (Hunchback) move to the extreme left of the screen and then press the jump button continuously the knight is able to walk straight through the Hunchback.

Steven Winstone-Adair,
Brentwood, Essex

Make a Spectrum space bar

Alan Tomkin's article on touch-typing on the Spectrum was timely, and the tip about "thumb under" symbol-shifting was neat.

However, if there is one thing the typist needs on the keyboard it is a space bar. This is simple to improvise and only costs pennies. I am surprised it has received so little attention. Here's my solution:

- I like my keyboard raked and blocked up so that the keys are at the same height as the cassette recorder keys. This means a strip of wood under the front edge of the keyboard, ready for fixtures.

- You need a piece of stiff wire or rod. Mine came from the disposable coat-hanger supplied by a dry-cleaner. Make an eye in one end to take a No. 6 "cheese-head" wood screw, and bend the wire as follows, using "turtle" directions seen from your point of view at the keyboard:

Right (horizontally), 60mm; **toward** (you), 10mm; **up** 45mm; **from** (you) 10mm; **right** 115mm; **up** 5 mm; **away** 35mm.

- Cut a scrap of hardboard, the same size as the SPACE key and lay it on the key, upside down.

- Lay the end of the wire on this pad, and screw the eye to the wood block. It will be roughly under the CAPS SHIFT, but minor adjustments may be needed. Secure the wire-end to the hardboard pad with a blob of Loctite strip.

- Cut another strip of hardboard, 90 x 15 mm, and fasten it on top of the wire so that it is roughly in

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front of the keys C to M. Decorate to taste.

- I tried mounting two SHIFT pads in the same way, but came to the conclusion that it was not worth it.

- All the items are held in place with blobs of Blutack to stop relative displacements.

- Typing is helped if the ear lead is switched to an old transistor radio, going direct to the amplifier for a good "click". Worth the extra battery.
C.R. Oswin, Christchurch, Dorset

★ software winner

How I get ideas

I was amused to see in your review of Transylvanian Tower for the Commodore 64 (HCW 52) that you gave it 3030%. I don't think Transylvanian's graphics are really up to that standard!

I own a 48K Spectrum which I have had since January '83 about five months after it was launched. At that time there was still only a relatively small amount of software of which I chose Galaxians and Caterpillar (spelt the right way). Galaxians has stood up quite well to most of the competition, though not the same class as the Ultimate and Software Projects games.

It is almost impossible to devise an original game now as there must be over 300 games for the Spectrum, if not 500. Ultimate still manages to produce new, original games and claims to have hundreds more in reserve, which seems to point to Ultimate having some sort of system in devising ideas.

I take a dictionary and choose a random word and try to derive a game idea from this. It's quite

successful, but I seem to have chosen every word in the dictionary by now.

Atic Atac spawned more castle-like games, such as Alchemist. I was disappointed by your Atic Atac rating. I think it was well worth five stars. I've managed to complete it with 99 per cent. You might well give this game 3030% for graphics. Scuba Dive looks very interesting. I have never seen any Durell games but I'm told Scuba Dive has excellent graphics.

Finally, I think your magazine is well constructed and I never miss it. I'm glad to see you still doing articles on the Spectrum.

Gareth Treves, Watford, Herts

You probably guessed that "3030%" was a typographical error!

Top scores?

I read in HCW 38 that Julian Showcross had a record on TI Invaders of 16,150. I would like to inform you about my record — 30,370 on the first and 21,170 on the second level. I have also scored 39,000 on Parsec and 54,050 on Munch Man.

I agree with what Julian says in HCW 38 that the TI joystick is uncomfortable and has slow reaction.

Orn Kristjánsson
Reykjavik, Iceland

They work

Congratulations on your fab computer magazine. I have only purchased one, but my friends say how good the others were. The good thing about your magazine is that the programs work. Most programs for the Spectrum don't work, but I am pleased that yours do. We could do with some more listings of the same quality. I look forward to your next edition.

J. Said
Bitterne, Soton

Whoops!

Our reviews of two programs from Salamander Software quoted incorrect prices. Graphs for the BBC and Graphic System for the Electron both cost £9.95.

They were given favourable reviews and are published by Salamander Software, 17 Norfolk Rd, Brighton, East Sussex BN1 3AA

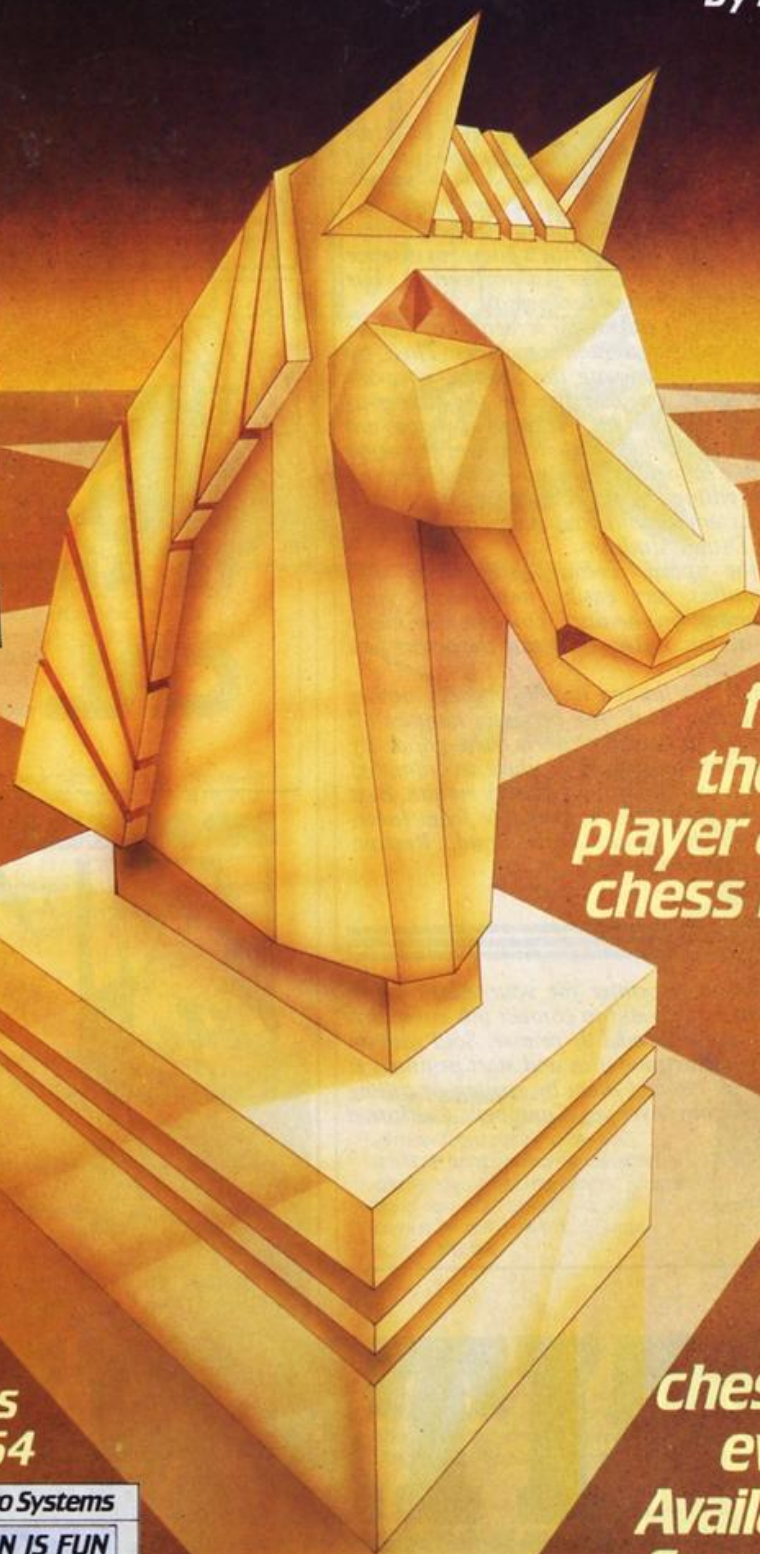
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U.S. SCENE

Now micros make movies

If you are into graphics, or would like to be, and own an Atari 800, 800XL, or 1200XL you might want to run right out and buy this new program.

Called *Movie Maker*, it puts you in charge of your computer's tremendous graphics capabilities without your having to know how to program. Though not a game, in essence it puts you behind the camera and invites you to become your own writer, director, producer, and cameraperson.

Using the *Composer* section, you design a screenful of shapes which becomes the basis for your animated sequences. Then, by telling the computer how to manipulate the shapes, you can create animation. Once created, you can also get the shapes to move across the screen using the joystick. A bunch of shapes are provided for you on the program disc so that you can see some examples of what is possible before trying it yourself. Using the built-in program graphics editor you can create anything from simple little box-like characters to animated characters that can rival anything out of the Disney studios.

You can change the speed, colour, brightness, and perspective of your creations very easily, and record your results, as well as any changes, on the disc. You can also make sounds to accompany the action. After you create the actors you also can create the background.

Although each "movie" is limited to 300 frames, movies can be linked for more playing time. The program handles all user errors with ease and the documentation is quite good. By using this program it is possible to literally produce an animated movie in an afternoon, with extremely high quality results. Best of all, it costs only \$60. *Movie Maker* is available from Interactive Picture Systems, 11480 Sunset Hills Road, Reston, Virginia VA 22090. Phone (703) 437-8900.

Happy animating!



Looking for a versatile low cost printer for your Atari, Commodore, or TI-99/4A? You might want to contact this company. Alphacom has just introduced its model 81 printer. Sold with an optional interface cable, you just plug it in and start printing. It costs all of £169.95. You can contact them by writing or calling Alphacom, 2323 South Bascom Avenue, Campbell, California 95008. (800) 227-6703.

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TITANIC

15th April 1912

TITANIC SINKS. (THE "UNSINKABLE" STRIKES ICEBERG)

Our American correspondent via wireless telegraphy reports: Late last night the S.S. TITANIC, pride of White Star line, was in collision with an

iceberg approximately 300 miles off the coast of Newfoundland, it is feared that many lives have been lost. Further reports to follow.

ORIC & ATMOS 48K Cassettes



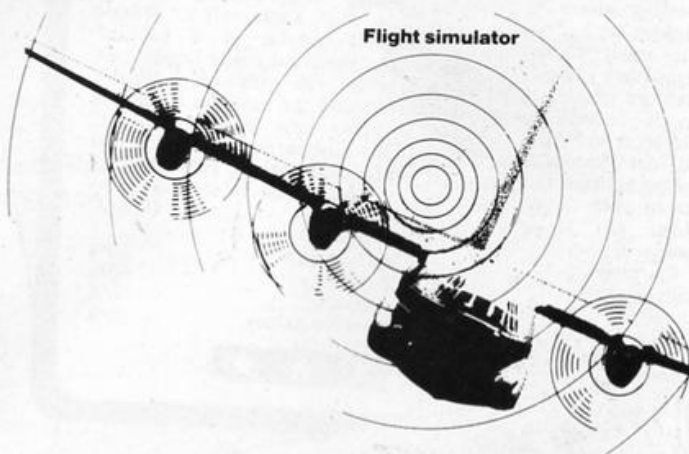
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Mystery Tower

Superb musical arrangements. 47 different rooms. 3D and colour make this adventure game most enjoyable. You will certainly get lost, or forget where you're going. £6.95 (Also in French)



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Read before you buy — five new games are given the once-over

Wings of War Dragon 32 £7.95

Salamander, 17 Norfolk Rd, Brighton, Sussex BN1 3AA

An average adventure game — no graphics, limited sound, more or less usual commands and messages, save game feature etc. One feature missing is the Help facility. If you need help you will have to send an SAE.

You are Lieutenant Roger Wilcoe parachuted into occupied France in 1941 on a dangerous mission. On landing your equipment — torch, binoculars and so on — are scattered throughout the woods. You must gather them together and then infiltrate a Chateau and steal six items relating to a new bomb and

take them back to Blighty. Quite an interesting plot.

I wandered about and recovered a few items, passing a menacing looking guard at the main entrance. At that point I wandered off into the "dark misty woods" looking for a weapon or something to bribe him with. Eventually Lt Wilcoe found himself in a cobbled courtyard and music began. Not being very cultured I didn't recognise the tune but I suppose it must have been significant. This tune carried on and on and there was nothing either Wilcoe or I could do to stop it or to continue.

instructions	80%
playability	60%
graphics	N/A
value for money	60%



Time Machine Atari £5

Fantastic, 15 Wynmoor Cres, Brampton, Barnsley, Yorks

You are transported into the future and land in an unknown world. Due to a fault in your time machine you are left behind as the machine travels on to the planet Karnak. You discover an abandoned spaceship which may be able to take you in pursuit, but first you must find a way into it.

So begins an exciting adventure exploring this strange planet in search of clues. On successfully entering the spaceship you are whisked off to your lost time machine. Beware the hidden dangers that mean sudden failure to your mission.

instructions	80%
playability	60%
graphics	N/A
value for money	70%



Atomic Protector 32K BBC £6.95

Optima, 36 St Petersgate, Stockport SK1 1HL

A maze-based game which, while it has a Pacman-like playing area, has little to do with eating dots. In fact your job is to prevent the dots being eaten, hence the name. The story goes something like this: You (a lonely robot) are in charge of uranium deposits of the secret research establishment which is always being invaded by hostiles.

You have only yourself, used as a battering ram, and a moveable partition with which to defend the ore. Needless to say, this makes life fairly difficult but

there are also radioactive distractors who have a limited life span and if not caught before it ends will contaminate you leading to a terminal wiring failure.

The packaging claims that the game is "fast and furious" and so it is. Unfortunately, it isn't that interesting after the first couple of sheets because, rather than having changes of aim or even graphics, it simply gets faster to the point where I haven't a chance.

Yes, you might learn to increase your score each time, but there is not that addictive something which makes me want to play it again.

instructions	55%
playability	65%
graphics	75%
value for money	55%



Empire Electron £6.95

Shards, 189 Eton Road, Ilford, Essex

A game of strategy for one player. There are eight difficulty levels. At level eight it really taxes your brain.

The screen displays all the inhabited continents of the world. You have to choose 13 territories. A moving cursor skips from area to area. Pressing the space bar when it lands in the place you want to select stops it. All your territories are marked in green. Your foe the Elect Empire does the same and all its territories are marked in red. You each have 39 armies. You can deploy them as you wish. There are also 13 neutrals in yellow, with armies of their own.

The attack begins once all the armies have been deployed. The Empire attacks first. You can always follow the progress of your armies and of your enemy by looking at the information line at the base of the screen. If you have survived this attack you will notch up a victory. I thoroughly enjoyed this game. The graphics are excellent and music in tune. The only irritating thing is the difficulty in following the cursor, due to lack of contrast between colours.

instructions	100%
playability	95%
graphics	95%
value for money	100%



Cosmic Cruiser 48K Spectrum

Imagine, 5 Sir Thomas St, Liverpool L1 6BW

After Imagine's loading screen and a superb picture of two spaceships attacking a spaceman, a melodic tune announces "loading complete". Keying presents the option screen, allowing choice of keyboard or one of five makes of joystick. Music accompanies the choice, followed by an extremely fast arcade-style shoot-out game.

Screen bottom shows score, high score, lives, time and level. There are essentially two games in one. In the first you have to blast open hatches on a large and colourful revolving space station and rescue

colleagues inside — zapping any aliens who interfere. The second challenges you to get him back to your space cruiser, using your hand gun or laser cannon to fight off the approaching aliens. After the first few levels alien fighters also come at you with missiles.

Excellent sound, colour and graphics. A fast and addictive game requiring quick responses and a nice roll of honour in computer type. Extensive instructions include pen pictures of the programmer and the company.

Also available for BBC, Dragon and Commodore 64.

instructions	90%
playability	80%
graphics	100%
value for money	95%



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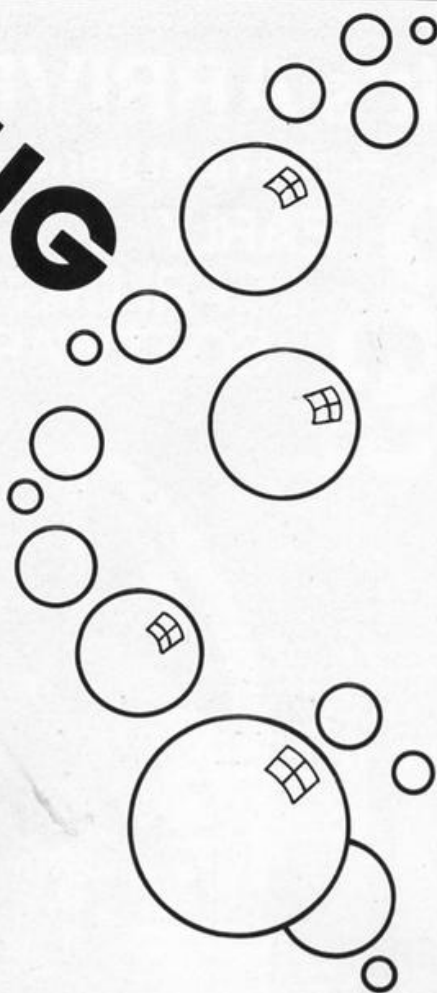
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Get ready for three skill-testing games

Mind Your Head by Paul O'Brien

This is a game which you can play against the computer or against one of your friends. The object is to surround your opponent and force him or her to crash into an obstacle, thereby making him lose his head.

Full instructions are included in the program.

The only part which needs explanation is the method used for player input during the game.

The INKEY function will only allow one key on the keyboard to be detected at any one time. Since there is a two player option and both use the keyboard, the IN function is used.

Array B(2,4) is set up, holding the port numbers used by IN for each player. A second array A(2,4) is set up holding the values for the keys used during play. Each port is checked for a recognised value on the player's turn and, if one is detected, the appropriate movement flag is changed (lines 70-110).

To change the key which moves player 1 up, for example, simply change the numbers in the DATA statement at line 9020.

This is a summary of all the keys used:

key	port	value	action
Q	64510	254	player 1 up
A	65022	254	player 1 down
Z	65278	251	player 1 left
X	65278	253	player 1 right
P	57342	254	player 2 up
L	49150	253	player 2 down
M	32766	253	player 2 left
SYM-32766	251		player 2 right

BOL
SHIFT

Variables

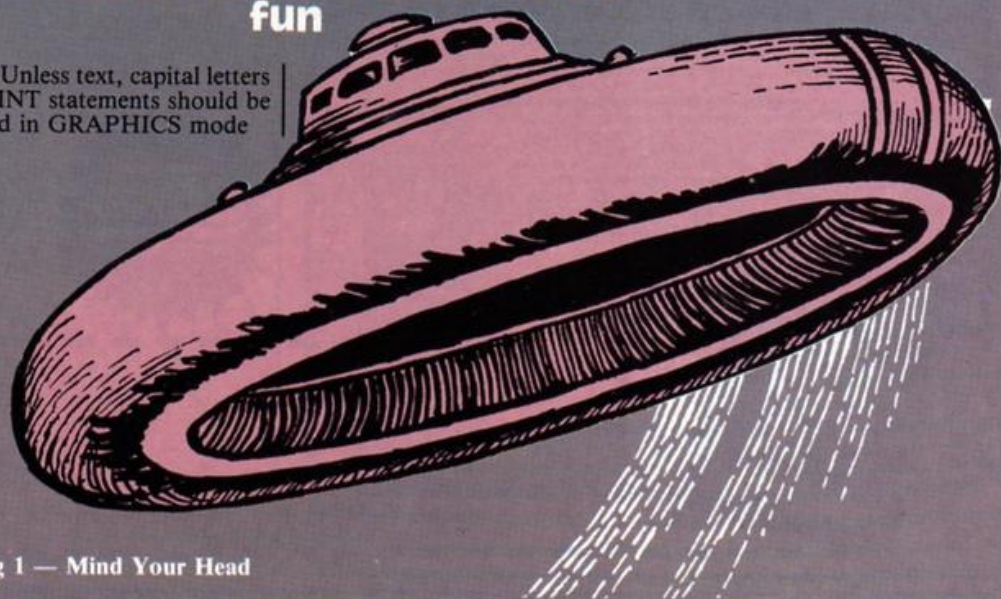
fl flag used in computer move
pl number of players
pro flag, set to one for progressive play
r level of play

Arrays:

a(2,4) values from movements ports
b(2,4) ports for movement
c(2) players selected colours
h(2) players vertical position
m(2) players game scores
s(2) up/down movement flags;
-1 for up, +1 for down
t(2) left/right movement flags;
-1 for left, +1 for right
v(2) players horizontal position
p\$(2,8) player identification
q\$(6,7) colours

Three programs with three challenges. All of them run on either model of the Spectrum. Just type them in for hours of fun

Note: Unless text, capital letters in PRINT statements should be entered in GRAPHICS mode



Listing 1 — Mind Your Head

```

10 RANDOMIZE : RESTORE : INK 7: BORDER 1: PAPER 1: CLS : GO TO 5000
20 LET t(x)=0: LET s(x)=1-(2 AND RND<.5): IF ATTR (h(x)+s(x),v(x)+t(x))<>120 T
HEN LET s(x)=(s(x)=-1)-(s(x)=1)
30 GO TO 150-f1
40 LET s(x)=0: LET t(x)=1-(2 AND RND<.5): IF ATTR (h(x)+s(x),v(x)+t(x))<>120 T
HEN LET t(x)=(t(x)=-1)-(t(x)=1)
50 GO TO 150-f1
60 LET x=1
70 IF IN 64510+IN 65022+IN 65278=765 THEN GO TO 150
80 IF IN b(x,1)=a(x,1) THEN LET s(x)=-1: LET t(x)=0: GO TO 150
90 IF IN b(x,2)=a(x,2) THEN LET s(x)=1: LET t(x)=0: GO TO 150
100 IF IN b(x,3)=a(x,3) THEN LET s(x)=0: LET t(x)=1: GO TO 150
110 IF IN b(x,4)=a(x,4) THEN LET s(x)=0: LET t(x)=-1
120 GO TO 150
130 IF RND>.92 THEN LET f1=10: GO TO 20+(20 AND t(x)=0)
140 IF ATTR (h(x)+s(x),v(x)+t(x))<>120 THEN LET f1=0: GO TO 20+(20 AND t(x)=0)
150 PRINT INK c(x);AT h(x),v(x);"A"
160 LET v(x)=v(x)+t(x): LET h(x)=h(x)+s(x)
170 IF ATTR (h(x),v(x))<>120 THEN GO TO 1000
180 PRINT INK c(x);AT h(x),v(x);("B" AND t(x)=1)+("C" AND t(x)=-1)+("D" AND s(x)=1)+("E" AND s(x)=-1)
190 BEEP .002,10: BEEP .002,0
200 LET x=x+1: IF pl=1 AND x=2 THEN GO TO 130
210 IF x=2 AND IN 57342+IN 49150+IN 32766=765 THEN GO TO 150
220 GO TO 120-x*20
998 REM *** END OF GAME AND ***
999 REM *** DISPLY OF SCORE ***
1000 PRINT AT 3,4: PAPER c(x): INK 9: FLASH 1;p$(x);" lost its head !"
1010 LET x=x-1: IF x=0 THEN LET x=2
1020 LET m(x)=m(x)+1
1030 FOR y=10 TO 20: BEEP .005,y: NEXT y
1040 BEEP .4,-25
1050 PRINT INK 9;AT 5,3: PAPER c(1);p$(1);AT 5,21: INK 9: PAPER c(2);p$(2)
1060 PRINT FLASH 1;AT 7,6;m(1);AT 7,25;m(2)
1070 PRINT #0;AT 1,0;"Continue This Contest (y/n) ?"
1080 LET z#=INKEY#
1090 IF z#="n" THEN GO TO 1500
1100 IF z#="y" THEN LET r=r+pro: GO TO 5200
1110 GO TO 1080
1499 REM *** END OF CONTEST ***
1500 IF p$(2,1)="S" THEN LET p$(2)="Me."
1510 CLS : GO TO 1540+10*(m(1)>m(2))-20*(m(1)<m(2))
1520 LET m=m(2)-m(1)
1530 PRINT AT 2,0;"Congratulations ";p$(2);"The winner by ";m;" game"+("s" AND m<>1);".": GO TO 1600
1540 PRINT AT 2,0;"Celebrations all round !""It was a draw": GO TO 1600

```


SPECTRUM PROGRAMS

How it works

10 skip game routine and GOTO initialisation
20-50 decision making for computer move
60-120 read keyboard for player input
130-140 check computer move and random direction change
150-190 print body, check new head position
200-220 whose move next?
1000-1110 end of game, score display
1500-1640 end of contest, continue?
5000-5190 set up variables, arrays, graphics, request game details
5200-5290 set start positions, display board and play intro tune
6000-6120 instructions
9000-9080 DATA
Lines 700 and 210 simply check for a valid input from the keyboard. If there isn't one, no movement change is checked for, thus speeding up the program.

Variables

W degree of difficulty
X your column position
F game ends if mines more than F
K controls warning sign
U mines counter
ab column position of mystery spaceship
cd initialises mystery spaceship
HS high score
S score
N,P position of alien
i,e position of mines
j counts remaining aliens

Bug Run by Jeff Llewellyn

Guide your bug around the island and collect up to 12 mushrooms in the least possible moves.

But it's not that easy: as well as danger from the sea, there are spiders' webs scattered about. Touch one and a spider will rush out and get you.

How it works

5 GOSUB for instructions
10-15 play tune
20 start game
30-40 READ DATA for graphics
50-90 print webs
100-140 print mushrooms
150 set variables
160-275 main loop
280-285 fall in sea
290-295 print spider if web hit
300-310 check if enough mushrooms collected
320-380 DATA for graphics
400-450 instructions
460-480 another go?

Variables

A,B; C,D; E,F co-ordinates of bug; webs; mushrooms
N direction of bug
M; R number of moves; mushrooms collected

```
1550 LET m=m(1)-m(2)
1560 PRINT AT 2,0;"Congratulations ";p$(1);".";"The winner by ";m;" game"+"(s"
AND m<>1);"."
1600 IF INKEY#<>"" THEN GO TO 1600
1610 PAUSE 5: PRINT #0;"Another contest (y/n) ?"
1620 IF INKEY#="y" THEN CLS : GO TO 5080
1630 IF INKEY#="n" THEN BRIGHT 0: INK 0: PAPER 7: BORDER 7: CLS : FOR x=0 TO 7:
PRINT AT 8,10; INK x;"Bye for now !": PAUSE 25: NEXT x: STOP
1640 GO TO 1620
4990 REM *** INITIALISATION ***
5000 PRINT INK 5: PAPER 1;AT 0,7;"MIND YOUR HEAD !";AT 1,9;"by P O'BRIEN"
5010 DIM a(2,4): DIM b(2,4): DIM p$(2,8): DIM q$(6,7)
5020 FOR y=1 TO 6: READ q$(y): NEXT y
5030 FOR w=1 TO 2: FOR y=1 TO 4: READ a(w,y): READ b(w,y): NEXT y: NEXT w
5040 IF PEEK USR "a"=24 THEN GO TO 5060
5050 FOR w=0 TO 4: FOR y=0 TO 7: READ u: POKE USR "a"+y+8*w,u: NEXT y: NEXT w
5060 PRINT AT 4,0;"Do you need instructions ?": REM LINE i$: IF i$="" THEN GO TO
0 5060
5070 LET i$=INKEY$: IF i$="" THEN GO TO 5070
5072 IF i$="y" OR i$="Y" THEN GO SUB 6000
5080 LET pro=0: DIM c(2): DIM h(2): DIM t(2): DIM v(2): DIM m(2)
5090 LET p$(1)="Player 1": LET p$(2)="Player 2"
5100 INPUT "Number of Players (1 or 2) ? ":pl
5110 IF pl<1 OR pl>2 THEN GO TO 5100
5120 CLS : IF pl=1 THEN LET p$(2)="Spectrum": LET c(2)=INT (RND*5)+1: PRINT AT 1
,0;"Your Spectrum choses the ";q$(c(2));"body."
5130 FOR y=1 TO pl: PRINT "Colour for Player ";y;" (1 to 6) ? "
5140 INPUT LINE c$: IF CODE c$<49 OR CODE c$>54 THEN GO TO 5140
5150 LET c(y)=VAL c$: PRINT "Player ";y;" choses a ";q$(c(y));" body"
5160 NEXT y
5170 GO SUB 6100
5180 INPUT "Level for Random Obstacles ? (Any letter for progressive) ":LINE
r$: IF r$="" THEN GO TO 5180
5185 IF CODE r$>64 AND CODE r$<123 THEN LET pro=1: LET r$=""
5190 LET r=VAL r$: PRINT #0;"Press any key to start": PAUSE 5: PAUSE 0
5200 LET h(1)=1: LET h(2)=1: LET v(1)=8: LET v(2)=23: LET t(1)=1: LET t(2)=-1:
DIM s(2): DIM p(2)
5210 BRIGHT 1: INK 0: PAPER 7: CLS : PRINT AT 21,5; FLASH 1;"Level ";r
5215 REM *** SCREEN DISPLAY ***
5220 FOR y=1 TO 32: PRINT INK RND*5+1;AT 0,y-1;""; NEXT y
5230 FOR y=1 TO 20: PRINT INK RND*5+1;AT y,0;"";AT y,31;""; NEXT y
5240 FOR y=1 TO 32: PRINT INK RND*5+1;AT 21,y-1;""; NEXT y
5245 PRINT AT h(1),v(1); INK c(1);"B";AT h(2),v(2); INK c(2);"C"
5250 FOR y=1 TO r*5: PRINT AT RND*19+1,RND*29+1; INK RND*5+1;""; NEXT y
5260 BEEP .1,5: BEEP .1,5: BEEP .1,5
5270 BEEP .0725,10.5: PAUSE 5: BEEP .05,5: BEEP .3,10.5
5280 POKE 23560,116
5290 GO TO 60
```

```
5990 REM ***** INSTRUCTIONS *****
6000 PRINT AT 2,0;"This is a game of skill in which you have to make your opponen
t crash into one of the obstacles."
6010 PRINT "The obstacles:-";AT 8,4;"1) Any coloured square.";AT 9,4;"2) Your b
ody segments.";AT 10,4;"3) Your opponents body segments."
6020 GO SUB 6100: PRINT #0;"Press any key to continue": PAUSE 0: CLS
6030 PRINT INK 6: PAPER 1;AT 0,7;"MIND YOUR HEAD !"
6040 PRINT AT 2,0;"Difficulty is decided by the number of random obstacles."
6050 PRINT "You enter a level, and this is multiplied by 5 to give the numb
er of obstacles."
6060 PRINT "When you select the one player option, your Spectrum becomes pla
yer 2, and you use the left controls."
6070 PRINT "Continuous pressing of any key slows the game down slightly, but
this feature can be used to confuse your opponent."
6080 RETURN
6100 PRINT AT 13,0;"The controls:-";AT 15,1;"Direction";AT 15,12;"Player 1";AT 1
5,22;"Player 2"
```

```
6110 PRINT AT 17,3;"Up q p";AT 18,3;"Down a 1";A
T 19,3;"Left z m";AT 20,3;"Right x SYMBOL";AT 21,23;"
SHIFT"
6120 RETURN
9000 DATA "Blue","Red","Magenta","Green","Cyan","Yellow"
9010 REM Next line represents q-up a-down x-right z-left for Player
1,reading the keyboard using IN. See page 160 of the manual.
9020 DATA 254,64510,254,65022,251,65278,253,65278
9030 REM Similarly for Player 2 p-up 1-down ss-right m-left
9040 DATA 254,57342,253,49150,253,32766,251,32766
9050 REM Data for UDG's
9060 DATA 24,60,126,255,255,126,60,24,0,120,79,252,252,79,120,0
9070 DATA 0,30,242,63,63,242,30,0,24,126,90,90,126,60,36,36
9080 DATA 36,36,60,126,90,90,126,24
```


SPECTRUM PROGRAM


Listing 2 — Space Mines



```

150 GO SUB 1000
170 BORDER 0
290 PAPER 0: CLS
300 INK 6
302 GO SUB 7400
305 GO SUB 6400
310 LET HS=0
320 INPUT "SELECT DIFFICULTY (1-3) 3 is the hardest",a
330 IF a<0 OR a>3 THEN GO TO 320
340 IF a=1 THEN LET w=.7
350 IF a=2 THEN LET w=.6
360 IF a=3 THEN LET w=.5
365 BORDER 0
370 LET X=10
375 LET F=19
378 LET K=14
380 LET u=0
384 LET ab=1: LET cd=1
390 LET S=0
400 CLS
420 LET P=0
430 FOR y=1 TO 50
440 PLOT INK RND*6+1: BRIGHT 0:RND*255,RND*110+50
450 NEXT y
455 LET j=1
460 LET S=S+P*10
470 PRINT AT 0,0;"SCORE":s
480 FOR z=1 TO 5
490 LET i=INT (RND*10)
500 LET e=INT (RND*30)
510 IF i<=2 OR i=4 OR i=6 OR i=8 OR i=10 THEN GO TO 490
520 IF e<2 THEN GO TO 500
530 LET u=u+1
535 PRINT AT 1,e;" "
540 PRINT AT 1,e: INK 3: PAPER 0: BRIGHT 1;"D"
550 NEXT z
555 IF S>2500 THEN LET K=24: LET F=29
560 LET P=1
570 LET N=RND*27
580 IF N<5 THEN GO TO 570
590 PRINT AT 0,10: INK 4;"C"
600 PRINT AT 0,11: INK 4;"C"
610 IF j>1 THEN PRINT AT 0,10;" "
620 IF j=3 THEN PRINT AT 0,11;" "
625 PRINT AT 2,ab;" "
640 LET C=0
642 PRINT AT 2,X-1;" "
644 IF cd=1 THEN IF RND>.98 THEN LET cd=2
648 IF cd=2 THEN PRINT AT 2,ab;" ": LET ab=ab+2
652 IF ab>30 THEN LET cd=1: LET ab=1
656 IF cd=2 THEN PRINT AT 2,ab: INK 6: BRIGHT 1;"HI"
660 IF u<=K THEN PRINT AT 0,17: INK 5: INVERSE 1;"MINES SAFE"
670 IF u>K THEN PRINT AT 0,17: INK 2: BRIGHT 1: FLASH 1;"CHAIN REACTION": IF u>
F THEN GO TO 5070
675 PRINT AT 16,X;" "
680 IF INKEY$="5" AND X>0 THEN LET X=X-1
690 IF INKEY$="8" AND X<30 THEN LET X=X+1
700 PRINT AT 16,X: INK 2: BRIGHT 1;"AB"
710 BEEP .004,10
720 PRINT AT P,N;" "
730 IF RND>.65 THEN LET N=N+INT (RND*3-1)
732 IF N>31 THEN LET N=N-1
735 IF N<1 OR N>31 THEN GO TO 730
740 IF RND>w THEN LET P=P+2
750 IF ATTR (P,N)=67 THEN LET u=u-1
760 PRINT AT P,N: INK 4: BRIGHT 1;"C"
770 IF P>15 THEN GO TO 7000
780 IF INKEY$="1" THEN LET C=X
795 IF C=0 THEN GO TO 640
800 LET z=x*8+7: LET y=40
805 PLOT OVER 1: INK 8;z,y:
810 DRAW OVER 1: INK 8;0,127: FOR l=60 TO 64: BEEP .01,1: NEXT l
815 FOR q=9 TO 1 STEP -2
820 IF ATTR (q,x)=67 THEN : PLOT OVER 1: INK 8;z,y: DRAW OVER 1: INK 8;0,127: L
ET S=S+10: PRINT AT 0,0;"SCORE":S: LET u=u-1: PRINT AT q,x;" ": GO TO 640
825 NEXT q
830 IF ATTR (P,X)=68 OR ATTR (P,X+1)=68 THEN PLOT OVER 1: INK 8;z,y: DRAW OVER
1: INK 8;0,127: PRINT AT P,N: INK 2: BRIGHT 1;"C": FOR b=59 TO 53 STEP -1: BEEP
0.05,b: NEXT b: FOR m=1 TO 3: PRINT AT P,N: INK RND*6+1: BRIGHT 1;"EF": BEEP .00
5,10: BEEP .007,5: BEEP .005,5: BORDER RND*6: BEEP .005,10: BEEP .007,5: BEEP .0
05,5: PRINT AT P,N;" ": NEXT m: GO TO 460
835 IF ATTR (2,X)=70 AND ATTR (2,X-1)<70 THEN PRINT AT 2,X-1;"100": LET S=S+100
: PRINT AT 0,0;"SCORE":S: LET cd=1: LET ab=1
840 PLOT OVER 1: INK 8;z,y
850 DRAW OVER 1: INK 8;0,127
990 GO TO 640

```



SPECTRUM PROGRAM

```

1000 FOR j=USR "A" TO (USR "I"+7): READ n: POKE j,n: NEXT j
1010 DATA 1,3,134,134,254,134,130,3
1020 DATA 0,128,194,194,254,194,130,128
1030 DATA 129,129,189,255,189,189,129,129
1040 DATA 0,66,24,60,60,24,32,9
1050 DATA 10,0,40,2,144,4,32,9
1060 DATA 72,0,84,1,40,130,8,32
1070 DATA 129,66,0,0,0,0,66,129
1080 DATA 3,7,15,31,32,63,31,15
1090 DATA 192,224,240,248,4,252,248,240
1100 RETURN
5070 PRINT AT 17,3: INK 2: FLASH 1:"OVERLOAD OVERLOAD OVERLOAD"
5080 FOR o=22528 TO 23231: POKE o,144: NEXT o
6000 PAPER 2: INK 0: BORDER 0: BRIGHT 1: FLASH 1: CLS
6010 BORDER 0
6020 FOR x=59 TO 53 STEP -1
6030 BEEP 0.05,x
6040 NEXT x
6060 FOR b=1 TO 30
6070 BEEP .005,10: BEEP .007,5: BEEP .005,5
6080 NEXT b
6090 PAPER 0: BORDER 0: BRIGHT 0: INK 9: FLASH 0: CLS
6110 CLS
6120 IF HS<=S THEN LET HS=S: PRINT FLASH 1: INK 6;AT 8,5:"**A NEW HIGH SCORE**":
PRINT AT 3,0:"LEVEL":a
6125 PRINT AT 10,5:"HI SCORE",HS
6130 PRINT AT 12,5:"YOUR SCORE",S: PRINT AT 20,4:"HAVE ANOTHER GO EARTHLING
press y to start"
6140 PAUSE 0
6150 IF INKEY#="y" OR INKEY#="Y" THEN GO TO 320
6160 IF j=3 THEN GO TO 6110
6170 IF d>19 THEN GO TO 6110
6190 PRINT AT 17,1: INK 2: FLASH 1:"OVERLOAD OVERLOAD OVERLOAD"
6400 PRINT AT 10,1:"PRESS ANY KEY FOR INSTRUCTIONS
RE INSTRUCTIONS PRESS N"
6408 PAUSE 0
6410 IF INKEY#="N" OR INKEY#="n" THEN GO TO 310
6500 PRINT AT 1,10: INK 2: BRIGHT 1:"SPACE MINES
Philip Carre
6505 PRINT AT 5,0:"INSTRUCTIONS an alien is heading towards earth laying mines a
s he comes your task is to destroy as many mines and aliens as possible the gam
e ends if 3 aliens get past you or enough mines are laid to cause a chain reacti
on, each alien lays 5 mines SCORING mines=10 aliens=random score(the lower the alien get
s the higher the score) mystery spaceship=100
if the w
ey to continue"
6510 PAUSE 0
6514 PRINT AT 5,12:"
arning flashes you must destroy more mines BEFORE destroying the alien otherwise
there will be a chain reaction and the game will end. when the MINES SAFE si
gn appears the danger is over and it is safe to destroy the alien,the higher you
r score the less mines are needed to cause a chain reaction.
PLAYING TIP destroy as many mines as possible befor
press any key to continue"
e destroying the alien
6520 PAUSE 0
6530 RETURN
7000 FOR v=20 TO 20-3 STEP -1
7010 PRINT AT v,0:"
7040 NEXT v
7050 IF j=3 THEN GO TO 6110
7060 LET j=j+1
7070 GO TO 470
7400 DIM c$(11,1)
7405 LET e=1
7410 FOR j=1 TO 11
7420 READ e$
7430 LET c$(j)=e$
7440 NEXT j
7450 DATA "S","P","A","C","E"," ","M","I","N","E","S"
7500 FOR j=10 TO 20
7510 PRINT AT 19,j: INK 2: BRIGHT 1:" AB "
7520 LET x=j*9+7-e: LET y=25
7530 PLOT OVER 1: INK 7:x,y
7540 DRAW OVER 1: INK 7:0,127

```


SPECTRUM PROGRAM

```

7550 FOR f=60 TO 64: BEEP .01,f: NEXT f
7560 PRINT AT 2,j+1: INK 7: BRIGHT 1;"G": PAUSE 5
7570 PLOT OVER 1: INK 8;x,y
7580 DRAW OVER 1: INK 8;0,127
7600 PRINT AT 2,j+1;" "
7610 PRINT AT 2,j+1;c$(e)
7620 IF e<12 THEN LET e=e+1
7625 PAUSE 10
7630 NEXT j
7640 PRINT AT 19,21;" "
7650 LET h=0: LET d=7: LET e=1
7660 DIM a$(19,1)
7670 FOR j=1 TO 19
7680 READ b$
7690 LET a$(j)=b$
7700 NEXT j
7710 DATA " ","p","h","i","l","i","p"," ","c","a","r","r","e"," ","i","g","8",
"3"
7720 FOR j=7 TO 25
7730 PAUSE 5
7740 PRINT AT 20,d: INK 5;(a$(e))
7750 LET d=d+1: LET e=e+1
7755 NEXT j
7757 LET d=7: LET e=1
7760 FOR c=20 TO 5 STEP -1
7770 PRINT AT c,d: INK 3;(a$(e))
7780 PRINT AT c+1,d;" "
7790 NEXT c
8000 LET d=d+1: LET e=e+1: LET h=h+1
8010 IF h=19 THEN RETURN
8020 GO TO 7760

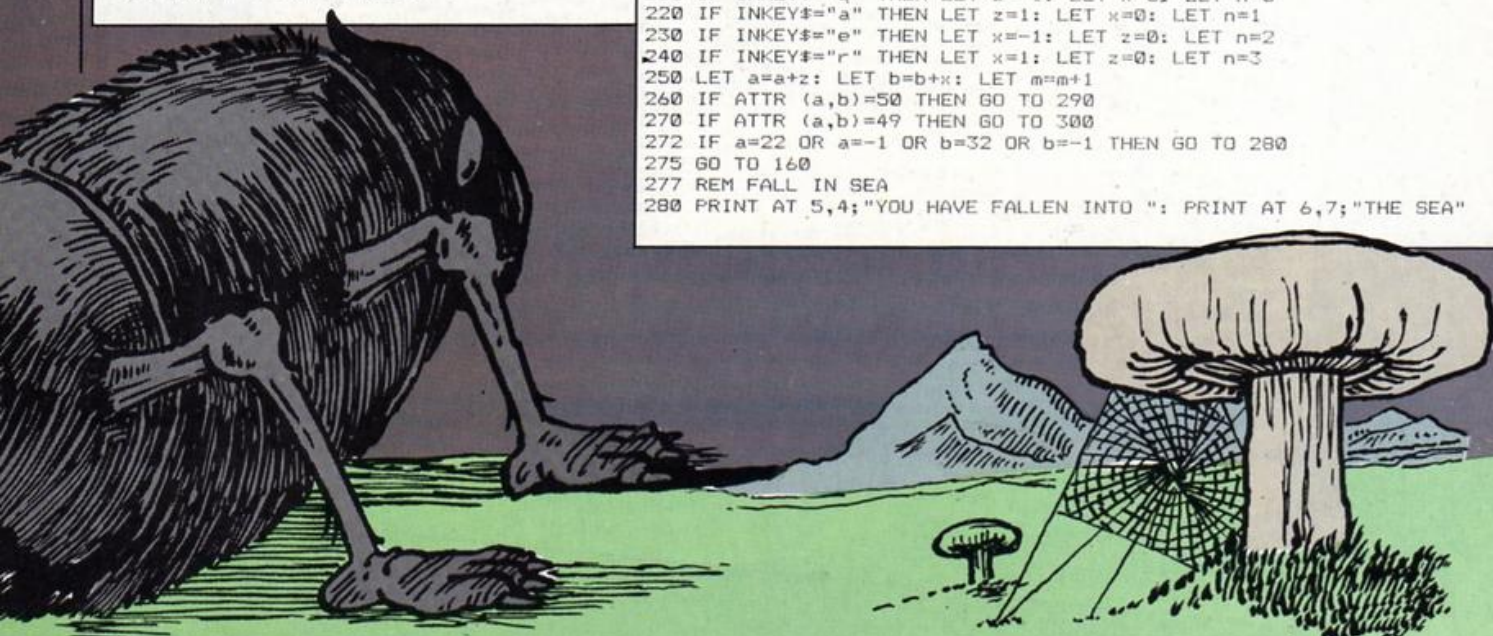
```

Listing 3 — Bug Run

```

1 REM *****BUG RUN*****
2 REM **BY J LLEWELLYN**
5 GO SUB 400
7 REM PLAY TUNE
10 FOR x=0 TO 24: READ a: BEEP .18,a: NEXT x: BEEP .3,12
15 DATA 11,17,14,17,17,17,14,17,9,17,12,17,17,17,14,17,7,17,17,14,16,14,12,11,
11
17 REM START GAME
20 PRINT FLASH 1:AT 20,6:"PRESS ANY KEY TO START": PAUSE 0
25 BORDER 5: PAPER 6: CLS
27 REM READ DATA FOR U.D.G
30 FOR x=0 TO 55
40 READ n: POKE USR "a"+x,n: NEXT x
45 REM PRINT WEBS
50 FOR x=1 TO 40
60 LET c=1+INT (RND*22)-1
70 LET d=1+INT (RND*32)-1
75 IF ATTR (c,d)=50 THEN GO TO 60
80 PRINT INK 2:AT c,d;"E": BEEP .01,9
90 NEXT x
95 REM PRINT MUSHROOMS
100 FOR x=1 TO 15
110 LET e=1+INT (RND*22)-1
120 LET f=1+INT (RND*32)-1
125 IF ATTR (e,f)=52 THEN GO TO 110
130 PRINT INK 1:AT e,f;"F": BEEP .01,4
140 NEXT x
145 REM SET VARIABLES
150 LET a=11: LET b=16: LET n=0: LET r=0: LET z=0: LET x=0: LET m=0
155 REM MAIN LOOP
160 IF n=0 THEN PRINT AT a,b;"A"
170 IF n=1 THEN PRINT AT a,b;"B"
180 IF n=2 THEN PRINT AT a,b;"C"
190 IF n=3 THEN PRINT AT a,b;"D"
200 BEEP .1,0
205 PRINT AT a,b;" "
210 IF INKEY$="q" THEN LET z=-1: LET x=0: LET n=0
220 IF INKEY$="a" THEN LET z=1: LET x=0: LET n=1
230 IF INKEY$="e" THEN LET x=-1: LET z=0: LET n=2
240 IF INKEY$="r" THEN LET x=1: LET z=0: LET n=3
250 LET a=a+z: LET b=b+x: LET m=m+1
260 IF ATTR (a,b)=50 THEN GO TO 290
270 IF ATTR (a,b)=49 THEN GO TO 300
272 IF a=22 OR a=-1 OR b=32 OR b=-1 THEN GO TO 280
275 GO TO 160
277 REM FALL IN SEA
280 PRINT AT 5,4:"YOU HAVE FALLEN INTO ": PRINT AT 6,7;"THE SEA"

```



SPECTRUM PROGRAM

```

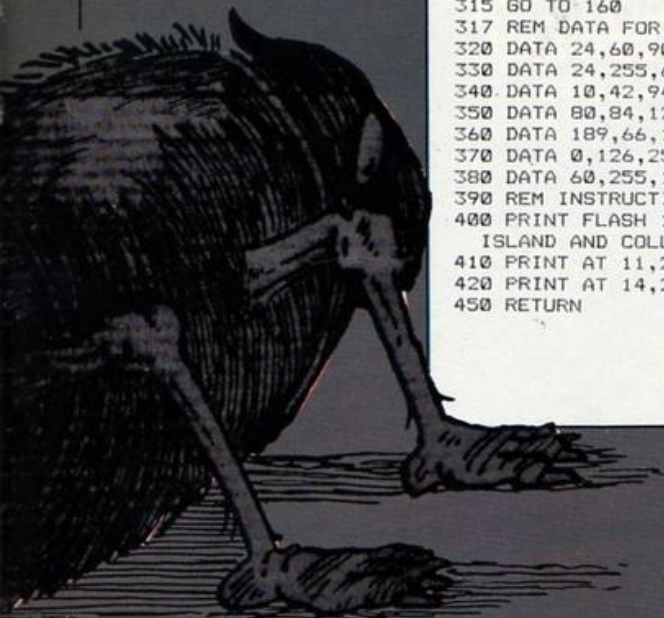
285 FOR x=0 TO 20: BORDER 1: BEEP .005,9: BORDER 5: NEXT x: FOR x=-5 TO 20: BEE
P .008,x: BEEP .006,40: NEXT x: GO TO 460
287 REM PRINT SPIDER
290 FOR x=0 TO b: PRINT AT a,x;"G": BEEP .01,20: PRINT AT a,x;" ": NEXT x: PRIN
T AT a,b;"G": PRINT AT 5,8;"A SPIDER GETS YOU":
295 FOR x=-10 TO 10: BEEP .01,x: BEEP .008,30: NEXT x: GO TO 460
297 REM CHECK IF ENOUGH MUSHROOMS COLLECTED
300 BEEP .05,0: BEEP .04,2: BEEP .06,5: LET r=r+1
310 IF r=12 THEN PRINT AT 5,5;"WELL DONE YOU HAVE": PRINT AT 6,2;"COLLECTED ENO
UGH MUSHROOMS": PRINT AT 7,7;"IN ";m;" MOVES": FOR x=-5 TO 20: BEEP .1,x: NEXT x
: GO TO 460
315 GO TO 160
317 REM DATA FOR U.D.G
320 DATA 24,60,90,60,255,60,255,24
330 DATA 24,255,60,255,60,90,60,24
340 DATA 10,42,94,255,255,94,42,10
350 DATA 80,84,122,255,255,122,84,80
360 DATA 189,66,189,165,165,189,66,189
370 DATA 0,126,255,255,255,60,60,60
380 DATA 60,255,153,255,149,255,146,146
390 REM INSTRUCTIONS
400 PRINT FLASH 1;AT 4,12;"BUG RUN": PRINT AT 6,3;"GUIDE YOUR BUG AROUND THE""
ISLAND AND COLLECT TWELVE"" MUSHROOMS IN THE LOWEST"" NUMBER OF MOVES "
410 PRINT AT 11,2;" TRY NOT TO HIT A SPIDERS"" WEB OR FALL INTO THE SEA"
420 PRINT AT 14,2;"USE"" q - UP"" a - DOWN"" e - LEFT"" r - RIGHT"
450 RETURN

```

```

455 REM ANOTHER GO
460 INPUT "ANOTHER GO (y/n) ";a$
470 IF a$="y" THEN CLS : GO TO 50
480 IF a$<>"y" THEN STOP

```



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Variables

AA% = AZ% used as flags to test actions

P% current location

E% tests if item is there

S%(x,y) holds map

QS(X) describes locations

GS(x) describes items

B%(x,1) pointer to items

NS(X) words understood

N%(X) pointer to word

ZS,BS,CS,DS words entered

LS second word entered

XS messages when lose game

R holds check for item

Other variables are used in FOR...NEXT loops

Pharaoh's Curse

For many years now, I have searched for the legendary Phramid of Ramisis and now I have found it!

Hints on conversion

- The main REPEAT UNTIL loop will need to be replaced with a goto loop: delete 140 and change line 580 to IF P% < 21 THEN GOTO 150

All PROCedures will need to be replaced by GOSUB line number following the DEFPROC statement

- ENDPROC's will have to be replaced by RETURN
- REPEAT... UNTIL GET = 32 can be replaced with 750 AS = INKEYS: IF AS <> "" THEN 750
- Integer variables A%-Z% have been widely used because they work much faster on the BBC/ELECTRON. You can leave the % sign off all variables
- The biggest problem occurs when you try to enter lines longer than 40 characters. Many computers will not allow these to be entered. You will need to split these lines into two lines and if they start with an IF THEN statement, the second line will need to start with the same conditional statement.
- The characters CHR\$129-135 are used to define the colour of the text. These are identical to the colours on the Oric, but will need to be changed or omitted on other computers.
- The data in line 690 is for the music at the start of the game and can be left out completely if required.
- Time delays have been introduced using TIME=0: REPEAT UNTIL TIME>150. This may be replaced with WAIT, PAUSE OR SIMPLY A FOR X = 1 TO 10000: NEXT X loop, depending on your machine.

Will you survive to reach the fabulous Sapphire of Ramisis? And how's your memory? Two great games for the BBC and Electron by Simon Lucas

I am at this very moment standing on the steps and within a few hours I hope to be outside the temple with the famed Sapphire of Ramisis.

There is just one small problem! When I arrived, I had five assistants and each of them died on entering the pyramid.

Please help me to survive by giving me instructions in the form of two word sentences such as GET FOOD etc.

The program runs in MODE 7 in the BBC micro which allows multiple colours to be used, whereas in the Electron, it works in MODE 6 with red background.

These are among the words that are recognised: LOOK, SCORE, INVENTORY, SAY, TALK, ASK, EAT, DRINK, RUB, GO GET, TAKE, GRAB, DROP, LEAVE, PUT, IN, OUT, NORTH, SOUTH, EAST, WEST, UP, DOWN, JUMP, CLIMB, UNLOCK, KILL, CUT, ATTACK, DESTROY, PULL, PUSH, OPEN, THROW, HELP, EXAMINE, SEARCH, WAIT, DIG

How it works

- 50 disables escape
- 60 error handling routine loses game
- 70 disable break
- 80 DIMension arrays
- 90 choses MODE 7 for BBC and MODE 6 with red colour for Electron
- 100 disables cursor
- 120 initialises variables
- 130 calls titles PROCedure
- 140-580 main control loop which repeats until location 21 is reached
- 150-330 describe locations, items to be seen and directions you can go
- 340 inputs response
- 350-570 call PROCedure appropriate to action. These use names which describe their action, e.g. PROCget GETs item
- 590-630 win game
- 640-1030 title, instructions, fill arrays
- 1040-2220 PROCedures for various actions



BBC ELECTRON PROGRAMS

Clues: read these only when you are completely stuck:

- You can only swim one way!
- Don't drop the lamp!
- Read the writing.. it will tell you a secret password which you can say to the face.
- Throw the rope at the metal loop
- Don't drop the phial or open the casket or get reptile
- Don't walk into the spider's web!
- Don't push the panel unless you are holding the sapphire
- Pull the level and go back up the steps

Underwater Reaction

This is a game of memory for the BBC/Elctron computers in which the computer will display a random sequence of deep sea monsters, together with appropriate sounds, in the four corners of the screen.

Your task is to repeat the sequence using the keys R, Y, C, B.

Each time you correctly repeat a sequence, the next sequence gets longer. You will lose if you are too slow.

Hints on conversion

This would be quite complex to convert to other machines because variables are passed to PROCedures. It could be achieved by replacing all procedures with subroutines and the numbers in brackets with LET statements.

Envelopes are used on the BBC to define the sound effects and can be completely left out or replaced with suitable sound effects REPEAT... UNTIL loops will need to be replaced with GOTO loops acting upon the condition, e.g. 260 IF (A < 49 AND A > 50) THEN GOTO 250

```
10REM ** PHARAOH'S CURSE **
20REM ** an adventure game for the BBC/Elctron comp
uters **
30REM ** by Steve W. Lucas Feb 1984 **
40 REM ** don't add the next three lines until you a
re sure that you have fully debugged the program and th
en SAVE a copy before running it
50 *FX229,1
60ON ERROR X$="The mummy of Ramisis just strangled m
e":PROClose
70*KEY 10 OLD:M RUN :M
80DIM S$(21,4),Q$(21),X$(40),G$(30),V$(4),B$(30,1),N
$(30),NX(30)
90MODE7:VDU19,0,1,0,0,0
100VDU23,1,0;0;0;0;0;
110REM ** above line selects MODE 7 with colour for B
BC and MODE 6 with RED background for ELECTRON **
120AA$=0:AB$=0:AC$=0:AD$=0:AE$=0:AF$=0:AG$=0:AH$=0:AI
$=0:AJ$=0:AK$=0:AL$=0:AM$=0:AN$=0:AO$=0:AP$=0:AQ$=0:AR$
=0:AS$=0:AT$=0:AU$=0:AV$=0:AX$=0:AY$=0:AZ$=0:S$=0:P$=1
130PROCtitles
140 REPEAT
150K=0
160IFP%>1AND AB$<>1THENX$="It's too dark in here with
out a lamp in my hand":PROClose
170 IFP%=11THENPRINT"I could be here forever!":
180I%=I%+1
190IFIX>75THENPRINT"A voice booms out 'You've been he
re long enough"
200IFIX>100THENX$="I did warn you.. You've been here
long enough!!!!":PROClose
210PRINT"CHR$(131);I am :-'Q$(P%)
220A$="":IFS$(P%,1)>0THENA$="North"
230IFS$(P%,2)>0ANDLEN(A$)>0THENA$=A$+",South" ELSEIFS
$(P%,2)>0THENA$="South"
240IFS$(P%,3)>0ANDLEN(A$)>0THENA$=A$+",East" ELSEIFS$
$(P%,3)>0THENA$="East"
250IFS$(P%,4)>0ANDLEN(A$)>0THENA$=A$+",West" ELSEIFS$
$(P%,4)>0THENA$="West"
260IFP%=1THENA$="In" ELSEIFP%=2THENA$=A$+" Down, Out"
ELSEIFP%=4THENA$=A$+",Up"
270IFP%=11ANDA$="":THENA$="I can't go anywhere!"
280PRINT"CHR$129;"I can go :-'A$
290E=0:FORTX=1TO15:PP%=0:IFB$(TX,1)=P%THENPP%=1
300IFPP%=1THEN320
310NEXT:GOTO340
320IFE=0THENPRINTCHR$134;"I can see :-"
330PRINTG$(TX):E=E+1:GOTO310
340PRINT"CHR$135;"What should I do now ":INPUTZ$
350CLS:VDU7
360B$=LEFT$(Z$,2):C$=LEFT$(Z$,3):D$=LEFT$(Z$,4)
370IFC$="LOO"THENK=1ELSEIFC$="SCO"THENPRINT"This isn'
t a game you know!":K=1
380IFC$="INV"THENK=1:PROCinventory
390IFC$="SAY"ORC$="TAL"ORC$="ASK"THENPROCsay
400IFC$="EAT"THENPRINT"Don't be silly there's no food
here!":K=1 ELSEIFC$="DRI"THENPRINT"What a #### there's
nothing to drink here!":K=1 ELSEIFC$="RUB"THENPRINT"Do
n't be a silly billy!":K=1
410IF (B$="N"ORD$="GO N")ANDS$(P%,1)>0THENP%=S$(P%,1):
K=1
420IF (B$="S"ORD$="GO S")ANDS$(P%,2)>0THENP%=S$(P%,2):
K=1
```

How it works

- 90-110 disable break and escape keys. Don't type these in until the program is fully debugged
- 120 turns off cursor
- 130 calls PROCedure to define characters
- 140-150 set variables and set keyboard repeat
- 160 calls PROCedure to define envelopes
- 180 reads data into array
- 200 defines maximum length of B\$ to be 200 characters
- 210-220 define & select colours, set score to zero
- 230-270 select difficulty level
- 280-300 initialise variables, turn off cursor and choose mode
- 310-390 main control loop
- 320 calls PROCedure to choose at random
- 330 calls PROCedure to display character
- 350 calls PROCedure for your try
- 360 response for too slow!
- 370 response for incorrect sequence
- 380 increase score
- 400-490 give score
- 510-840 define characters
- 830-930 plot one type of graphics
- 940-990 define envelopes for sound
- 1000-1090 plot graphics 2
- 110-1190 plot graphics 3
- 1200-1280 plot graphics 4
- 1300-1350 choose at random
- 1370-1470 plot appropriate graphics in selected colour
- 1480-1670 your turn
- 1680-1920 instructions and data

Main variables

- X%, Y% plotting coordinates
- SC% score
- Z% colour

```
430IF (B$="E"ORD$="GO E")ANDS$(P%,3)>0THENP%=S$(P%,3):
K=1
440IF (B$="W"ORD$="GO W")ANDS$(P%,4)>0THENP%=S$(P%,4):
K=1
450IFK=0AND (B$="N"ORB$="S"ORB$="E"ORB$="W")THENPRINT
I can't go that way!":K=1
460IFC$="ROW"ORC$="SAI"THENPRINT"I'd need a boat!":K=
1 ELSEIFC$="UP"ORB$="U"ORD$="GO U"THENK=1:PROCup
470 IFC$="DOW"ORB$="D"ORD$="GO D"THENK=1:PROCdown ELS
EIFC$="REA"THENK=1:PROCread
480 IFC$="IN"ORB$="I"ORD$="GO I"THENK=1:PROCin ELSEIF
C$="OUT"ORD$="GO O"ORB$="O"THENK=1:PROCout
490IFC$="UNL"THENK=1:PROCunlock ELSEIFC$="KIL"ORC$="A
TT"ORC$="DES"THENPROCkill
500IFC$="PRA"THENPRINT"That made me feel better!":K=1
ELSEIFC$="CUT"THENPROCcut ELSEIFC$="PUS"THENK=1:PROCpu
sh
510IFC$="OPE"THENK=1:PROCopen ELSEIFC$="THR"THENK=1:P
ROCThrow ELSEIFC$="HEL"THENK=1:PROChelp
520IFC$="GET"ORC$="TAK"ORC$="GRA"THENK=1:PROCget
530IFC$="DRO"ORC$="LEA"ORC$="PUT"THENK=1:PROCdrop
540IFC$="EXA"THENK=1:PROCexamine ELSEIFC$="SEA"THENK=
1:PROCsearch ELSEIFC$="SWI"THENK=1:PROCswim ELSEIFB$="F
U"ORB$="PI"THENX$="How dare you speak like that says a
voice from above!":PROCclose
550IFC$="WAI"THENK=1:PROwait ELSEIFC$="CLI"THENK=1:PR
OCclimb ELSEIFC$="DIG"THENPRINT"I have no spade!":K=1 E
LSEIFC$="JUM"ORC$="DIV"THENK=1:PROCjump
560 IFC$="PUL"THENK=1:PROCpull
570IFK=0THENPRINT"I'm sorry I don't seem to understan
```

d you"
580 UNTIL P%=21
590CLS:PRINTCHR\$130;"You are standing outside the Pyra
mid...CHR\$131;"WELL DONE.....you have found the"
600PRINT"CHR\$129;"famous ";CHR\$130;"Sapphire of Ramis
is."
610PRINT"SPCA;"and have solved this adventure!"
620RESTORE:FORX=1TO12:READ: SOUND1,-10,D,4:NEXT
630 END
640DEFPROCtitles
650CLS:PRINTTAB(9,2);CHR\$131;"PHARAOH'S CURSE"

```
670 RESTORE
680 FORX=1TO17:READ D:SOUND 1,-10,D,4:NEXT
690DATA 53,69,53,69,89,53,97,89,81,73,69,61,53,89,53,
89,53
700PRINT"For many years, I have searched for the P
yramid of Ramisis and now I have found it!"
710PRINT"I am at this very moment standing on thestep
s of this famous temple and within a few hours I hope
to have found the sapphire of Ramisis."
720PRINT"There is just one small problem, when I arri
ved I had five assistants and each of them has died as
soon as they enteredthe pyramid. Please help me to sur
vive and find the sapphire by giving me"
730PRINT"instructions in the form of two word sent
ences such as GET FOOD etc."
740 PRINT"CHR$129" Press the";CHR$131;"<SPACE BAR>"
```


BBC ELECTRON PROGRAMS

```
;CHR$129;"to start.";
750 REPEAT UNTIL GET=32:CLS
760 FOR X=1TO21:READQ$(X):FOR Y=1TO4:READS$(X,Y):NEXT Y,X
770FORX%=1TO15:READG$(X),B$(X,1):NEXT
780 FORX%=1TO18:READN$(X),N$(X):NEXT
790DATAstanding at the entrance of the famous Pyrami
d of Ramisis,0,0,0,0
800DATAstanding in a small chamber. Steps lead down f
rom here.,0,0,0,0
810 DATAin an ornate chamber. There is a statue of th
e Pharaoh Ramisis in here.,0,0,0,2
820DATAat the bottom of some steps. A gently slopin
g passage leads South from here,0,5,0,0
830DATAat the edge of a deep precipice. There is a l
ight on the South side.,4,0,6,0
840DATAin a small chamber. The walls have strang
e inscriptions on them.,0,0,0,5
850DATAat the South side of a deep precipice. A narr
ow wooden plank stretches across.,5,0,8,0
860DATAon a narrow ledge on the south side of a deep
precipice,0,9,0,7
870DATAin a downward sloping passage.,8,10,0,0
880DATAin a vast cavern. The walls are lined with s
trange and menacing faces.,9,0,11,12
890DATAtrapped in a giant spider's web which is hangi
ng from the ceiling.,0,0,0,0
900DATAat the edge of a subterranean lake,0,0,10,0
910DATAin a small cavern. There is a small laketo the
North.,0,14,0,0
920DATAin the anteroom of Sabar. There is a golden
face on the wall.,13,0,0,0
930 DATAin a secret passage.,0,16,0,14
940 DATAat the South end of a narrow passage. A wider
passage leads East.,15,0,17,0
950 DATAin a vast cavern full of small insects which
are crawling all over the walls and ceiling.,0,18,0,
16
960 DATAat the bottom of a sheer rock face,17,0,0,0
970 DATAat the top of a rock face. The drop is enorm
ous. A passage leads West,0,0,0,20
980 DATAby a panel. A voice says 'BEWARE only those
who possess the SAPPHIRE may proceed',0,0,19,0
990 DATAoutside the Pyramid with a valuable Sapphire
,0,21,21,21
1000 DATAa coil of rope,1,a lantern,1,a narrow plank
of wood,3,a plaque with writing on it,6,a golden statue
,5,a small reptile,4,a spider's web,10
1010 DATAa sharp knife,3,The Sapphire of Ramisis,17,a
metal loop hanging from above,18,an effigy of Ramisis,2
0,a small casket,14,a small phial,3,a bird,9,a small le
ver,4
1020DATA COIL,1,ROPE,1,LANTERN,2,PLANK,3,WOOD,3,PLAQUE
,4,STATUE,3,REPTILE,6,WEB,7,KNIFE,8,SAPPHIRE,9,METAL,10
,LOOP,10,EFFIGY,11,CASKET,12,PHIAL,13,BIRD,14,LEVER,15
1030ENDPROC
1040DEFPROCget
1050K=1:PROCcheck
1060IFLX<>1THENENDPROC
1070EX=0
1080FORHX=1TO15:IFB$(HX,1)=P$ANDB$(N$(R),1)=P$THENEX=1
1090 NEXT
1100IFEX=0THENPRINT"I can't see it here!":ENDPROC
1110IFR=10RR=2THENAAX=1 ELSEIFR=3THENABX=1 ELSEIFR=4OR
R=5THENACX=1
1120IFR=6THENPRINT"It's bolted to the wall!":ENDPROC E
LSEIFR=7THENPRINT"It's too heavy!":ENDPROC
1130IFR=8THENX$="It bites me.. venom surges through my
veins.":PROCclose
1140IFR=9THENPRINT"Don't be silly!":ENDPROC
1150IFR=11THENADZ=1
1160IFR=12ORR=13ORR=14THENPRINT"Don't be ridiculous!":
ENDPROC
1170IFR=15THENAEX=1 ELSEIFR=16THENAFX=1
1180IFR=17THENPRINT"It flies away!":ENDPROC ELSEIFR=18
THENPRINT"Don't be silly!":ENDPROC
1190EX=0:FORDX=1TO3:IFV$(DX)=""THENV$(DX)=G$(N$(R)):EX
=1:DX=5
1200NEXT
1210IFEX=0THENPRINT"I'm sorry my hands are full!":ENDP
ROC
1220B$(N$(R),1)=0:ENDPROC
1230DEFPROCcheck
1240L$="":FORHX=1TOLEN(Z$)
1250IFMID$(Z$,HX,1)=" THENL$=RIGHT$(Z$, (LEN(Z$)-HX)):
HX=HX+40
1260NEXT
1270R=0:LX=0:IFLEN(L$)<2THENENDPROC
1280FORHX=1TO18:IFLEFT$(N$(HX),LEN(L$))=L$ THENLX=1:R=
HX
1290NEXT
1300ENDPROC
1310DEFPROCdrop
1320PROCcheck
1330IFLX<>1THENPRINT"I can't see a :-":L$:ENDPROC
1340EX=0
1350FORDX=1TO3
```

```
1360IFV$(DX)=G$(N$(R))THENV$(DX)=""EX=1
1370NEXT:IFEX<>1THENPRINT"I haven't got it!":ENDPROC
1380B$(N$(R),1)=P$
1390IFR=10RR=2THENAAX=0 ELSEIFR=3THENABX=0 ELSEIFR=11T
HENADZ=0 ELSEIFR=15THENAEX=0 ELSEIFR=16THENAFX=0
1400IF(R=4ORR=5)ANDP%=5THENQ$(5)="by a deep precipice.
A plank stretches to the far side.":S$(5,2)=7
1410IF(R=4ORR=5)THENACX=0
1420IFR=16THENX$="The Phial breaks and a poisonous gas
envelopes me!":PROCclose
1430ENDPROC
1440DEFPROCinventory
1450K=1:PRINTCHR$(131);"I have :-"
1460FX=0:FORHX=1TO3:IFV$(HX)<>""THENPRINTV$(HX):FX=1
1470NEXT:IFFX=0THENPRINT"Not a thing!"
1480ENDPROC
1490DEFPROCchelp
1500K=1:PRINT"I'm sorry I can't think of anything!":EN
DPROC
1510DEFPROCin
1520K=1:IFFX=1THENP%=2:PRINT"O.K. I go in!":ENDPROC
1530 PRINT"I can't do that just yet!":ENDPROC
1540DEFPROCdown
1550K=1:IFFX=2THENP%=4:PRINT"O.K. I go down!":ENDPROC E
LSEIFFX=5ORP%=7ORP%=8ORP%=19THENX$="I fall to my death"
:PROCclose
1560PRINT"I can't do that here dummy!":ENDPROC
1570DEFPROCout
1580K=1
1590IFFX=2THENX$="A VOICE BOOMS OUT... 'How dare you t
ry to leave the temple..' and a surge of power runs
through my body":PROCclose
1600PRINT"I can't do that here!":ENDPROC
1610 DEFPROCclose
1620RESTOREK=1:CLS:PRINTX$""I am dead!":FORX%=1TO12
:READ D:SOUND1,-10,D,3:NEXT
1630PRINT""CHR$129;"Would you like to play again <Y/N
>?"
1640REPEAT: A$=GET$
1650 UNTIL A$="Y"ORA$="N"
1660IFA$="Y"THENRUN ELSEPRINT""THANK YOU FOR PLAYING.
.. GOODBYE!!!":END
1670ENDPROC
1680DEFPROCcup
1690K=1:IFFX=4THENP%=2:PRINT"I climb the stairs":ENDPR
OC
1700 IFFX=18 THENPRINT"I'd need something to CLIMB up!
":ENDPROC
1710PRINT"Don't be silly!":ENDPROC
1720DEFPROCswim
1730K=1:IFFX=12THENP%=13:PRINT"I swim across ":ENDPROC
1740IFFX=13THENX$="A wierd fish swims over and eats m
y flesh!":PROCclose
1750PRINT"Don't be absurd!":ENDPROC
1760DEFPROCpull
1770IFFX<>4THENPRINT"I can't do that here!":ENDPROC
1780IFAGX=0THENAAGX=1:PRINT"I hear a distant rumbling."
:Q$(2)=Q$(2)+" a secret panel has moved to one sid
e.":S$(2,3)=3
1790ENDPROC
1800DEFPROCread
1810K=1:IFFX=6THENPRINT"when translated it reads 'BEWA
RE OF THE FISH'""there is also a strange lookin word"
"FINGLOWIAN":ENDPROC
1820DEFPROCopen
1830IFAEX<>1THENPRINT"I can't see anything to open!":E
NDPROC
1840X$="A venomous spider crawls out and bites me!":P
ROCclose
1850ENDPROC
1860DEFPROCexamine
1870PRINT"I can't see anything special!":ENDPROC
1880DEFPROCsearch
1890K=1:PRINT"Try as I might I can't find anything
here!":ENDPROC
1900DEFPROCcut
1910K=1:IFFX=11THENPRINT"The webb is too difficult to
cut!":ENDPROC
1920PRINT"That's not the right approach!":ENDPROC
1930DEFPROCthrow
1940IFFX=18ANDAAZ=1THENPRINT"The rope catches on the h
ook":Q$(18)=Q$(18)+" A rope hangs from above"
1950IFFX=18ANDAAZ=1THENAAX=2:Y=0:REPEAT Y=Y+1:UNTILV$(
Y)=G$(1):V$(Y)=""ENDPROC
1960PRINT"Don't be silly!":ENDPROC
1970DEFPROCclimb
1980K=1:IFFX<>18THENPRINT"I can't do that here!":ENDPR
OC
1990IFAAX<>2THENPRINT"I can't do that just yet!":ENDPR
OC
2000PRINT"I climb the rope!":P%=19:ENDPROC
2010DEFPROCpush
2020K=1:IFFX<>20THENPRINT"Not here!":ENDPROC
2030IFADZ<>1THENX$="I did warn you' says a voice.":PR
OCclose
2040P%=21:PRINT"O.K.":ENDPROC
2050DEFPROCunlock
```


BBC ELECTRON PROGRAMS

```

2060K=1:PRINT"I can see nothing to unlock!":ENDPROC
2070DEFPROCkill
2080K=1:X$="A mummy sneaks up behind me before I   ha
ve chance to attack!":PROCclose
2090ENDPROC
2100DEFPROCsay
2110K=1:IFP%<6THENX$="You have woken the god from his
rest' booms a voice!":PROCclose
2120IFP%=14THENPRINTCHR$131"What would you like to say
";:INPUTZ$:IFZ$="FINGLOWIAN"THENPRINT"I will show you
a secret passage' says a voice!":P%=15:ENDPROC
2130IFP%=14THENX$="YOU GOT IT WRONG!...SAYS A VOICE":P
ROCclose
2140 PRINT"I talk but nobody listens":ENDPROC
2150 DEFPROCwait
2160K=1:TIME=0
2170PRINT"O.K."
2180REPEAT UNTIL TIME>150
2190ENDPROC
2200DEFPROCjump
2210K=1:IFP%=19ORP%=20ORP%=50ORP%=60ORP%=70ORP%=8THENX$="I
jump and break my neck!":PROCclose
2220 PRINT"I can't do that here!":ENDPROC

```

```

10 REM *****
20 REM **
30 REM ** A game of memory **
40 REM ** for the ACORN ELECTRON **
50 REM ** and BBC model B computers **
60 REM ** S.W. Lucas Jan 1984 **
70 REM *****
80 REM ** DO NOT ADD THE NEXT THREE LINES UNTIL YOU
HAVE FULLY DEBUGGED THE PROGRAM .. AND THEN SAVE A COP
Y BEFORE RUNNING IT
90 *KEY 10 OLD:M RUN:M
100 ON ERROR RUN
110 *FX229,1
120 VDU23,1,0;0;0;0;
130 PROCchars
140 P% = 15
150 *FX11,0
160 PROCenvelope
170 DIMX$(6)
180 FORX=1TO6:READX$(X):NEXT
190 MODE1:PROCInstructions
200 B$=STRING$(200," ")
210 VDU19,1,3,0,0,0
220 SC%=0:COLOUR1
230 PRINTTAB(1,10);"Enter the difficulty level (1-2)"

```

```

240 REPEAT
250 A=GET
260 UNTIL A=49ORA=50
270 IFA=49THENP% = 200ELSEP% = 100
280 SC%=0:AC%=0:B$=""
290 MODE2
300 VDU23,1,0;0;0;0;
310 REPEAT
320 PROCchoose
330 *FX15,0
340 CLS:PROCgame
350 CLS:PROCtry
360 IF TT%>P%THENCLS:COLOUR1:PRINTTAB(6,10)X$(6):COL
OUR2:PRINTTAB(2,20)"Your score was ";SC%:SOUND1,1,15,30
:COLOUR5:PRINTTAB(1,25)"Press <SPACE BAR>":REPEAT UNTI
L GET=32:RUN
370 IFAA$<>MID$(B$,ZX%,1)THENCLS:COLOUR1:PRINTTAB(6,
1);X$(4):GOTO400
380 SC%=SC%+1:P% = P%-5:IFP%<70 THENP% = 70
390 UNTILAC%<>0
400 TIME=0:REPEAT UNTIL TIME>100:CLS:PRINTTAB(0,10)X
$(5):TIME=0
410 REPEAT UNTIL TIME>100
420 CLS:PROCgame
430 TIME=0:REPEAT UNTIL TIME>100
440 CLS:COLOUR1:PRINTTAB(1,10)"You scored :-"
450 COLOUR3:PRINTTAB(15,10);SC%
460 SOUND1,1,45,20
470 COLOUR6:PRINTTAB(0,17)"Press <SPACE BAR>"
480 REPEAT UNTIL GET=32
490 RUN
500 END
510 DEFPROCchars
520 VDU23,224,0,0,0,0,0,0,1,7
530 VDU23,225,0,0,31,63,127,243,225,243
540 VDU23,226,0,0,192,224,240,255,255,255
550 VDU23,227,0,16,16,16,48,240,240,240
560 VDU23,230,30,240,7,120,0,0,0,0
570 VDU23,231,63,255,255,127,63,31,0,0
580 VDU23,232,255,255,240,240,224,192,0,0
590 VDU23,233,240,240,112,112,48,16,16,0
600 VDU23,234,0,0,1,1,3,7,7,7
610 VDU23,235,0,126,255,255,24,24,255,195

```

```

620 VDU23,236,0,0,128,128,192,224,224,224
630 VDU23,237,255,231,207,144,161,163,162,160
640 VDU23,238,189,255,255,129,128,0,0,0
650 VDU23,239,255,231,235,17,137,201,73,9
660 VDU23,240,0,31,63,99,79,127,96,64
670 VDU23,241,0,195,195,227,243,219,27,27
680 VDU23,242,2,227,227,231,103,103,103,103
690 VDU23,243,64,64,64,0,0,0,0,0
700 VDU23,244,31,15,15,0,0,0,0,0
710 VDU23,245,99,102,102,54,54,54,62,14
720 VDU23,246,8,28,42,127,54,28,8,28
730 VDU23,247,4,68,36,18,201,34,17,7
740 VDU23,248,17,18,20,40,83,164,200,112
750 VDU23,249,62,54,54,54,127,99,99,65
760 VDU23,250,17,33,197,8,17,34,68,68
770 VDU23,251,72,68,195,160,88,36,18,17
780 VDU23,255,255,255,255,255,255,255,255
790 REM ** FISH graphics = VDU224,225,226,227,10,8,8
,8,8,8,8,228,229,230,231,232,233 **
800 REM ** CRAB graphics = VDU234,235,236,10,8,8,8,2
37,238,239 **
810 REM ** SNAKE graphics = VDU240,241,242,10,8,8,8,
243,244,245 **
820 REM ** fish2 graphics =VDU246,10,8,249
830 REM ** JELLY FISH graphics = VDU247,248,10,8,8,2
50,251
840 ENDPROC
850 DEFPROCjelly(X%,Y%,Z%)
860 VDU5:GCOLOR,Z%
870 MOVE X%,Y%
880 VDU247,248,10,8,8,250,251,4
890 SOUND1,-15,5,PX%/15
900 FOR X=1TO PX%*10:NEXTX
910 CLS
920 VDU23,1,0;0;0;0;
930 ENDPROC
940 DEFPROCenvelope
950 REM ** define the envelopes **
960 ENVELOPE 4,12,10,8,6,4,0,0,126,0,0,-126,126,126
970 ENVELOPE2,1,5,0,0,25,0,0,126,0,0,-126,126,126
980 ENVELOPE 1,1,43,0,0,100,0,0,126,0,0,-126,126,126
990 ENDPROC
1000 DEFPROCcrab(X%,Y%,Z%)
1010 REM choose colour Z%
1020 VDU5:GCOLOR,Z%
1030 MOVE X%,Y%
1040 VDU234,235,236,10,8,8,8,237,238,239,4
1050 SOUND1,-15,53,PX%/15
1060 FORX=1TOPX%*10:NEXTX
1070 CLS
1080 VDU23,1,0;0;0;0;
1090 ENDPROC
1100 DEFPROCfish(X%,Y%,Z%)
1110 REM CHOOSE COLOUR Z%
1120 VDU5:GCOLOR,Z%
1130 MOVE X%,Y%
1140 VDU224,225,226,227,10,8,8,8,8,8,228,229,230,231
,232,233,4
1150 SOUND1,-15,101,PX%/15
1160 FORX=1TOPX%*10:NEXTX
1170 CLS
1180 VDU23,1,0;0;0;0;
1190 ENDPROC
1200 DEFPROCsnake(X%,Y%,Z%)
1210 VDU5:GCOLOR,Z%
1220 MOVE X%,Y%
1230 VDU240,241,242,10,8,8,8,243,244,245,4
1240 SOUND1,-15,149,PX%/15
1250 FORX=1TOPX%*10:NEXT
1260 CLS
1270 VDU23,1,0;0;0;0;
1280 ENDPROC
1290 PROCgame
1300 DEFPROCchoose
1310 REM ROUTINE TO SELECT RANDOM LETTER
1320 A=RDND(4):IFA=1THENAS$="R" ELSEIFA=2THENAS$="Y" EL
SIFA=3THENAS$="C" ELSEIFA=4THENAS$="B"
1330 IFA$=""THENPRINT"ERROR...IN LINE 5000!":END
1340 B$=B$+A$
1350 ENDPROC
1360 DEFPROCgame
1370 VDU19,1,1,0,0,0
1380 CLS:PRINTTAB(6,10);X$(1):TIME=0:REPEATUNTILTIME=
100:CLS
1390 LET XYX=LEN(B$):XX%=1
1400 REPEAT:C$=MID$(B$,XX%,1)
1410 IFC$="R"THENPROCfish(100,800,1)
1420 IFC$="Y"THENPROCsnake(900,800,2)
1430 IFC$="C"THENPROCcrab(100,200,3)
1440 IFC$="B"THENPROCjelly(900,200,4)
1450 XX%=XX%+1
1460 UNTIL XX%>XYX
1470 ENDPROC
1480 DEFPROCtry
1490 PRINTTAB(6,10);X$(2)
1500 TIME=0

```


BBC ELECTRON PROGRAMS

```

1510 REPEAT UNTIL TIME=100
1520 TI%=0
1530 CLS:ZX%=0
1540 REPEAT
1550 TIME=0
1560 AA$=INKEY$(0)
1570 TT%=TIME
1580 IF AA$="R" OR AA$="Y" OR AA$="C" OR AA$="B" OR T
TX>PX% THEN 1600
1590 GOTO 1560
1600 ZX%=ZX%+1
1610 VDU19,1,1,0,0,0
1620 IFAA$="R" THEN PROCfish(100,800,1)
1630 IFAA$="Y" THEN PROCsnake(900,800,2)
1640 IFAA$="C" THEN PROCcrab(100,200,3)
1650 IFAA$="B" THEN PROCjelly(900,200,4)
1660 UNTIL (ZX%=LEN(B$) OR AA$<>MID$(B$,ZX%,1) OR TT%>
PX%)
1670 ENDPROC
1680 DEFPROCInstructions
1690 CLS:PROCfis(1000,200,1):PROCfis(1000,900,1):PR
OCfis(200,200,1):PROCfis(200,900,1)

1710 COLOUR3:PRINT TAB(9)" S.W. Lucas 1984"
1720 PRINTTAB(4,20)"Press <Space Bar> to continue"
1730 REPEAT UNTIL GET=32
1740 CLS:PRINTTAB(5,5)"This is a game of memory."
1750 PRINT""Watch the screen whilst coloured fish"
1760 PRINT"flash in a random sequence in the four"
1770 PRINT"corners of the screen."
1780 COLOUR1:PRINT""You must try to repeat the sequen
ce"
1790 PRINT"using the keys:-""
1800 COLOUR2:PRINTSPC(16);"R Y""SPC(16);"C B""
1810 COLOUR1:PRINTTAB(4)"Press <Space bar> to continu
e."
1820 REPEAT UNTIL GET=32
1830 CLS
1840 ENDPROC
1850 END
1860 DEFPROCfis(X%,Y%,Z%)
1870 VDUS:GCOL0,Z%

```

```

1880 MOVEX%,Y%
1890 VDU246,10,8,249,4
1900 SOUND2,2,10,20
1910 ENDPROC
1920 DATA Watch,Now Repeat,Correct!,Wrong!,The correc
t sequence was:-,Too slow

```

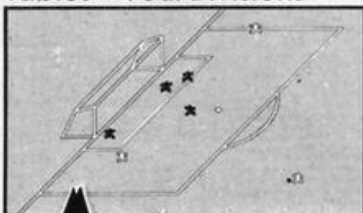


The No.1* Football Game

Designed by Kevin Toms

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* ZX81 Chart
Home Computing Weekly
1.8.83 and 1.11.83.

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Draw the Starship Enterprise — in five seconds

With this week's machine code routine you can draw 3D structures at an average speed of 40 points per second, 30 for screen filling objects. It has the capacity for up to 255 lines to be drawn.

Unlike last week's program, angles and perspectives can be changed by key entry, as drawing is so fast.

How it works (listing 4)

- 5 set memory limits
- 10-15 set Extended BASIC commands
- 20 set screen colours
- 30 set line colour
- 40 set POINT or LINE drawing
- 50 set X and Y shift (in case image lies off the screen)
- 80 set start angles
- 85 POKE start angles to memory
- 90-95 set and POKE perspective
- 100-146 GET a key and move to a routine
- 150-220 change angles routines
- 230-290 change perspective routines
- 500-520 POKE new values routine
- 1000-1030 draw a new image
- 2000-2370 make a Hi Res print-out
- 4000-4030 spare a print routine (to add text to the display)

Its speed is given in the 3D equation in Listing 1 — which may be useful for those with other micros — as well as custom mathematics routines and direct access to Extended BASIC LINE machine code.

If you do not have my Extended BASIC, which appeared in HCW 45-47, listing 1 will help you write the program in other BASICs.

Listing 2 POKes custom machine code to memory.

As always, SAVE the programs before RUNNING them as one DATA mistake could be fatal. Listings 2, 3 and 4 need Extended BASIC to function and the use of custom mathematics routines mean they are long, but fast.

After listing 2 has finished,

Main variables

- Q start of machine code registers
- M what is added/subtracted from an angle with one key press
- B1-B3 angles for X, Y and Z rotation
- A1-A6 SIN and COS values for angles B1-B3
- PX, PY, PZ perspective (PX moves image Xwards, PY Ywards, PZ for magnification)

Concluding a two-part graphics series on the Commodore 64. David Rees shows how to draw at speed using his Extended BASIC, which appeared in issues 45-47. But you can also use it if you missed those issues

Listing 1 — the 3D equation. Given as a guide, not to be typed in

```
90 REM* 3D EQUATION *
91 REM*A1 TO A6 REPRESENT*
92 REM*SIN AND COS VALUES*
93 REM* PRE-CALCULATED *
100 Y1=Y*A2-Z*A1:Z=Y*A1+Z*A2
120 X1=X*A4-Z*A3:Z=X*A3+Z*A4
140 X=X1*A6-Y1*A5:Y=X1*A5+Y1*A6
160 X=2*X+PX:Y=2*Y+PY:Z=Z+PZ
170 Z=(256-Z)*(256-Z)/256
178 REM*128 AND 99 ARE NUMBERS*
179 REM* FOR SCREEN CENTERING *
180 X=128-X*Z/256:Y=99-Y*Z/256
```

Listing 2 — POKes machine code to memory

```
1 REM*MACHINE CODE FOR*
2 REM* FAST 3D DRAW *
3 REM* BY DAVID REES *
4 REM* FEB 1984 *
5 POKE52,63:POKE56,63
10 X=37376
110 FORN=0TO51
120 FORM=0TO955
130 READA:C=C+A:IFA=-1THEN150
140 POKEX+M+64*N,A:NEXT
150 NEXTN
160 PRINTC,"IT SHOULD BE 187871"
1000 DATA169,,141,64,123,141,65,123
1010 DATA172,64,123,185,,114,201,2
1020 DATA208,14,169,,141,65,123,238,64,123
1030 DATA173,64,123,208,233,96
1035 DATA201,3,208,1,96,141,27,123
1040 DATA185,,115,141,29,123,185,,116,141,30,123
1050 DATA185,,117,141,31,123,185,,118,141,33,123
1060 DATA185,,119,141,34,123,185,,120,141,35,123
1070 DATA185,,121,141,37,123,185,,122,141,38,123
1080 DATA169,,141,28,123,141,32,123,141,36,123
1090 DATA32,,148,173,66,123,208,24
1100 DATA173,28,123,141,92,3,173,29,123
1110 DATA141,93,3,173,33,123,141,94,3
1120 DATA32,105,194,24,144,77,173,63,3
1130 DATA141,60,3,173,64,3,141,61,3
1140 DATA173,65,3,141,62,3,173,28,123
1150 DATA141,63,3,173,29,123,141,64,3
1160 DATA173,33,123,141,65,3,173,67,123
1170 DATA141,89,3,173,68,3,205,63,3
1172 DATA208,19,173,61,3,205,64,3,208,11
1174 DATA173,62,3,205,65,3,208,3,24,144,8
1178 DATA173,65,123,240,3,32,112,197
1180 DATA238,65,123,238,64,123,173,64,123
1190 DATA208,1,96,76,8,146,-1,-1,-1
```

Listing 3 POKes X, Y and Z positions to memory.

These can be in the range of —63.99 to 63.99 and, unlike most machine code routines, non whole numbers can be used. The accuracy can be thought of as being + or — 16383 divided by 256.

64,0,0, signifies the end of a set of lines, and 65,0,0 means end of DATA. For those wishing to create their own objects, use the above information, and just replace the DATA with your own.

Listing 4 utilises the routine to make it easier for you to create and move the picture.

Variables in lines 80-90 can be changed to most values (range as with X, Y and Z), to change the start position of your object. For key functions, see table 1. Note that you can only print-out a screen once — to repeat this you will have to start the program again.

By changing POKE 31555 in line 30, you can change the graphics colour. Also, by changing POKE 31554 to zero, points are drawn instead of lines. If you want more advanced displays, all the features are given by POKes in Extended Basic Part 1 HCW 45) can be used.

Hints on conversion

The main routine is in machine code designed for the Commodore 64 so, unless you have last weeks listing 2, it is best to use listing 1 as a core routine and make your own program.

Hopefully, when you have finished, the Starship Enterprise should appear on the screen, in about five seconds.

Last week's DATA is also compatible with this program as is this DATA with last week's program.

I hope you find this routine useful and fast enough.

If you do want anything faster, what you need is a good 16-bit computer, a machine code book, money and a lot of perseverance!

Table 1

- Q/W changes X angle
- E/R changes Y angle
- T/Y changes Z angle
- P printout to VIC 1525 printer
- D draw the shape
- 1/2 change X perspective
- 3/4 change Y perspective
- 5/6 change Z perspective

COMMODORE 64 PROGRAMMING

```

1200 DATA185,,123,133,80,185,1,123,133,81
1210 DATA185,2,123,133,82,185,3,123,133,83
1220 DATA172,56,123,185,,123,133,84
1230 DATA185,1,123,133,86,185,2,123
1240 DATA133,87,169,,133,85,32,,157
1250 DATA165,88,141,47,123,165,89,141,48,123
1260 DATA165,90,141,49,123,165,91,141,50,123
1270 DATA172,57,123,185,,123,133,80
1280 DATA185,1,123,133,81,185,2,123,133,82
1290 DATA185,3,123,133,83,172,58,123
1300 DATA185,,123,133,84,185,1,123,133,86
1310 DATA185,2,123,133,87,169,,133,85
1320 DATA32,,157,165,88,133,80,165,89,133,81
1330 DATA165,90,133,82,165,91,133,83
1340 DATA173,47,123,133,84,173,48,123,133,85
1350 DATA173,49,123,133,86,173,50,123,133,87
1360 DATA173,60,123,240,6,32,128,158,24
1370 DATA144,3,32,,158,172,59,123,165,88
1380 DATA153,,123,165,89,153,1,123,165,90
1390 DATA153,2,123,165,91,153,3,123,96
1400 DATA-1,-1,-1,-1
1410 DATA169,1,141,60,123,169,12,141,56,123
1420 DATA169,35,141,57,123,169,9,141,58,123
1430 DATA169,43,141,59,123,160,31,32,,147
1440 DATA169,,141,60,123,169,9,141,56,123
1450 DATA169,35,141,57,123,169,12,141,58,123
1460 DATA169,35,141,59,123,160,31,32,,147
1470 DATA169,1,141,60,123,169,18,141,56,123
1480 DATA169,35,141,57,123,169,15,141,58,123
1490 DATA169,39,141,59,123,160,27,32,,147
1500 DATA169,,141,60,123,169,15,141,56,123
1510 DATA169,35,141,57,123,169,18,141,58,123
1520 DATA169,35,141,59,123,160,27,32,,147
1530 DATA169,1,141,60,123,169,24,141,56,123
1540 DATA169,43,141,57,123,169,21,141,58,123
1550 DATA169,27,141,59,123,160,39,32,,147
1560 DATA169,,141,60,123,169,21,141,56,123
1570 DATA169,43,141,57,123,169,24,141,58,123
1580 DATA169,31,141,59,123,160,39,32,,147
1590 DATA173,27,123,133,80,173,28,123,133,81
1600 DATA173,29,123,133,82,173,30,123,133,83
1610 DATA24,38,83,38,82,38,81,24
1620 DATA173,,123,133,84,169,,133,85
1630 DATA173,1,123,133,86,173,2,123,133,87
1640 DATA32,,158,165,88,141,27,123,165,89
1650 DATA141,28,123,165,90,141,29,123
1660 DATA165,91,141,30,123,173,31,123
1670 DATA133,80,173,32,123,133,81,173,33,123
1680 DATA133,82,173,34,123,133,83
1690 DATA24,38,83,38,82,38,81,24
1700 DATA173,3,123,133,84,169,,133,85
1710 DATA173,4,123,133,86,173,5,123,133,87
1720 DATA32,,158,165,88,141,31,123
1730 DATA165,89,141,32,123,165,90,141,33,123
1740 DATA165,91,141,34,123,173,35,123
1745 DATA133,80,173,36,123,133,81,173,37,123
1750 DATA133,82,173,38,123,133,83,173,39,123
1755 DATA133,84,169,,133,85,173,7,123
1760 DATA133,86,173,8,123,133,87,32,,158
1765 DATA165,88,133,80,165,89,133,81
1770 DATA165,90,133,82,165,91,133,83
1775 DATA169,,133,84,133,85,133,87,169,128
1776 DATA133,86,24,102,81,102,82,102,83,24
1780 DATA32,128,158,165,88,133,80
1785 DATA133,84,165,89,133,81,133,85
1790 DATA165,90,133,82,133,86,165,91
1795 DATA133,83,133,87
1797 DATA24,38,87,38,86,38,85,24
1799 DATA32,,156,165,88
1800 DATA141,35,123,169,,141,36,123
1805 DATA165,89,141,37,123,165,90,141,38,123
1810 DATA173,27,123,133,80,173,28,123,133,81
1815 DATA173,29,123,133,82,173,30,123,133,83
1820 DATA173,35,123,133,84,173,36,123,133,85
1825 DATA173,37,123,133,86,173,38,123,133,87
1830 DATA32,,156,165,88,133,80,169,,133,84
1835 DATA133,85,133,87,133,81,165,89
1840 DATA133,82,165,90,133,83,169,128,133,86
1845 DATA32,128,158,24,38,91,38,90,38,89,24
1846 DATA165,90,56,237,98,123,176,17
1847 DATA133,90,198,89,165,89,201,255,208,10
1848 DATA169,1,133,88,24,144,3,24,133,90
1850 DATA165,88,240,17,169,,141,27,123
1855 DATA141,28,123,141,29,123,141,30,123
1860 DATA24,144,54,141,27,123,165,89
1865 DATA201,,240,32,201,1,208,7

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1868 DATA165,90,56,233,64,144,19
1870 DATA24,169,63,141,29,123,169,1
1875 DATA141,28,123,169,,141,30,123,24
1880 DATA144,15,165,89,141,28,123,165,90
1881 DATA141,29,123,165,91,141,30,123
1885 DATA173,31,123,133,80,173,32,123,133,81
1890 DATA173,33,123,133,82,173,34,123,133,83
1895 DATA173,35,123,133,84,173,36,123,133,85
1900 DATA173,37,123,133,86,173,38,123,133,87
1905 DATA32,,156,165,88,133,80,169,,133,84
1910 DATA133,85,133,87,133,81,165,89,133,82
1915 DATA165,90,133,83,169,87,133,86
1920 DATA32,128,158,24,38,91,38,90,38,89,24
1921 DATA165,90,56,237,99,123,176,17
1922 DATA133,90,198,89,165,89,201,255,208,10
1923 DATA169,1,133,88,24,144,3,24,133,90
1925 DATA165,88,240,15,169,,141,31,123
1930 DATA141,32,123,141,33,123,141,34,123
1935 DATA96,141,31,123,165,89,240,2
1940 DATA169,
1945 DATA141,32,123,165,90,56,233,208
1950 DATA144,6,24,169,199,24,144,2
1960 DATA165,90,141,33,123,165,91,141,34,123
1965 DATA96
1990 DATA-1,-1
1991 DATA-1,-1,-1,-1,-1,-1,-1,-1,-1,-1
1992 DATA-1,-1,-1,-1,-1,-1,-1,-1,-1,-1
1993 DATA-1,-1,-1,-1,-1,-1,-1,-1,-1,-1
2000 DATA165,81,141,199,3,169,1,133,38
2010 DATA160,8,169,,133,89,133,90
2020 DATA133,91,165,87,37,38,201,
2030 DATA240,29,165,90,24,101,81,144,3
2040 DATA24,230,89,133,90,165,91,24
2050 DATA101,82,144,8,24,230,90,208,3
2060 DATA24,230,89,133,91,24,6,38,24
2070 DATA38,83,38,82,38,81,24,136
2080 DATA208,205,165,82,133,83,165,81
2090 DATA133,82,173,199,3,133,81
2100 DATA 169,1,133,38,160,8,165,86
2110 DATA37,38,201,,240,37,165,89,24
2120 DATA101,81,24,133,89,165,90,24
2130 DATA101,82,144,3,24,230,89,133,90
2140 DATA165,91,24,101,83,144,8,24
2150 DATA230,90,208,3,24,230,89,133,91
2160 DATA24,6,38,24,38,83,38,82,38,81
2170 DATA24,136,208,197
2180 DATA165,85,41,1,240,20,165,89,24
2190 DATA101,81,24,133,89,165,90,24
2200 DATA101,82,144,3,24,230,89
2210 DATA133,90,165,80,24,101,84,24
2220 DATA41,1,133,88,96,-1,-1,-1
2370 DATA160,,185,80,,153,,124,200
2380 DATA192,12,208,245,160,,185,,125
2390 DATA153,80,,200,192,12,208,245
2400 DATA32,,146,160,,185,80,,153,,126
2410 DATA200,192,12,208,245,160,
2420 DATA185,,124,153,80,,200,192,12
2430 DATA208,245,96,-1
2440 DATA165,81,141,199,3,169,1,133,38
2450 DATA160,8,169,,133,89,133,90
2460 DATA133,91,165,87,37,38,201,
2470 DATA240,29,165,90,24,101,81,144,3
2480 DATA24,230,89,133,90,165,91,24
2490 DATA101,82,144,8,24,230,90,208,3
2500 DATA24,230,89,133,91,24,6,38,24
2510 DATA38,83,38,82,38,81,24,136
2520 DATA208,205,165,82,133,83,165,81
2530 DATA133,82,173,199,3,133,81
2540 DATA165,86
2550 DATA41,1,201,,240,37,165,89,24
2560 DATA101,81,24,133,89,165,90,24
2570 DATA101,82,144,3,24,230,89,133,90
2580 DATA165,91,24,101,83,144,8,24
2590 DATA230,90,208,3,24,230,89,133,91
2600 DATA24,165,80,24,101,84,24
2610 DATA41,1,133,88,96,-1,-1,-1
2620 DATA164,80,165,84,133,80,132,84
2630 DATA164,81,165,85,133,81,132,85
2640 DATA164,82,165,86,133,82,132,86
2650 DATA164,83,165,87,133,83,132,87
2660 DATA96,-1
2670 DATA165,80,240,11,165,84,208,21
2680 DATA169,,133,80,76,164,158
2690 DATA165,84,240,10,32,192,157
2700 DATA169,,133,80,76,164,158
2710 DATA165,81,24,101,85,24,133,89

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COMMODORE 64 PROGRAMMING

```

2720 DATA165,82,24,101,86,144,3,24
2730 DATA230,89,133,90,165,83,24,101,87
2740 DATA144,8,24,230,90,208,3,24
2750 DATA230,89,133,91,165,80,133,88
2760 DATA96,-1,-1
2770 DATA165,80,240,21,169,,133,80
2780 DATA165,84,240,10,32,192,157
2790 DATA169,,133,80,24,144,14,76,29,150
2800 DATA165,84,240,7,169,1,133,80
2810 DATA76,29,150,169,,133,80,165,85
2820 DATA56,229,81,176,9,133,89
2830 DATA169,1,133,88,24,144,3,24
2840 DATA133,89,165,86,56,229,82
2850 DATA176,12,198,89,166,89
2860 DATA224,255,208,4,160,1,132,88
2880 DATA24,133,90,165,87,56,229,83
2890 DATA176,21,198,90
2900 DATA166,90,224,255,208,13,24,198,89
2910 DATA166,89,224,255,208,4
2920 DATA160,1,132,88,24,133,91
2940 DATA165,88,208,1,96
2950 DATA165,89,73,255,133,89,165,90
2960 DATA73,255,133,90,165,91,73,255
2970 DATA133,91,96,-1,-1

```

```

1330 DATA26,4,-5,26,4,-8,30,2,-8
1340 DATA30,-2,-8,26,-4,-8,26,4,-8
1350 DATA21,4,-8,18,4,25,-9,-13,5,-9
1360 DATA19,2,-8,-19,-10,64,,
1370 DATA26,4,-5,26,,3,64,,
1380 DATA26,-4,-5,26,-4,-8,64,,
1390 DATA21,-4,-8,21,4,-8,64,,
1400 DATA18,-4,25,-9,18,4,25,-9,64,,
1410 DATA13,,13,-13,-5,-9,-13,-5,-4,5
1420 DATA13,,1,-13,5,-4,5,-13,5,-9
1430 DATA13,,13,64,,
1440 DATA19,,10,-19,-2,-8,64,,
1450 DATA19,-2,-5,-19,,4,64,,
1460 DATA19,2,-5,-19,2,-8,64,,
1470 DATA34,-2,4,-32,-2,4,-30,7,,4
1480 DATA32,2,4,-34,2,4,-35,3,,4
1490 DATA34,-2,4,64,,
1500 DATA11,16,11,11,4,-4,11,5,-3
1510 DATA11,17,12,17,17,12,17,5,-3
1520 DATA17,4,-4,17,16,11,11,16,11
1530 DATA64,,
1540 DATA-2,19,10,56,19,10,56,17,11,5
1550 DATA-2,17,11,5,-2,17,14,5
1560 DATA58,17,14,5,60,19,16,-2,19,16
1570 DATA-2,21,14,5,58,21,14,5
1580 DATA56,21,11,5,-2,21,11,5
1590 DATA-2,19,10,64,,
1600 DATA56,17,11,5,58,17,14,5,64,,
1610 DATA60,19,16,58,21,14,5,64,,
1620 DATA56,21,11,5,56,19,10,64,,
1630 DATA-2,17,11,5,-2,19,10,64,,
1640 DATA-2,17,14,5,-2,19,16,64,,
1650 DATA-2,21,11,5,-2,21,14,5,64,,
1700 DATA11,-16,11,11,-4,-4,11,-5,-3
1710 DATA11,-17,12,17,-17,12,17,-5,-3
1720 DATA17,-4,-4,17,-16,11,11,-16,11
1730 DATA64,,
1740 DATA-2,-19,10,56,-19,10,56,-17,11,5
1750 DATA-2,-17,11,5,-2,-17,14,5
1760 DATA58,-17,14,5,60,-19,16,-2,-19,16
1770 DATA-2,-21,14,5,58,-21,14,5
1780 DATA56,-21,11,5,-2,-21,11,5
1790 DATA-2,-19,10,64,,
1800 DATA56,-17,11,5,58,-17,14,5,64,,
1810 DATA60,-19,16,58,-21,14,5,64,,
1820 DATA56,-21,11,5,56,-19,10,64,,
1830 DATA-2,-17,11,5,-2,-19,10,64,,
1840 DATA-2,-17,14,5,-2,-19,16,64,,
1850 DATA-2,-21,11,5,-2,-21,14,5,65,,

```

Listing 3 — graphics DATA for USS Enterprise

```

5 REM*GRAPHIC DATA FOR THE*
6 REM* USS ENTERPRISE *
7 REM* NCC 1701 *
10 S=29184:FORN=0T0255:POKES+N,3:NEXT
20 T=256:IFPEEK(49152)<>173THENEND
30 FORN=0T0255
40 READX,Y,Z:IFX=64THEN200
50 IFX=65THEN300
60 A=-SGN(X):X=ABS(X):IFA=-1THENA=0
70 B=INT(X):D=(X-B)*256:C=BAND255:E=INT(B/256)
80 POKES+N,A:POKES+T+N,C:POKES+T*2+N,D
100 A=-SGN(Y):Y=ABS(Y):IFA=-1THENA=0
110 B=INT(Y):D=(Y-B)*256:C=BAND255:B=INT(B/256)
120 POKES+T*3+N,A:POKES+T*4+N,C:POKES+T*5+N,D
140 A=-SGN(Z):Z=ABS(Z):IFA=-1THENA=0
150 B=INT(Z):D=(Z-B)*256:C=BAND255:E=INT(B/256)
160 POKES+T*6+N,A:POKES+T*7+N,C:POKES+T*8+N,D
180 NEXTN
190 END
200 POKES+N,2:GOTO180
300 POKES+N,3:GOTO190
320 POKES+N,3:GOTO190
1000 DATA-60,6,9,-52,18,9,-40,26,9
1010 DATA-28,26,9,-16,20,9,-8,6,9
1020 DATA-8,-6,9,-16,-20,9,-28,-26,9
1030 DATA-40,-26,9,-52,-18,9,-60,-26,9
1040 DATA-60,6,9,-58,5,6,-51,17,6
1050 DATA-40,24,6,-28,24,6,-18,18,6
1060 DATA-10,5,6,-10,-5,6,-18,-18,6
1070 DATA-28,-24,6,-40,-24,6,-51,-17,6
1080 DATA-58,-5,6,-58,5,6,64,,
1090 DATA-24,,10,-24,-2,10,-30,-4,11
1100 DATA-36,-4,11,-38,-2,11,-38,2,11
1110 DATA-36,4,11,-30,4,11,-24,2,10
1120 DATA-24,,10,-18,10,-14,2,9
1130 DATA-8,,9,-14,-2,9,-18,10,64,,
1140 DATA-34,-2,14,-32,-2,14,-30,7,,14
1150 DATA-32,2,14,-34,2,14,-35,3,,14
1160 DATA-34,-2,14,64,,
1170 DATA-25,,5,-25,3,5,5,-30,8,5
1180 DATA-36,8,5,-41,3,5,5,-41,-3,5,5
1190 DATA-36,-8,5,-30,-8,5,-25,-3,5,5
1200 DATA-25,,5,-12,,1,-6,-2,-1,3
1210 DATA-15,-2,6,-25,,5,-15,2,6
1220 DATA-6,2,-1,8,1,,2,-7,,6
1230 DATA-15,-2,6,64,,
1240 DATA-15,2,6,-7,,6,64,,
1250 DATA-12,,1,-6,2,-1,8,64,,
1260 DATA-6,-2,-1,8,1,,2,64,,
1270 DATA-19,,10,-13,,13,18,,10
1280 DATA21,,8,26,,8,26,-4,-8
1290 DATA21,-4,-8,18,4,25,-9,-13,-5,-9
1300 DATA19,-2,-8,-19,-2,-5,-13,-5,-4,5
1310 DATA26,-4,-5,26,,3,-13,,1
1320 DATA19,,4,-19,2,-5,-13,5,-4,5

```

Listing 4 — for easier drawing and movement

```

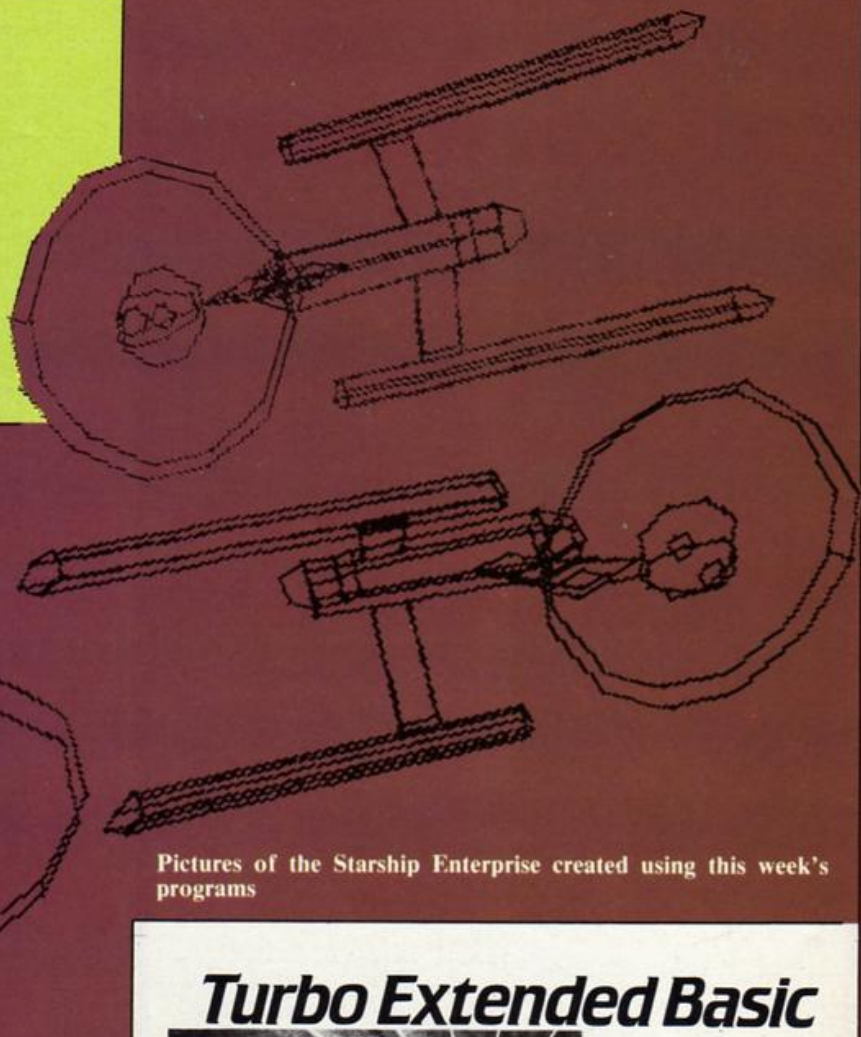
5 POKE51,0:POKE52,31:POKE55,0:POKE56,31
10 MODE=51828:GCOL=51770:GTEXT=52657
15 LINE=51754:GMOVE=52039
20 SYSGCOL,5,0:SYSGCOL,6,0:SYSGCOL,1,14
29 REM*LINE COLOUR*
30 POKE31555,14:POKE56325,255
39 REM*POINT(0) OR LINE(1)*
40 POKE31554,1:Q=123*256
45 REM**Y*
50 POKE31586,100:POKE31587,90
80 B1=PI*2.07:B2=PI*3.1591:B3=PI*3.083:M=PI*12
85 GOSUB160:GOSUB190:GOSUB220
90 PX=0:PY=0:PZ=10:GOSUB240:GOSUB260
95 GOSUB280:V=40128
100 GETA$:IFA$=" "THEN100
110 ONVAL(A$)GOSUB150,160,180,190,210,220
120 IFA$="Q"ORA$="W"THENGOSUB240
130 IFA$="E"ORA$="R"THENGOSUB260
140 IFA$="T"ORA$="Y"THENGOSUB280
142 IFA$="P"THEN2000
145 IFA$<>"D"THEN100
146 GOTO1000
150 B1=B1+M:A1=SIN(B1):A2=COS(B1):GOTO170
160 B1=B1-M:A1=SIN(B1):A2=COS(B1)
170 A=A1:D=9:GOSUB500:A=A2:D=12:GOTO500
180 B2=B2+M:A3=SIN(B2):A4=COS(B2):GOTO200
190 B2=B2-M:A3=SIN(B2):A4=COS(B2)
200 A=A3:D=15:GOSUB500:A=A4:D=18:GOTO500
210 B3=B3+M:A5=SIN(B3):A6=COS(B3):GOTO230
220 B3=B3-M:A5=SIN(B3):A6=COS(B3)

```


COMMODORE 64 PROGRAMMING

```

230 A=A5:D=21:GOSUB500:A=A6:D=24:GOTO500
240 PX=(PX+(A$="Q"))-(A$="W")AND63
250 D=0:A=PX:GOTO500
260 PY=(PY+(A$="E"))-(A$="R")AND63
270 D=3:A=PY:GOTO500
280 PZ=PZ+(A$="T")-(A$="Y")
284 IFPZ<-64THENPZ=-64
286 IFPZ>128THENPZ=128
290 D=6:A=PZ:GOTO500
499 REM*POKE VALUES*
500 S=-SGN(A):A=ABS(A):IFS=-1THENS=0
510 B=AND255:C=(A-B)*256:POKEQ+D,S
520 POKEQ+D+1,B:POKEQ+D+2,C:RETURN
1000 SYSMODE,0,0,1
1010 SYSMOVE,0,0:SYSLINE,2,319,0
1020 SYSLINE,2,319,199:SYSLINE,2,0,199
1030 SYSLINE,2,0,0:SYSV:GOTO100
2000 REM
    
```



Pictures of the Starship Enterprise created using this week's programs

```

2001 OPEN1,4
2010 PRINT#1
2020 PRINT#1
2030 PRINT#1,CHR$(8)
2050 DIMS$(200),TX(200),AX(200)
2060 G$=""
2070 FORN=0TO50:G$=G$+CHR$(128):NEXT
2090 PRINT#1,G$
2100 FORN=0TO199:SZ(N)=0:NEXT
2110 A=312:X=127:XD=1:TM=256:K=8192
2120 FORN=0TO199
2130 Z=NAND7:P=PEEK(K+A+Z+40*INT(N-Z))
2140 TX(N)=SZ(N):AX(N)=PANDX:SZ(N)=P-AX(N)
2150 AX(N)=AX(N)*XD+128+TX(N)/TM
2160 PRINT#1,CHR$(AX(N)):NEXT
2200 XD=XD*2:TM=TM/2:PRINT#1
2210 PRINT#1,G$
2220 X=(X/2)AND255:A=A-8
2230 IFX=0THENA=A+8:X=127:XD=1:TM=256
2240 IFAD=1THEN2120
2300 FORN=0TO199
2330 AX(N)=128+SZ(N)/TM
2340 PRINT#1,CHR$(AX(N)):NEXT
2350 PRINT#1
2360 CLOSE1
2370 GOTO100
4000 L=LEN(A$)
4010 FORN=1TOL:XZ=XX+N-1:C$=MID$(A$,N,1):C=PSC(C$)
4020 IFC>64THENC=C-64
4030 SYSGT,XZ,YZ,48,0,C:NEXT:RETURN
    
```

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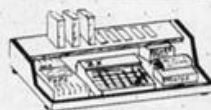
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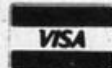
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