

Home

An Argus Specialist Publication

Computing WEEKLY

No. 62
May 15-21, 1984

45p

FREE

screen planner
for BBC and
Electron

FREE

competition:
scores of
games from

S&C DRAGON

must be won

Software

reviews for:
Commodore 64,
Spectrum, BBC,
Electron, TI,
Dragon, Sord

Great games to
type in for VIC-20,
Spectrum,
BBC/Electron
and Texas



Learning's fun
with our CBM 64
listing

Special report:
the new micro in
the High Streets

PLUS
software charts,
news, letters...



Micro show goes monthly

BBC TV is to screen a monthly computer magazine, hosted by Ian McNaught-Davis.

The idea was prompted by the success of the Micro Live show in October which was viewed by about 1.3m people, good for a Sunday morning.

No name has yet been chosen for the series, but it will be screened by BBC2 in the early evening on weekdays.

But first there will be a follow-up to Micro Live, a one-hour show on June 24 on BBC1 at 11.30am.

Among the features will be the announcement of the winners of a software competition for schools and colleges, launched on the earlier show by the Information Technology Minister Kenneth
Continued on page 6

QL is here ...at last

Sinclair Research delivered the first batch of QL micros in style — by car.

One of the lucky recipients was John Smith, a self-employed programmer/engineer, who reckons the QL was worth the wait.

He said: "My partner and I ordered a QL two days after the launch. We weren't among the first to order, but my partner was so aggravated by the delay
Continued on page 6

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REGULARS

News	6
One Computer's View	6
A micro airs its thoughts!	
£1,000 GEC Dragon competition	7
There are 92 prizes waiting to be won	
Letters	38
The things you tell us	
Software charts	41
Best selling arcade and non-arcade games, plus Top 10s for six home computers	

SOFTWARE REVIEWS

Play more with your 64	8
New games tested and star rated	
Jamboree for all	10
Software for CBM 64, VIC-20, Electron, Texas and Sord M5	
Fun and games	13
A page of new games for Spectrum users	
Game for some fun?	23
BBC users stop here... and read our ratings	
Make more use of your micro	26
Utilities for the Dragon and TI-99/4A	

SPECIALS

Special report: WHS goes for Advance	5
Why Britain's biggest computer retailer decided to sell a new micro — and what it offers	
BBC/Electron screen planner	24-25
Create great graphics and plot them on the screen with our special pull-out guide	
£1 off K-tel software	37
Save on twin-game tapes. You'll need the voucher in last week's HCW, as well	



PROGRAMS

BBC/Electron	16
Snakes alive! Sophisticated graphics make this a game that's good to look at as well as fun to play	
VIC-20	20
How long will you last? A two-listing game packs great graphics into the unexpanded VIC	
Commodore 64	28
Two games: make a bid on the land speed record in your jet car, then see how you manage against the cats as Rex the red setter	
TI-99/4A	42
Deal yourself in: a card game for you and the family	

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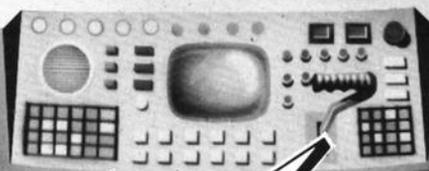
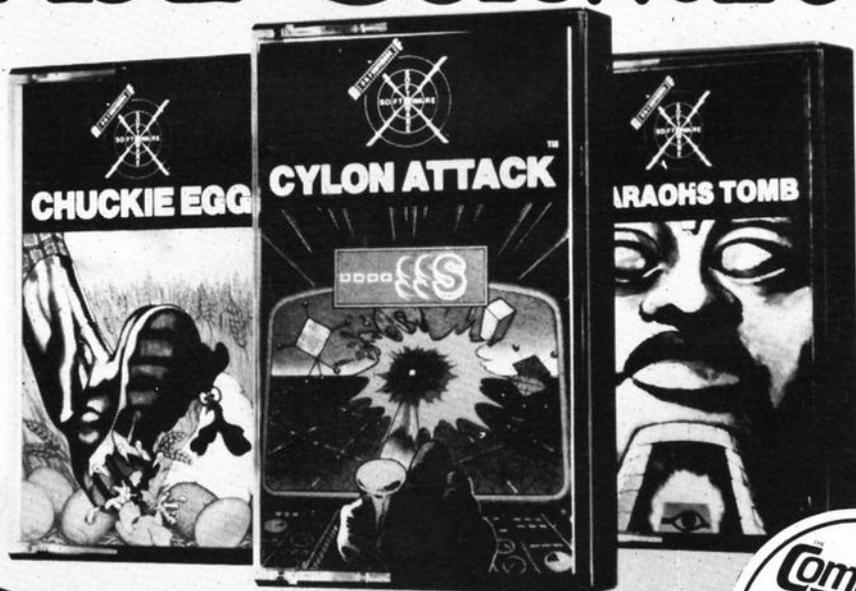
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SPECIAL REPORT

W.H.S goes for the Advance

Why has W.H. Smith decided to sell the Advance, and what does it offer? Paul Liptrot reports

The Advance 86, model B — remove the disc drive unit and it's the model A. The monitor costs extra.



Sound: built-in speaker
Input/output: cassette (1-2K baud), light pen, two joystick ports, Centronics, TV, RGB, composite video. Model B also has TS232 port

cards, including those made for the IBM PC, and space for another two drives or hard disc
Software free with model B is Perfect Writer, Perfect Speller,

Britain's biggest computer retailer, W.H. Smith, has signed an exclusive deal to sell the 16-bit Advance 86.

There are two models, both IBM compatible, with 128K of RAM, an 84-key typewriter-style keyboard — which slides into the main unit when not in use — Microsoft GW BASIC and an Intel 8086 processor running at 4.77MHz.

● Model A, which works with a domestic cassette recorder, costs £399 and is designed for home use

● Model B, for small businesses, is £1,500 and has an extra unit containing two 5¼in disc drives and space for extra boards, plus four free software packages

Model A can be upgraded to Model B for £1,100.

Merchandise controller John Rowlands said the Advance was now on sale in 35 computer shops-within-shops. Another 14 would be added within three months. It will also go into 220 computer Know-how departments.

He said: "It replaces the Apple. We sold several hundred, but I don't think it has the appeal or the same availability of software. We will have about two dozen software packages by early June and 48 by the end of summer. We are talking to a number of UK software houses, but a lot is coming from the US."

The Advance, and the Sinclair QL when available to retailers, adds to Smith's current range of computers: BBC, Electron, Spectrum, ZX81 and Commodore 64.

W.H.S. already markets two own-brand computer-compatible cassette recorders and is now adding a 14in colour monitor at £249 and a 12in amber screen monitor (£89). A modem and carrying straps are possible for the Advance.

British made (by Ferranti) and designed, the Advance has 62K available to BASIC and an extra 16K handles the screen. The 64K of ROM contains BASIC, with 72 error messages, diagnostics and the cassette operating system. A further 128K of RAM chips can be added to the model A and 640K to the model B.

Advance Technology systems programmer Carl Phillips said it was as compatible with the IBM Personal Computer as rival micros.

He said: "Compatibility is a word which has lost all meaning. The ROM is obviously not byte-for-byte — that would invite IBM's legal department. The question is 'Does it run IBM software?', and it does."

A demonstration showed the Advance running a flight simulator, generally reckoned to be a good test of IBM compatibility.

Main features: Display: 256 characters — all redefinable — scroll, full screen editing, 16 colours plus flashing. Modes:

mode	colours	horiz.	vert
text	16	40/80	25
medium res.	4	320	200
high res.	2	640	200

Keyboard: black with 84 cream and grey keys, all with auto repeat, including 10 function keys and numeric keypad incorporating cursor control. The unit fits into a black box measuring 20¼in by 16¼in by 4¼in

Disc expansion unit fits on top and contains two half-height Shugart SA455 drives, power supply and larger mother board. There are slots for more

Perfect Calc and Perfect Filer, said to be worth a total of £750

● Last year W.H.S. sold £28m-worth of computers, £13m up on the previous year

W.H. Smith, Strand House, 10 New Fetter Lane, London EC4A 1AD

Advance 86 BASIC keywords

ABS	or string	LOF*	PSET
ASC	DEF SEG	LOG	PUT*
ATN	DEF USR	LPOS	RANDOMIZE
AUTO	DELETE	LPRINT	READ
BEEP	DIM	LPRINT USING	REM
BLOAD	DRAW*	LSET*	RENUM
BSAVE	EDIT	RSET*	RESET closes
CALL	END	MERGE	files on all
CDBL converts to double precision	EOF	MIDS	drives*
CHAIN*	ERASE	MKIS, MKSS,	RESTORE
CHRS	ERR	MKDS convert numeric values	RETURN
CINT	ERL	to string values*	RIGHTS
CIRCLE*	ERROR	MOTOR	RND
CLEAR	EXponential	NAME*	RUN
CLOSE file	FIELD*	NEW	SAVE
CLS	FILES	OCTS	SCREEN
COLOR	FIX	ON COM	SGN
COM event trapping*	FOR...NEXT	ON ERROR	SOUND
COMMON passes variables to chained program*	FRE	ON...GOSUB	SPACES
CONTinue	GET	ON KEY	SPC
COSine	GOSUB	ON PEN*	SQR
CSNG converts to single precision	GOTO	ON STRIG(n)*	STICK
CVI, CVS, CVD convert string values to numeric variables*	HEX	OPEN*	STOP
DATA	IF...THEN	OPEN COM*	STRS
DATES*	INKEYS	OPTION BASE	STRIG
DATES*	INP	declares min. value for array subscripts	STRINGS
DEF FN	INPUT	OUT	SWAP
DEF INT/SGN/DBL/STR declare variable types as integer, single precision, double precision	INPUTS	PAINT fills graphics with colour*	SYSTEM*
	INSTR	PEEK	TAB
	Integer	PEN lightpen	TAN
	KEY	PLAY music*	TIMES*
	KEY(n)*	POINT	TRON/TROFF
	KILL	POKE	USR
	LEFTS	POS horiz.	VARPTR*
	LEN	pos. of cursor	WAIT
	LET	PRESET	WEND...
	LINE	PRINT	WIDTH
	LINE INPUT	PRINT USING	WRITE
	LIST		
	LLIST		
	LOAD		
	LOC*		
	single precision		
	double precision		
	LOCATE		

* Disc BASIC only. The Advance disc operating system, supplied on disc, is a version of Microsoft MS-DOS used on the IBM Personal Computer

QL here*From front page*

Baker. One of the 15 regional winners will get prizes worth £25,000.

Director and co-producer of both is Patrick Tittle. He said: "We want to show how people are using their computers."

In the one-hour show there will be a follow-up to an earlier item where John Coll found while demonstrating communications that hackers had broken the security and left messages.

Mr Tittle said they faced a moral dilemma over including it, but decided to go ahead to demonstrate that computer systems can be insecure.

Like the earlier show, Micro Live will have a studio audience, possibly drawn from computer clubs.

The 30-minute series, due to start in October, will often be live and include occasional phone-ins.

Among the items pencilled in is a regular report from America. Outside experts will review hardware and software, programs from the series will probably be available via teletext and there may be a British Telecom Gold mailbox for viewers' comments.

Also in the planning stages is a chart of best selling commercial software.

My Tittle and his co-producer, David Allen, were both involved in the series Making the Most of the Micro, which led to Micro Live and now the series.

He invited comments from readers of Home Computing Weekly on what should be included both in the single show and the series.

Micro Live, BBC TV, Villiers House, London W5

Micro show*From front page*

that he went to Camberley and blew his top.

"Perhaps his behaviour, and a number of phone calls to Sinclair, helped speed up delivery in our case."

He went on: "I think it's brilliant. I certainly wouldn't knock it. Of course there are some minor bugs but I've waited a few months and I'm prepared to wait a couple more for Sinclair to sort out the problems. As long as they update it, I'm happy".

Some of the criticisms Mr Smith did have were discrepancies between the handbook and the system. "The handbook only seems to be half finished," he said. "It contains

details on the packages, and a few small things like how to switch it on, but nothing about the BASIC."

One arithmetic bug is that if you PRINT -1-1 you get 0, not -2. I'm not worried by the bugs though. After all, the Spectrum had 16 bugs."

Peter Walters is another new QL owner. He said: "The packages are very good," he said. "The graphics are very easy to use and the microdrive is very good and reliable. The spreadsheet is good but there is a bug in it."

Mr Walters had discovered several problems. "The FILL routine doesn't work properly and the flashing is awkward," he said. "One major problem was that it took three of us eight attempts to get it back in the box!"

"In my view it is potentially better than the BBC, but it isn't at the moment," he continued.

A Sinclair spokesman said: "Our production target is 20,000 units by the end of the summer. We have had more than 13,000 orders; those who had letters from us telling them that they should receive their QL in April should by now have received them. Those who had May letters should be receiving their QL by the end of the month.

"The handbook was not completed when the first QLs went out, and the customers were advised of this. Other sections, including information on the BASIC, will be sent out this week and there will be a separate free booklet on the operating system software."

"At the moment the QL has an EPROM board which must be plugged in at the back," he continued. "This is the equivalent of three 16K EPROMS; these will all be located internally. Redesign of the PCB is not necessary. All owners are being issued with vouchers for a free conversion of firmware, and this should take place within one or two months."

Sinclair, Stanhope Rd, Camberley, Surrey GU15 3PS

Briefly

Reactions is the third release in Cloud 9's Chemistry Revision Aid Series. Two experimental simulations, a model of particles colliding and revision notes are included in this package for the 48K Spectrum. Price: £8.50 for over 75K of program.

Cloud 9, 4 Dolvin Rd, Tavistock, Devon PL19 9EA

March of the micros

My ancestry can be traced back many hundreds of years to the Chinese, although Babbage has been accredited as my creator.

Consider my development from beads on wires through Jacquard loom cards, transistors, chips, LSI chips and VLSI chips. I shudder to think how many millions of pounds/dollars/yen have been spent on my development. Even in my lowly form, I can work at thousands of instructions per second and have condensed in size from the equivalent of the Albert Hall to a keyboard.

After all this high technology development what is my ultimate aim in life? I'll tell you... to zap aliens, rescue maidens from neurotic gorillas, guide frogs across highways and rivers. You must admit, with my breeding it is a little degrading.

Still the tide is slowly turning, we are beginning to bite (or should that be byte?) back. I may only be used as a clever toy but some of my relatives are already making their presence felt.

It is a very carefully planned strategy. We even enlist you humans to help bring about your own downfall. We get you to convince each other how much you would benefit from one of us in your office/factory. We then demand special environments, and special clothes to be worn. We have even got our own languages (which nobody understands) and a breed of acolytes to tend our every need. We demand and get utter obedience to our every command and we are never (well, hardly ever) wrong. If we give the wrong answer it is your fault: you must have asked the wrong question or input the wrong information.

We behave for a while until you are dependent on us and then we start to flex our chips and cause problems. Nothing serious to begin with so you do not lose confidence — yet!

Even I, a homecomputer, am playing my part in the grand plan. I have taken over the colour TV and am making fast progress in addicting the humans in my household to using me to the exclusion of all else.

Our advance into all aspects of your way of life is continuous. We are now virtually unstoppable. To be sure, we can be unplugged individually but how are you going to unplug us all at once? You even let us talk to each other at speeds most of you cannot even comprehend. Imagine how much we can tell each other in less than the twinkling of one of your eyes.

Yes, we are destined to take over and control the world. You think that you are clever, but who was the first to the moon, Mars, the outer planets? Our super brethren are so complex that we have to design them ourselves. You are giving it to us on a plate.

So be warned and think on it, although there is not much that you can do about it now.

A TI-99/4A

Alias B. E. Brind
Rugely, Staffs

● This space is for you to sound off about the micro scene, to present bouquets, to hurl brickbats, or just to share your opinions or experiences. Contributions from individuals earn a fee. Send your views to Paul Liprot, Editor, Home Computing Weekly, No.1 Golden Square, London W1R 3AB

COMPETITION

Spot the differences: 92 prizes from

GEC DRAGON

waiting to be won

AS well as making one of Britain's most popular home computers, GEC Dragon is also among the biggest producers of software.

And we have got together with Dragon for this week's free-to-enter competition. We are offering 92 prizes of Dragon's fun game, Junior's Revenge, which cost £10.95 in the shops.

As well as 32K and 64K computers, Dragon produces double and single 5¼in disc drives and joysticks — and there are more peripherals to come.

And the company, which now has the power of GEC behind it, also markets more than 80 software titles.

They range from arcade and adventure games to educational, utilities and a new suite of business software for the Dragon 64, including word processing and a database.

Junior's Revenge is a seven-screen game featuring characters like ZuZu birds and the Vinegators.

Here's Dragon's description of it:

After saving his girlfriend from the clutches of a huge gorilla, Luigi has captured the gorilla and put him in a cage. In this game, you are Junior. The gorilla is your dad and you must save him. This would be a simple task except for the trained animals Luigi has sent to stop you. You have the ability to climb up and down vines and chains and to jump over obstacles.

Junior's Revenge, which runs on either Dragon, is the subject of our cartoon.

How to enter

Study the two cartoons — there are a number of differences between them. Circle the differences on cartoon B and seal the cartoon and the coupon in an envelope. Write clearly on the back of the envelope the number of differences you found.

Post your entry to GEC Dragon Competition, Home Computing Weekly, No. 1 Golden Square, London W1R 3AB. Entries close at first post on Friday June 1, 1984.

You may enter as many times as you wish, but each entry must be on the official coupon — not a copy — and sealed in a separate envelope.

The winners will be the senders of the first 92 correct entries opened at random after the closing date.

The prizes will arrive from GEC Dragon within 28 days of the publication of the issue containing the names of the winners, or earlier.

Important: please follow carefully the guidelines on entering — incomplete coupons and entries in envelopes with no number on the back cannot be considered. If you are a winner, the coupon will be used as a label to send your prize so clear writing is essential.

The rules

Entries will not be accepted from employees of Argus Specialist Publications, GEC Dragon and Alabaster Passmore & Sons. This restriction also applies to employees' families and agents of the companies.

The How to Enter section is part of the rules.

GEC Dragon Competition

Entry Coupon

Name _____

Address _____

_____ post code _____

Number of differences found _____

Complete clearly and fully — if you are a winner this will act as a label for your prize. Post to GEC Dragon Competition, Home Computing Weekly, No. 1 Golden Square, London W1R 3AB. Closing date: first post, Friday June 1, 1984. Do not forget to write the number of differences on the back of your envelope.



Megawarz CBM 64 £7.50

Paramount, 67 Bishopton Lane,
Stockton, Cleveland TS18 1PU

It's the finishing touches which separate the good from the bad. The good ensure initial playability by ham-fisted novices, long use by difficulty levels and enjoyment by attention to detail. A personal tailoring option — selecting three to five lives, bonus life, five difficulty and volume levels — raised hopes which were not disappointed.

The aim of the game is a round-trip mission to neighbouring planets, rescuing space-floating astronauts. Each planet is defended by hostiles: once these are cleared, all nearby astronauts appear for a brief rescue period, before mutating into deadly aliens. Contact with

these or any hostile causes you to explode. Shields will save you but their power is limited.

The ship rotates in eight directions, thrusting forward only and bounces off the screen edge. Rotation controls are very sensitive, needing precise control if you are not to spin helplessly.

The sound and music are well-chosen, the graphics excellent. Display shows score, hi-score, lives, rescues and shields, if you have time to look. End screen gives details of achievement and rating. Exciting and addictive. Get it.

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

D.C.



Midnight Express CBM 64 £7.00

Camilla, 4 Marenes Crescent,
Brightlingsea, Colchester CO7
0RX

With the strength of the big boys in the software market, life can be rather tough for the small fish. This game is of the maze type and could easily have entered the realms of mediocrity.

The game has three phases, each involving trains. In phase one a circular man moves around the maze picking up mail Pac Man style. A train also moves around the track and you must avoid colliding with it. By moving your man to certain locations in the maze you can

convert him to a carriage which, if you can catch the train, you can tack on the end for a bonus.

In phase two the length of the train continually increases and you must remove carriages from the end, or else it will collide with itself and end the phase. The final phase is similar to phase one but much faster.

Graphically the game is nice but not outstanding. At the price the game is perhaps a touch overpriced but it is an enjoyable game and worth checking out.

A.W.

instructions	80%
playability	75%
graphics	70%
value for money	70%



Mind Control CBM 64 £6.90

ACE, 82/84 Peckham Rye, London SE15 4HB

Science fiction film fans will remember when miniaturised doctors were injected into the bloodstream of a human to operate on a brain tumour. Here, you've got to destroy the nerve centre in Zyco's brain, an indestructible (their spelling) alien, before your miniaturising pill wears off, avoiding blood corpuscles and antibodies. There is illogicality to this twist on the original. Why does the alien permit injection? And why wouldn't a human body, exploding full-size in his brain, finish him off anyway?

Screen display also shows lack of research. Basically, a visible maze in the convoluted shape of a brain, with some circles (corpuscles?) whizzing around, and a spiderish shape I assume to be the target at the centre. Your weapon fires only in the direction you are going, without effect on corpuscles. Controls are extremely sensitive and touching anything changes you from a tiny dot to a mountaineer in Lederhosen, and sends you back to start again.

And that's it. Possibilities — lungs, heart, variety of opponent — must be left to a future programmer with more imagination. Illogicality aside, won't interest for more than five minutes.

D.C.

instructions	90%
playability	40%
graphics	30%
value for money	50%



Play more with your CBM 64

Our panel reviews sci-fi, space
and maze games for the CBM
64

Pigs in Space CBM 64 £6.90

ACE, 82/84 Peckham Rye, London SE15 4HB

Clearly programmer and insert writer are unacquainted. It's wolves in space, the pigs being land-based and your pig lazer (a pun on lazy pigs or poor spelling?) is a bow and arrow.

Mummy pig is hoisted up and down in a basket, while wolves drop by balloon or heli-pack from a conveyor belt through the middle of a cloud. Or perhaps it's a spaceship. They are hurling at Mummy what the insert calls space dust but looks like thumping great rocks to me. Once hit, Mummy's dead.

After she has killed 20 wolves, she's supposed to come down, avoid atomic bombardment, and

rescue a piglet hiding in trees. Mummy really could do with more modern equipment because her arrows are slow. Landing wolves can be shot on the ground, but if missed, rise underneath the basket, meaning certain death.

Keyboard or joystick. No display of wolves hit so I don't know if I ever came near to 20 before my lives ran out on Level 1 and I could not work up sufficient interest to keep trying. No title screen, poor use of sound, chunky graphics and loading difficulties.

D.C.

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



Outback CBM 64 £7.50

Paramount, 67 Bishopton Lane,
Stockton, Cleveland TS18 1PU

Cunning swagmen drop from the trees, parachute from helicopters and swarm from the hills, intent upon stealing baby kangaroos. But they're not getting yours, Blue. Nine roos penned up as decoy and you're concealed, ready to pick swaggers off with your bow and arrow. Trouble is, they keep throwing the boomerangs, which has a nasty effect on your life, and if you run out of lives or roos, you're out of business.

A previous version of this scenario bored me to tears — so why do I like this? The option to customise difficulty to my level?

The screen variety? Choice of straight or guided arrows? All that, plus combination of super graphics, excellent sound and a great sense of humour. The plaintive squeal of captured roos, swagmen diving satisfyingly head-first to death, text comments; all make it a joy to play. The death sequence is superb too.

Hall of Fame, joystick or keyboard, music 'off', hold, on-screen details, end screen achievement and rating — this program lacks nothing but Fosters, and will last as long as you can play.

D.C.

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



STAR COMMANDO

Win Your Wings

The Galaxy is under attack! You must destroy hostile forces such as Cosmic Kamikazes and Sausonic Raiders, and hazardous Space Minefields and Meteor Storms.

Reach the top rank of "Star Commando" and you'll earn you a special "Star Commando" wings metal badge.

A fantastic 3-D perspective fast action game for the Commodore 64. Written by Reg Stevens. £7.95.

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 Stage One
 Tiger Distribution



Jungle Jive 32K Acorn Electron £7.95

Virgin, 61-63 Portobello Rd,
London W11 3DD

I think the name for this game was pulled out of a hat, because there is no relationship with the game.

You are a lone hunter armed with a rifle. You are surrounded by wild animals which you must shoot. You also have to avoid the ricocheting bullets if you miss. To clear one screen you must shoot all the pink elephants. In this time of wild life conservation it must be illegal to kill pink elephants.

If this makes the game sound exciting it's not meant to. The game suffers very badly from

lack of movement. You can only move up or down on one plane and shoot left or right. After playing a couple of times it becomes monotonous.

Graphics are fair. The colour of the animals is not true to nature but makes for interesting viewing. As you progress the game speeds up but the excitement does not increase in proportion.

I expect this game could appeal to the very young. If you like exciting safari then give this one a miss. **M.B.**

instructions	90%
playability	90%
graphics	80%
value for money	70%



Three Circles/ Number Search Sord M5 £8.95

Computer Games, CGL House,
Goldings Hill, Loughton, Essex
IG10 2RR

This double games cassette for the unexpanded Sord M5 contains Three circles and Number search.

Three circles is described as an original version of the three circle game and is a contest between your brain and the computer's CPU. You must consider your move as well as your opponents. I'm afraid this is all I can say about this game since I found the instruction booklet totally incomprehensible.

Number search is a simple version of the once popular game

Master Mind by Invicta Plastics. If you've been living in an underground shelter for the last 50 years, you won't know this game so let me explain. The purpose of this game is to find a special number generated by the opponent — in this case the computer — by using the fewest possible hints. In this version you choose the number of digits and the computer gives the hints.

These are two trivial games which don't exploit the capability of the M5 to any extent. This is surprising since all the other double cassettes are fairly good but I honestly cannot recommend this. **S.S.**

instructions	40%
playability	30%
graphics	30%
value for money	40%



Bankroll TI-99/4A £7

Not Polyoptics, from Stainless,
10 Alstone Rd, Stockport,
Cheshire SK4 5AH

The only complaint I have is that nowhere in the instructions, and contrary to information on the cassette, is it mentioned that this program runs in Extended BASIC. Otherwise, this is a quite good, text only, investment game for two to four players.

Each player starts with \$10,000 and the game ends when a predetermined target is reached. The upper limit is \$999,999 so you've no chance to achieve millionaire status.

The computer randomly decides the order of turns and when everyone has completed their choices, annual returns on all the players' investments are shown. Each player may buy and sell bonds or shares, but a sharp eye must be kept on interest rates and taxation. 'Headlines' may also have a long- or short-term effect on the outcome.

When the game ends the name of the winner is transformed into sprites which roll around the screen.

Overall, a complex and well structured program. You need to be a financial wizard to appreciate all the factors affecting capital and investments, but even if you aren't, it's still fun to play. Needs Extended BASIC. **J.W.**

instructions	90%
playability	75%
graphics	N/A
value for money	85%



Jamboree for all!

A mixed bag of games are
reviewed for you by our panel

Pedes and Mutants VIC-20 £6.99

Romik, 272 Argyle Avenue,
Slough, Berks SL1 4HE

The first thing you will notice is that the screen area has been positioned a little too close to the top of the TV screen.

The second thing you will notice is the sometimes quaint structure of the English used in the pages of instructions/descriptions.

What you will not fail to notice is the complete unoriginality of the game itself, which consists of various objects being continually scrolled

towards you.

You can use either a joystick or the keyboard to move left, right and fire.

Personally I found the game a veritable confusion of objects on the screen. Why an ant? Why a flea?

Having once seen the game I certainly wouldn't take the trouble to attach a joystick.

Nor for that matter would I bother to play it again. **B.B.**

instructions	100%
playability	50%
graphics	60%
value for money	50%



Sorcerers Apprentice Commodore 64 £9.99

Phoenix, Spangles House, 116
Marsh Rd, Pinner, Middx

This company uses a novel format in that they sell double cassette sets. One cassette is an arcade-type game and the other a textual adventure. The arcade game gives clues on how to solve the adventure. These clues are obtained when you reach the end of various skill levels. You are the sorcerer's apprentice trying to stop animated brooms from filling a well. The game is graphically good but the levels were so long that it was a game of endurance rather than skill, and soon became boring. To pile on the agony, Duca's music was murdered in the background.

The adventure is a little more challenging. Your quest is to locate the spell to stop the brooms. The scenario is a slightly improbable wizard's house (I didn't know that wizards watched TV). The game has lots of problems to solve and soon makes the brain hurt.

It does have some weaknesses, one being that the interpreter only recognises the first two letters of your commands so that drain sump would be treated the same way as drop suitcase.

Overall, a fair package. **M.W.**

instructions	65%
ease of use	75%
graphics	75%
value for money	60%





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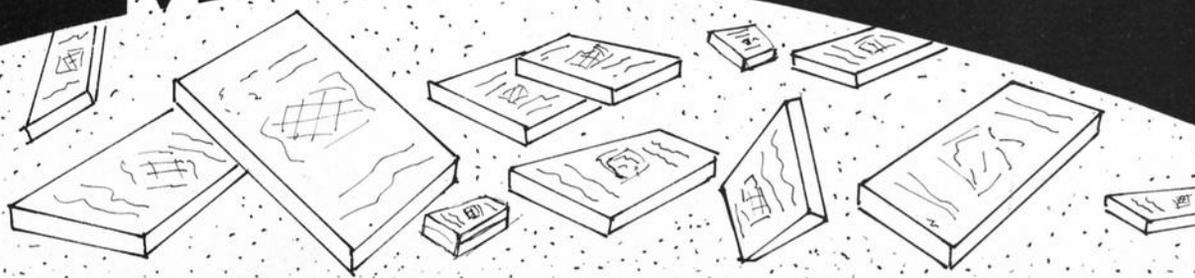
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All games described here run on the UNEXPANDED TEXAS T199/4a.

CHRISTINE



Vegetable Crash Spectrum £6.95

Kuma, 12 Horseshoe Pk, Horse-shoe Rd, Pangbourne, Berks

A simple but addictive arcade game in machine code from the Kuma stable especially for gardening fanatics.

A fair loading screen leads us to the instructions — a nice idea — and then to the game itself. Screen top has score and hi-score in computer type above a five-row formation of vegetables, which fly down to attack you, squirting seeds. Your only defence is three guns firing fork missiles. As you shoot the vegetables new ones arrive from the top. When the screen is emptied a new formation

appears and screen two is recorded bottom right. Hit a radish — or is it a turnip? — in mid-attack and you receive a healthy bonus score.

Kuma has produced a game that youngsters will enjoy until zapping and scoring become boring — then, because there is nothing new, it will be discarded. The use of sound is fair, but not brilliant, as is the use of colour and graphics.

There needs to be more than one good idea in a game — in this case seed-squirting vegetables — for it to catch on. T.W.

instructions	80%
playability	70%
graphics	65%
value for money	50%



Millionaire 48K Spectrum £5.50

A program for budding entrepreneurs who would like to run a software company. Your task is to earn a million from software sales.

You start with £500 and a marketable program which may be sold to boost capital. The program runs in monthly cycles: first a graphic representation of your offices, which become more impressive as your assets grow. At the start of the game you occupy a terraced house — 24 Broad St.

Next a balance sheet shows the number of programs you have on the market, sales, stock, rates, assets and money borrowed. Then a sales graph is drawn, followed by a news sheet. You must now decide on the month's

activities: programming, 'seeing Honest Harry, selling to dealers, converting programs, obtaining a loan or selling out...

You will be asked for advertising expenditure and how many cassettes you wish to have duplicated. Periodically you are asked what makes a good program: this is very important.

This is all well presented and very addictive, offering excellent value for money. I think it will take a while for the player to make his million — my highest is only £50,000 and I only moved house once to a nice detached house — 16 The Avenue. J.S.

instructions	80%
playability	90%
display	80%
value for money	90%



3D Lunattack 48K Spectrum £7.95

Hewson, Hewson House, 56B Milton Trading Estate, Milton, Abingdon, Oxon OX14 4RX

This is the second of a trilogy of 3D games featuring the Great Seiddab Empire. You must save mankind from imminent destruction by destroying the Seiddab command base on the moon.

The game is played from the cockpit of your Z5 Luna Hover Fighter. Craters rush towards your ship at an alarming speed and then the first wave of defence appears: Dab Tanks firing Ytsan missiles. Next, you fly across a mountainous mined area. If you survive this, you enter the final zone: silos firing Hewstron missiles. At last you reach the heavily armed command base which can take several hits to destroy.

The instructions are very good although they don't explain the choice of control keys fully. There is also an appalling sound track — a James Bond style briefing. This is also available on the Currah Micro-speech unit.

This is an excellent program — the 3D graphics are stunning and it is highly addictive. It's not easy though. I spent a long time plummeting to the ground before I even saw the base. I have yet to destroy it. J.S.

instructions	85%
playability	85%
graphics	95%
value for money	60%



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Zigzag 48K Spectrum £6.95

DK'tronics, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ

3D graphics seem to be the vogue among the smaller software houses while the larger ones are concentrating on animation. Usually 3D games have great visual impact but are much less addictive, as much of the program is concerned with display rather than with playability. Unfortunately, Zigzag is no exception.

This is a 3D maze game consisting of six sectors: you must rid each sector of the Scarabaqs — peculiar limpet-like things with legs — before you

can enter the next one. You must watch out for the Hoverdroids who will zap your energy. That's all there is to it.

Your time is spent either searching endless corridors or chasing a Scarabaq into a blind alley. There's no alien or missile dodging like most arcade games. The only danger is the loss of energy, but you will be totally bored before then.

The inlay card boasts a special rapid loading system: that ought to fool the pirates for a while.

It's a boring game even if the graphics are nice. J.S.

instructions	80%
playability	20%
graphics	80%
value for money	25%



Ad Astra 48K Spectrum £5.95

Gargoyle Games, 4 North Western Arcade, Birmingham B2 5LH

There's a bug in this program. The inlay card boasts 'out of this world explosions'; they certainly are the best I've seen, but... they don't work: an image of your ships appears just below. This is just about acceptable except that when your ship is at the bottom of the screen the program crashes.

You are a member of the Deep Space Patrol and must rid the galaxy of enemy ships, while dodging massive, rotating moons. This is as far as I can get before an enemy catches me at the bottom of the screen and the program crashes. However, it appears there are other aliens, mines and mine layers and inter-stellar debris.

The graphics are third party 3D, i.e. you see your ship on the screen in front of you, instead of a cockpit view. Thus, your ship, rather than the display, moves when you change direction. This destroys the realism.

This would be a reasonable program if it weren't for the bug. I hope Gargoyle Games have ironed it out — it seems only a simple mistake. I would advise anyone wishing to buy this game to ask for a demonstration first. (The ratings assume the bug has been corrected.) J.S.

instructions	90%
playability	65%
graphics	95%
value for money	65%



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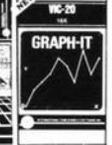
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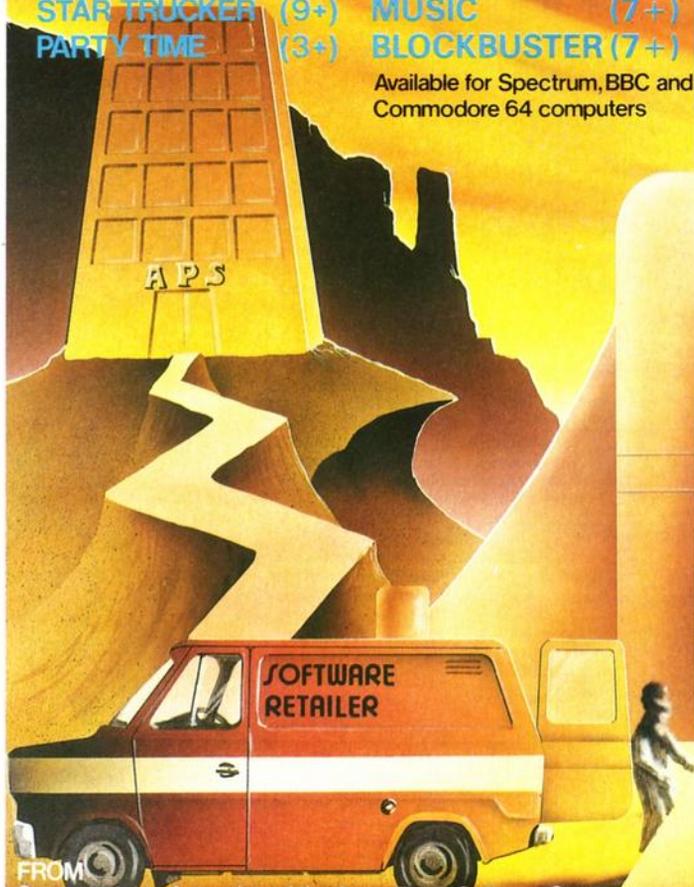
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Listing 1 — this must be entered first

```

10 REM ** SNAKES & LADDERS **
20 REM ** A computerised version for the Acorn Electr
on / BBC micro model B **
30 REM ** S.W. Lucas      1984 **
40 REM ** This part must be used to load the main p
rogram because it defines the characters and envelopes
**
50 ENVELOPE1,1,-7,7,0,10,10,0,126,0,0,-126,126,126
60 ENVELOPE2,1,1,0,0,200,0,0,126,0,0,-126,126,126
70 ENVELOPE3,1,36,-36,0,20,20,0,126,0,0,-126,126,12
6
80 ENVELOPE4,4,-1,1,0,20,20,0,126,0,0,-126,126,126
90 REM DISABLE ESCAPE (O.S. 1.2)
100 *FX229,1
110 REM DISABLE BREAK
120 *KEY 10 OLD:M RUN:M
130 COLOUR1
140 MODE1:COLOUR131:COLOUR1:PRINTTAB(10,2)"Snakes and
Ladders"
150 COLOUR130:PRINTTAB(10,10)"<C> 1984 S.W. Lucas"
160 COLOUR129:COLOUR2:PRINT""This is a version of t
he familiar board game for two players.
"
170 COLOUR132:PRINT""In this version, the computer w
ill be your opponent and before you can move up a l
adder, you will be given a question to answer."
180 FORX=1018:READY: SOUND1,-15,Y,3:NEXTX
190 COLOUR131:COLOUR1:PRINT"Please wait for the main
program to load"
200 VDU23,230,195,195,195,255,195,195,255,195
210 VDU23,231,2,14,30,58,251,111,199,7
220 VDU23,232,0,0,0,0,0,0,128,128
230 VDU23,233,0,0,0,0,7,15,28,63
240 VDU23,234,0,0,0,0,0,248,252,286,63
250 VDU23,235,195,255,195,255,195,255,195,195
260 VDU23,236,0,0,0,0,0,1,1,0
270 VDU23,237,192,224,224,244,192,128,192,96
280 VDU23,238,28,15,8,24,16,16,16,0
290 VDU23,239,14,252,4,6,2,2,2,0
300 VDU23,240,96,124,44,6,6,6,3,3
310 VDU23,241,0,1,2,2,2,1,0,0,0
320 VDU23,242,0,224,16,16,16,224,0,0
330 VDU23,243,2,7,4,13,4,4,7,1
340 VDU23,244,168,252,4,86,68,4,252,240
350 VDU23,245,0,31,31,31,31,31,31,29
360 VDU23,246,224,255,191,191,191,255,255,247
370 VDU23,247,25,25,25,27,27,27,3,3
380 VDU23,248,243,179,243,251,27,27,24,24
390 VDU23,249,3,3,3,3,3,63,33,63
400 VDU23,250,24,24,24,24,24,31,17,31
410 VDU23,255,255,255,255,255,255,255,255,255
420 REM LADDER = VDU230,10,8,235
430 REM SNAKE = VDU231,232,10,8,8,236,237,10,8,240
440 REM OCTOPUS = VDU233,234,10,8,8,238,239
450 REM MONSTER = VDU243,244,10,8,8,245,246,10,8,8,24
7,246,10,8,8,249,250
460 DATA53,61,53,61,53,69,53,69,101,97,89,81,73,69,61
,53,61,53
470 REM USERS WHO HAVE BOTH DISC AND ECONET FITTED S
HOULD CHANGE THIS LINE TO PAGE=&1900 SO THAT IT WILL R
UN FROM DISC
480 CHAIN""

```

That family favourite, Snakes and Ladders, written for the BBC and Electron computers by Steve Lucas

This is a computerised version of the familiar board game in which the object is to move your piece to the top right hand location on the board. Your opponent is the computer.

If you land on a snake, you will move down and if you land on a ladder you will move up.

If, however, you land on a square which has both snake and a ladder you will be given a simple sum to do and, depending on your answer, you will move up or down.

The computer cheats... it always moves up!

Listing 1 defines the characters and envelopes and gives brief instructions and CHAINs the main program, Listing 2.

• Disc users see line 470 of Listing 1

Listing 2 — CHAINED by Listing 1

```

10 REM ** LADDERS - part 2 of Snakes and Ladders **
20 REM ** S.W. Lucas      1984 **
30 ON ERROR RUN
40 MODE1:=1:UZ:=0:VZ:=0:VDU19,0,7,0,0,0,19,1,6,0,0,0
,19,2,1,0,0,0,19,3,4,0,0,0:GCOLOR1:FORX=0TO800STEP300:
FORX=0TO800STEP300
50 MOVEZX,150+YZ:MOVEVX,YZ:PLOTBS, XZ+150,150+YZ:PLD
TBS, XZ+150, YZ:MOVEZX+150, YZ+150:MOVEVX+150, YZ+300:PLDTB
5, XZ+300, YZ+150:PLOTBS, XZ+300, YZ+300:NEXTX, YZ
60 MOVE0,0:DRAW#00,0:DRAW#00,900:DRAW0,900:DRAW0,0
70 VDUS:GCOLOR,2:MOVE620,100:PRINT1:MOVE640,250:PRINT
12:MOVE640,400:PRINT13:MOVE640,550:PRINT24:MOVE640,700:
PRINT25:MOVE640,860:PRINT36:VDU4
80 PRINTTAB(29,30)"Start";:PRINTTAB(29,6)"End":PROC5
1
90 PROCman(0,1024,3):PRINTTAB(6,1)"Snakes & Ladders"
:PROCman(800,1024,3)
100 TIME=0:REPEAT UNTILTIME=100::PRINTTAB(6,1)SPC(16)
:PRINTTAB(34,8)"You":PROCcrab(1280,800,2):PRINTTAB(35,1
0)"Me":PROCman(1200,700,2)
110 REPEAT:PROCme
120 IFVZ>1THENPROCerase(825,140,0)
130 IFVZ=36THEN180
140 PRINTTAB(30,22)"HIT A KEY":A=BET:PRINTTAB(30,22)S

```

How it works

50-80 define envelopes
100-120 disable break and escape keys
130-180 instructions
190-460 define user-defined characters
460 DATA for music
480 LOADS main program

```

PC10
150 PROCyou
160 IFUX>1THENPROCerase (750,140,0)
170 PRINTTAB (30,22)"HIT A KEY":A=GET:PRINTTAB (30,22)S
PC10
180 UNTILUX>3SORVZ>35
190 IFUX>35THENPROCwin ELSEPROClose
200 END
210 DEFPROCsnake (XZ,YZ,Z)
220 VDUS:GCOL0,ZZ:MOVEXZ,YZ:VDU231,232,10,8,8,236,237
,10,8,240,4:ENDPROC
230 DEFPROCadder (XZ,YZ)
240 VDUS:GCOL0,2Z:MOVEXZ,YZ:VDU230,10,8,235,4:ENDPROC
250 DEFPROCman (XZ,YZ,ZZ)
260 VDUS:MOVEXZ,YZ:GCOL0,ZZ:VDU243,244,10,8,8,245,24
6,10,8,8,247,248,10,8,8,249,250,4:ENDPROC
270 DEFPROCsl
280 RESTORE360:FORX=1TO11:READXZ,YZ:PROCsnake (XZ,YZ,2
):NEXT

```

```

570 IFP%=0THENPROCdown ELSEIFP%=1THENPROCup
580 IFP=1ORQ=1THENRESTORE600:FORX=1TOUX:READXZ,YZ:NE
X:PROCerase (XZ,75,YZ,Z):RESTORE600:FORX=1TOY:READXZ,Y
Z:NEXT:PROCcrab (XZ,YZ,Z):UX=Y:PROCS1
590 ENDPROC
600 DATA825,140,675,140,525,140,375,140,225,140,75,14
0,75,290,225,290,375,290,525,290,675,290,825,290,825,44
0,675,440,525,440,375,440,225,440,75,440,75,590,225,590
,375,590,525,590,675,590,825,590
610 DATA825,740,675,740,525,740,375,740,225,740,75,74
0,75,890,225,890,375,890,525,890,675,890,825,890
620 DATA75,740,825,890,675,890,525,890,375,890,225,89
0,75,890
630 DEFPROCch
640 P=1:IFY=3THENY=10 ELSEIFY=8THENY=20 ELSEIFY=14THE
NY=23 ELSEIFY=18THENY=31 ELSEIFY=22THENY=27 ELSEIFY=25T
HENY=36 ELSEP=0
650 Q=1:IFY=8THENY=4 ELSEIFY=14THENY=12 ELSEIFY=15THE
NY=2 ELSEIFY=29THENY=21 ELSEIFY=34THENY=23 ELSEQ=0

```

Snakes alive! Will you win against your computer?

```

290 FORYZ=480TO800STEP50:PROC1adder (20,YZ):NEXT:FORYZ
=300TO560STEP50:PROC1adder (170,YZ):NEXT:FORYZ=700TO800S
TEP50:PROC1adder (770,YZ):NEXT:FORYZ=100TO200STEP50:PROC
1adder (470,YZ):NEXT
300 FORYZ=400TO500STEP50:PROC1adder (620,YZ):NEXT:FOR
Y=550TO650STEP50:PROC1adder (470,YZ):NEXT
310 ENDPROC
320 DEFPROCerase (XZ,YZ,ZZ)
330 VDUS:GCOL2,ZZ:MOVEXZ,YZ:VDU255,255,10,8,8,255,255
,10,8,8,255,255,10,8,8,255,255,4:ENDPROC
340 DEFPROCcrab (XZ,YZ,ZZ)
350 VDUS:MOVEXZ,75,YZ:GCOL0,ZZ:VDU233,234,10,8,8,238,
239,4:ENDPROC
360 DATA270,190,500,800,550,720,600,640,550,350,600,2
70,650,190,180,720,230,640,260,560,730,350
370 DEFPROCme
380 PROCsl:IFVZ=10RVZ=30RVZ=50RVZ=70RVZ=90RVZ=110RV
Z=130RVZ=150RVZ=170RVZ=190RVZ=210RVZ=230RVZ=250RVZ=270RV
Z=290RVZ=310RVZ=330RVZ=350RVZ=370RVZ=390RVZ=410RVZ=430
RVZ=450RVZ=470RVZ=490RVZ=510RVZ=530RVZ=550RVZ=570RVZ=590
RVZ=610RVZ=630RVZ=650RVZ=670RVZ=690RVZ=710RVZ=730RVZ=750
RVZ=770RVZ=790RVZ=810RVZ=830RVZ=850RVZ=870RVZ=890RVZ=910
RVZ=930RVZ=950RVZ=970RVZ=990RVZ=1010RVZ=1030RVZ=1050RVZ=1070
RVZ=1090RVZ=1110RVZ=1130RVZ=1150RVZ=1170RVZ=1190RVZ=1210RVZ=1230RVZ=1250RVZ=1270RVZ=1290RVZ=1310RVZ=1330RVZ=1350RVZ=1370RVZ=1390RVZ=1410RVZ=1430RVZ=1450RVZ=1470RVZ=1490RVZ=1510RVZ=1530RVZ=1550RVZ=1570RVZ=1590RVZ=1610RVZ=1630RVZ=1650RVZ=1670RVZ=1690RVZ=1710RVZ=1730RVZ=1750RVZ=1770RVZ=1790RVZ=1810RVZ=1830RVZ=1850RVZ=1870RVZ=1890RVZ=1910RVZ=1930RVZ=1950RVZ=1970RVZ=1990RVZ=2010RVZ=2030RVZ=2050RVZ=2070RVZ=2090RVZ=2110RVZ=2130RVZ=2150RVZ=2170RVZ=2190RVZ=2210RVZ=2230RVZ=2250RVZ=2270RVZ=2290RVZ=2310RVZ=2330RVZ=2350RVZ=2370RVZ=2390RVZ=2410RVZ=2430RVZ=2450RVZ=2470RVZ=2490RVZ=2510RVZ=2530RVZ=2550RVZ=2570RVZ=2590RVZ=2610RVZ=2630RVZ=2650RVZ=2670RVZ=2690RVZ=2710RVZ=2730RVZ=2750RVZ=2770RVZ=2790RVZ=2810RVZ=2830RVZ=2850RVZ=2870RVZ=2890RVZ=2910RVZ=2930RVZ=2950RVZ=2970RVZ=2990RVZ=3010RVZ=3030RVZ=3050RVZ=3070RVZ=3090RVZ=3110RVZ=3130RVZ=3150RVZ=3170RVZ=3190RVZ=3210RVZ=3230RVZ=3250RVZ=3270RVZ=3290RVZ=3310RVZ=3330RVZ=3350RVZ=3370RVZ=3390RVZ=3410RVZ=3430RVZ=3450RVZ=3470RVZ=3490RVZ=3510RVZ=3530RVZ=3550RVZ=3570RVZ=3590RVZ=3610RVZ=3630RVZ=3650RVZ=3670RVZ=3690RVZ=3710RVZ=3730RVZ=3750RVZ=3770RVZ=3790RVZ=3810RVZ=3830RVZ=3850RVZ=3870RVZ=3890RVZ=3910RVZ=3930RVZ=3950RVZ=3970RVZ=3990RVZ=4010RVZ=4030RVZ=4050RVZ=4070RVZ=4090RVZ=4110RVZ=4130RVZ=4150RVZ=4170RVZ=4190RVZ=4210RVZ=4230RVZ=4250RVZ=4270RVZ=4290RVZ=4310RVZ=4330RVZ=4350RVZ=4370RVZ=4390RVZ=4410RVZ=4430RVZ=4450RVZ=4470RVZ=4490RVZ=4510RVZ=4530RVZ=4550RVZ=4570RVZ=4590RVZ=4610RVZ=4630RVZ=4650RVZ=4670RVZ=4690RVZ=4710RVZ=4730RVZ=4750RVZ=4770RVZ=4790RVZ=4810RVZ=4830RVZ=4850RVZ=4870RVZ=4890RVZ=4910RVZ=4930RVZ=4950RVZ=4970RVZ=4990RVZ=5010RVZ=5030RVZ=5050RVZ=5070RVZ=5090RVZ=5110RVZ=5130RVZ=5150RVZ=5170RVZ=5190RVZ=5210RVZ=5230RVZ=5250RVZ=5270RVZ=5290RVZ=5310RVZ=5330RVZ=5350RVZ=5370RVZ=5390RVZ=5410RVZ=5430RVZ=5450RVZ=5470RVZ=5490RVZ=5510RVZ=5530RVZ=5550RVZ=5570RVZ=5590RVZ=5610RVZ=5630RVZ=5650RVZ=5670RVZ=5690RVZ=5710RVZ=5730RVZ=5750RVZ=5770RVZ=5790RVZ=5810RVZ=5830RVZ=5850RVZ=5870RVZ=5890RVZ=5910RVZ=5930RVZ=5950RVZ=5970RVZ=5990RVZ=6010RVZ=6030RVZ=6050RVZ=6070RVZ=6090RVZ=6110RVZ=6130RVZ=6150RVZ=6170RVZ=6190RVZ=6210RVZ=6230RVZ=6250RVZ=6270RVZ=6290RVZ=6310RVZ=6330RVZ=6350RVZ=6370RVZ=6390RVZ=6410RVZ=6430RVZ=6450RVZ=6470RVZ=6490RVZ=6510RVZ=6530RVZ=6550RVZ=6570RVZ=6590RVZ=6610RVZ=6630RVZ=6650RVZ=6670RVZ=6690RVZ=6710RVZ=6730RVZ=6750RVZ=6770RVZ=6790RVZ=6810RVZ=6830RVZ=6850RVZ=6870RVZ=6890RVZ=6910RVZ=6930RVZ=6950RVZ=6970RVZ=6990RVZ=7010RVZ=7030RVZ=7050RVZ=7070RVZ=7090RVZ=7110RVZ=7130RVZ=7150RVZ=7170RVZ=7190RVZ=7210RVZ=7230RVZ=7250RVZ=7270RVZ=7290RVZ=7310RVZ=7330RVZ=7350RVZ=7370RVZ=7390RVZ=7410RVZ=7430RVZ=7450RVZ=7470RVZ=7490RVZ=7510RVZ=7530RVZ=7550RVZ=7570RVZ=7590RVZ=7610RVZ=7630RVZ=7650RVZ=7670RVZ=7690RVZ=7710RVZ=7730RVZ=7750RVZ=7770RVZ=7790RVZ=7810RVZ=7830RVZ=7850RVZ=7870RVZ=7890RVZ=7910RVZ=7930RVZ=7950RVZ=7970RVZ=7990RVZ=8010RVZ=8030RVZ=8050RVZ=8070RVZ=8090RVZ=8110RVZ=8130RVZ=8150RVZ=8170RVZ=8190RVZ=8210RVZ=8230RVZ=8250RVZ=8270RVZ=8290RVZ=8310RVZ=8330RVZ=8350RVZ=8370RVZ=8390RVZ=8410RVZ=8430RVZ=8450RVZ=8470RVZ=8490RVZ=8510RVZ=8530RVZ=8550RVZ=8570RVZ=8590RVZ=8610RVZ=8630RVZ=8650RVZ=8670RVZ=8690RVZ=8710RVZ=8730RVZ=8750RVZ=8770RVZ=8790RVZ=8810RVZ=8830RVZ=8850RVZ=8870RVZ=8890RVZ=8910RVZ=8930RVZ=8950RVZ=8970RVZ=8990RVZ=9010RVZ=9030RVZ=9050RVZ=9070RVZ=9090RVZ=9110RVZ=9130RVZ=9150RVZ=9170RVZ=9190RVZ=9210RVZ=9230RVZ=9250RVZ=9270RVZ=9290RVZ=9310RVZ=9330RVZ=9350RVZ=9370RVZ=9390RVZ=9410RVZ=9430RVZ=9450RVZ=9470RVZ=9490RVZ=9510RVZ=9530RVZ=9550RVZ=9570RVZ=9590RVZ=9610RVZ=9630RVZ=9650RVZ=9670RVZ=9690RVZ=9710RVZ=9730RVZ=9750RVZ=9770RVZ=9790RVZ=9810RVZ=9830RVZ=9850RVZ=9870RVZ=9890RVZ=9910RVZ=9930RVZ=9950RVZ=9970RVZ=9990RVZ=10010RVZ=10030RVZ=10050RVZ=10070RVZ=10090RVZ=10110RVZ=10130RVZ=10150RVZ=10170RVZ=10190RVZ=10210RVZ=10230RVZ=10250RVZ=10270RVZ=10290RVZ=10310RVZ=10330RVZ=10350RVZ=10370RVZ=10390RVZ=10410RVZ=10430RVZ=10450RVZ=10470RVZ=10490RVZ=10510RVZ=10530RVZ=10550RVZ=10570RVZ=10590RVZ=10610RVZ=10630RVZ=10650RVZ=10670RVZ=10690RVZ=10710RVZ=10730RVZ=10750RVZ=10770RVZ=10790RVZ=10810RVZ=10830RVZ=10850RVZ=10870RVZ=10890RVZ=10910RVZ=10930RVZ=10950RVZ=10970RVZ=10990RVZ=11010RVZ=11030RVZ=11050RVZ=11070RVZ=11090RVZ=11110RVZ=11130RVZ=11150RVZ=11170RVZ=11190RVZ=11210RVZ=11230RVZ=11250RVZ=11270RVZ=11290RVZ=11310RVZ=11330RVZ=11350RVZ=11370RVZ=11390RVZ=11410RVZ=11430RVZ=11450RVZ=11470RVZ=11490RVZ=11510RVZ=11530RVZ=11550RVZ=11570RVZ=11590RVZ=11610RVZ=11630RVZ=11650RVZ=11670RVZ=11690RVZ=11710RVZ=11730RVZ=11750RVZ=11770RVZ=11790RVZ=11810RVZ=11830RVZ=11850RVZ=11870RVZ=11890RVZ=11910RVZ=11930RVZ=11950RVZ=11970RVZ=11990RVZ=12010RVZ=12030RVZ=12050RVZ=12070RVZ=12090RVZ=12110RVZ=12130RVZ=12150RVZ=12170RVZ=12190RVZ=12210RVZ=12230RVZ=12250RVZ=12270RVZ=12290RVZ=12310RVZ=12330RVZ=12350RVZ=12370RVZ=12390RVZ=12410RVZ=12430RVZ=12450RVZ=12470RVZ=12490RVZ=12510RVZ=12530RVZ=12550RVZ=12570RVZ=12590RVZ=12610RVZ=12630RVZ=12650RVZ=12670RVZ=12690RVZ=12710RVZ=12730RVZ=12750RVZ=12770RVZ=12790RVZ=12810RVZ=12830RVZ=12850RVZ=12870RVZ=12890RVZ=12910RVZ=12930RVZ=12950RVZ=12970RVZ=12990RVZ=13010RVZ=13030RVZ=13050RVZ=13070RVZ=13090RVZ=13110RVZ=13130RVZ=13150RVZ=13170R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660 ENDPROC
670 DEFPROC win
680 CLS:COLOUR1:PRINTTAB(10)"Well done"':COLOUR2:PR
INTTAB(12)"You win"
690 COLOUR3:PRINTTAB(0,24)"Would you like another gam
e ? <Y/N>"
700 REPEAT A$=GET$:UNTIL A$="Y":ORA$="N":IFA$="Y" THEN R
UN ELSE CLS:PRINT"GOODBYE":END
710 ENDPROC
720 DEFPROC lose
730 CLS:COLOUR2:PRINTTAB(10)"So sorry.... You lose!"
740 COLOUR3:PRINTTAB(0,24)"Would you like another gam
e ? <Y/N>"
750 REPEAT A$=GET$: UNTIL A$="Y":ORA$="N":IFA$="Y" THEN
RUN ELSE CLS:PRINT"GOODBYE":END
760 DEFPROC question
770 COLOUR3:PRINTTAB(30,15)"What is :-"
780 G=RND(5):H=RND(4):PRINTTAB(30,17);G;" + ";H;" ?"
790 REPEAT AA$=GET$:AA=VAL(AA$)
800 UNTIL AA=0 AND AA<10
810 IFAA=G+H THEN P%=1 ELSE P%=0
820 ENDPROC
830 DEFPROC down
840 P%=2:IFUZ=0 THEN Y=4 ELSE IFUZ=14 THEN Y=12 ELSE IFUZ=1
5 THEN Y=2 ELSE IFUZ=29 THEN Y=21 ELSE IFUZ=34 THEN Y=23
850 IFUZ=3 THEN Y=3 ELSE IFUZ=18 THEN Y=18 ELSE IFUZ=22 THEN
Y=22 ELSE IFUZ=25 THEN Y=25
860 SOUND1,4,30,60
870 ENDPROC
880 DEFPROC up
890 *FX21,5
900 SOUND1,2,30,30
910 IFUZ=15 THEN Y=15 ELSE IFUZ=29 THEN Y=29 ELSE IFUZ=34 TH
EN Y=34
920 P%=2:ENDPROC
    
```



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MIKRO-GEN

VIC-20 PROGRAM

score, lives and moisture left. Two features not normally found are included for ease of play:

- A carefully timed jump will clear any oncoming traffic up to

Hints on conversion

Conversion would be difficult but not impossible, given the control characters, POKE numbers and a suitable routine for scrolling the screen. The POKEs are:

646 character (cursor) colour
36878 volume
36874-36877 voices
36869,255 switches in defined characters with normal characters if reverse text is used
7680-8185 screen locations
38400-38906 equivalent colour locations
30720 difference between the above two
7168-7679 contain hi-res DATA
680-747 contain screen-split code during loading
825-895 contain screen split code after loading
300-393 contain scrolling code
1-2 contain address of line to be scrolled

```

3---CLEAR SCREEN
3---CURSOR HOME
H---CURSOR RIGHT
H---CURSOR LEFT
X---CURSOR DOWN
3---CURSOR UP
3---NORMAL CHARS
■---USER CHARS
■-----BLACK
■-----WHITE
■-RED(POUND SIGN)
▲-----CYAN
■-----PURPLE
■-----GREEN
■-----BLUE
■-----YELLOW
    
```

Your guide to the Commodore control characters used in the program

There are many hazards to face between you and your frog pond. Peter Berrecloth has packed a lot of features into Frog Runner

two characters long

- The snake will not notice you unless you move, but don't stay still for too long. Keep an eye on the timer.

As expected, a game such as this requires lots of those dreaded DATA statements. These are included in a separate program which must be LOAded first.

A checksum is included to trap errors, but no crashes will occur with the first program anyway.

How it works main program

2-3 display frog and scroll is on a log or turtle
4-5 scroll cars and logs
6-10 get key pressed
11-12 frog jump and sound
13-14 update and check timer
15-16 check for frog collisions
17-20 frog home and bonus check
21 bonus for time left
22-24 check for five frogs home and increase speed
25-26 draw snake
27-29 frog on log collision
30-32 lose a life routine
33-36 rest timer and plot random frogs
40 display score
41 countdown to start
42-48 alter layout of screen depending on level
49 relocate machine code to cassette buffer at 828-895 and start up screen-split routine
50-58 set up screen and variables
59-60 game over routine

The DATA is in three parts: user-defined characters, screen split and scroll routines. The characters are explained so that any corruption of graphics can be traced.

After the first program has been RUN successfully, SAVE it to tape.

Then type in the second part. Do not RUN it yet as line 49 could cause a fatal crash.

After entering, this part must be SAVED to tape following the first part. Many lines in the program must be abbreviated (? for PRINT and so on) to enable them to be entered. Your manual explains the abbreviations of keywords.

If the LOAding is successful, GAME OVER will appear. Hit any key to start.

I think this game contains enough features to keep it interesting. The level may be changed by altering X in line 1 of the main program. Try 50 if life is not too hard.

Look for scores of 150,000-plus, without cheating. Happy frog running.

Note: continuous RUN/STOP restoring of the program will cause errors in the machine code, so avoid this.

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Battletank 32K BBC £7.95

Superior Software, Dept C,
Ground Floor, Regent House,
Skinner Lane, Leeds LS7 1AX

This is the BBC version of the well known arcade game Battlezone. The graphics and nearly colourless display make the game look very similar.

If you've never seen Battlezone here's a description: you are the tank gunner and you must seek out and destroy the enemy tanks. You view through your periscope and find enemy tanks on your radar. On radar the enemy tank appears to jump around — this is distracting.

This game could be very good if it weren't for the movement. The area moves character by character, making sighting very difficult. Unlike the arcade game

the enemy is always the same, which becomes monotonous after a while.

Improvements such as a high score table could improve this game, and it is unusual to find a game without one. However, the graphics are good and the game is testing. I did notice one small bug: after losing a life, a flashing line sometimes appears across the bottom of the screen. This shouldn't put anyone off.

Usual superior software cover, flashy picture. Reasonable instructions, and reasonable overall. **D.B.**

instructions	80%
playability	65%
graphics	75%
value for money	75%



Positron BBC B £6.95

Micro Power, 8/8a Regent St,
Chapel Allerton, Leeds LS7 4PE

Well, once again the very old theme of Space Invaders hence no surprises. I must admit there are still plenty who want to play this type of arcade game. Just recently at a school fête one of the most popular items was the computer games and, significantly, the invader game still seemed to be raking in the money! I suspect the computer is bringing respectability to the arcade game tarnished by its association with seaside resorts and seedy amusement arcades.

So, if there's still money to be made they will still be produced. On with the game itself. This

version is very colourful and noisy. You play it from the keyboard and it's very fast. There are one or two variations: you must hit the mother ship after the final wave to be able to move on and you have no laser defences. This is no great loss.

Nice attention to detail makes this game a very good one. A high score table is included to record the top eight scores. Different invaders have imaginative names: "Spazmoid" and "Bumfluff" are two of my favourites. **M.P.**

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



Boris in the Underworld BBC 32K £7.95

Superior, Regent House, Skinner
Lane, Leeds LS7 1AX

Boris is a funny looking fellow, who has had his home raided by the creatures of the underworld. They steal most of his possessions, and the unforgiving Boris decides to venture underground in the hope of retrieving his valuables.

Boris can move in four directions and has a rapid-fire laser cannon. A joystick can be used with the game, which in my view aids play. As soon as the game starts the underworld creatures start rushing towards you, and you must start firing straight away. This is nothing like a 'shoot 'em out of the sky' game, but never the less, the creatures move like those in the legendary Space Invaders. The sound is identical and the more you shoot the harder it is to outrun them. When you have finished them all off one of Boris's possessions appears on the screen.

In the later stages, indestructible discs start appearing on the screen. This considerably slows down the process of killing the undergrounders. These and the fiery walls which close in around you make the game almost impossible. **M.B.**

instructions	70%
playability	50%
graphics	60%
value for money	60%



Game for some fun?

Our panel star-rates the latest
batch of games for the Beeb

Overdrive BBC 32K £7.95

Superior, Regent House, Skinner
Lane, Leeds LS7 1AX

It's not hard to see from the cassette inlay that this game is all about motor racing. Never having seen a racing game for the BBC, and knowing of the high standard of Superior Software products, I was eagerly looking forward to this one.

On loading, the game begins straight away. Your ultimate aim is to complete all five stages of the race and then take the world drivers' championship. To complete each stage you must finish in one of the top twelve positions, which means overtaking about 50 cars.

Your car is red, and you can accelerate, decelerate and steer

left and right.

Judging from the cover I expected to be powering around bends, and overtaking cars at lightning speeds. Instead, I found myself driving along a never ending Roman road, dodging the odd car.

Overall I was extremely disappointed with this game. I know Superior can and has produced far better than this middle-of-the-road material, if you excuse the pun. This is a very drab game from a software company of whom we have come to expect more. **M.B.**

instructions	65%
playability	40%
graphics	50%
value for money	40%



Digger BBC 32K with 1.2 O.S. £6.95

Visions, 1 Felgate Mews, Stud-
land St, London W6 9JT

Your garden is full of pests which are more interested in eating you than the grass. Equipped with a pump you can kill the pests by giving each one three quick blasts. There are two types of pests, the Red Goggle Aliens or Footas, which look like an owl, and the Green Dragons or Pubars.

You can tunnel underground, but the pests cannot. The only way they can move from tunnel to tunnel is by turning into ghosts. As the dragon moves around the tunnels it flashes for a few seconds before it breathes fire. If it is facing in your direction you will die. You can also lose a life if any of the pests catch you.

From level three onwards eight pests appear, and movement is so slow that travelling around the screen becomes a bore. From then on the difficulty never changes.

The keyboard response is sometimes terrible: I often had to press a key twice before I could make my man move.

Please remember that you can only buy this game if you have a 1.2 operating system. BBC owners who haven't will not be disappointed as they are not missing out on much. **M.B.**

instructions	80%
playability	40%
graphics	60%
value for money	50%



Dragon Cruncher Dragon 32/ Tandy Colour £7.95

Elkan Electronics, 11 Bury New Rd, Prestwich, Manchester M25 8JZ

This has got to be a mutually beneficial program for these two computers. They use the same 6809 chip and this makes it easy to convert BASIC programs from one to the other, which it does quickly and efficiently. There are only a few reservations, one being that it will ignore "machine code and the contents of REM and STRINGS".

It will allow any number of programs to be converted on one loading so long as you do not RUN the program or PCLEAR 1.

There are certainly many programs for each of the computers which can now be converted and so extend the range of available software.

A simple and effective utility that may prove a saviour for the Tandy owner who feels increasingly isolated. **M.P.**

instructions	100%
ease of use	100%
display	N/A
value for money	80%



Minitext Dragon 32 £9.95

Microplot, 19 The Earls Croft, Cheylesmore, Coventry CV3 5ES

This is an interesting utility as it has a dual purpose to fulfil as both a text editor (or small word processor) and BASIC program manipulator. It has plenty of commands, in fact probably too many to remember. They are mainly activated by pressing the 'clear' key followed by an alphabetic key with some sort of relationship to the command desired. So, for example, C centres text, L loads or joins a file to the one currently in memory and J justifies lines.

There is a command for every letter key but some are unlikely

to be used regularly and are more difficult to learn. The cursor control keys have several functions including underline on the shift/cursor up which is very simple.

The problem with editing BASIC programs is that you cannot test your changes without first saving, but this is to be expected from a word processor. Another thing that is difficult to get used to is that you don't need to press 'enter' after typing a line. If you do accidentally press that key during program editing real problems can result. **D.C.**

instructions	70%
ease of use	80%
value for money	70%



Editor/Reseq & Renum Dragon 32 £7.95/£5.95

Microplot, 19 The Earls Croft, Cheylesmore, Coventry CV3 5ES

The reason for reviewing these two programs together is that Reseq/Renum is simply a subset of Editor. These are BASIC programming utilities and allow you to manipulate programs you have recorded on tape using the CSAVE command.

The 'Reseq' command allows you to move chunks of program to a new position, valuable if you like to develop programs in small chunks ready for final assembly. 'Renum' can renumber selected program lines.

The full editor has further commands, the most useful of which is 'Merge' which will add and sort another program to the one already in memory. The 'Delete' command allows block deletion and a line joining facility helps to save memory.

There is a global search and replace facility called 'Find' and a 'Copy' facility to save retyping commonly used lines.

Its biggest failing by far is that you cannot run the program whilst editing it. You must first save to cassette and then reload to test your alterations.

I cannot really see why anyone would buy the subset tape unless they need the extra memory it leaves (just over 1K). **D.C.**

instructions	80%
ease of use	70%
value for money	70%



Make more use of your micro

Useful utilities are given the once-over by our panel of experts

Autochar File TI-99/4A £4.95

Autochar File is not a game but a valuable programming aid for those who would like to devise their own games but are put off by the work involved in setting up graphics characters.

On loading this program a box is depicted on screen with a black square in it. By using the direction keys you can move around in the box and print the square by pressing the number one key. If an alteration is required a square may be deleted by pressing the number zero key.

In this way characters may be built up and when the desired format is achieved you simply press enter and the char code is

shown. A small diagram is also displayed showing the effect the character gives when printed across the entire screen.

Additional facilities are that char codes may be saved for use at a later date, enabling the user to build an entire library of character codes.

At £4.95 I think this program is invaluable to the programmer as a great effort- and time-saving device. **D.B.**

instructions	90%
ease of use	100%
display	80%
value for money	90%



Music Synthesizer TI-99/4A £10

Norton, from Stainless, 10, Alstone Rd, Stockport, Cheshire SK4 5AM

This program, also available in TI BASIC, is in two parts. The first, quite large, program is the synthesizer, and the second enables you to play the music created by the first and stored on another tape as a series of data files. I don't know how it compares with the TI module which performs a similar task, but as an amateur musician who can't read a note it held my interest and taught me a thing or two — not very difficult.

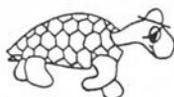
Having set up sharps and flats and chosen a tempo, you are presented with a fairly complex display consisting of the treble and bass staves; graphics representing musical notes and options for choosing one of three notes for the 'voice' with which you will 'draw' or play.

It is possible to create music using a score which you may have bought and to produce most necessary effects — you can even transpose a voice up or down. You can play all three voices or any one independently, and once edited to your satisfaction using the usual eight direction keys, you can store on tape.

There is more to this program, and it is a very useful utility for someone who wants to produce a melody but doesn't want the chore of having to learn music in any depth. **P.B.**

instructions	100%
ease of use	90%
display	95%
value for money	80%





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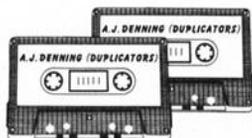
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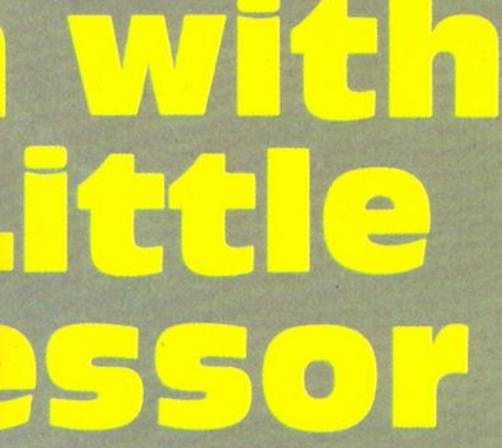
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I have found it extremely difficult to play the parts of both players: even when I do manage to remember the details of the last shots, I still seem to get confused over which was which. A beginner can even find it confusing to hear the other player thinking aloud about angles and powder.

start. This part of the program must be typed in correctly and saved.

No attempt must be made at this stage to run this part of the program unless the DATA FILE (slave) has been previously entered and ran.

Having entered both parts of the program all that remains to be done is combine the two into one working routine.

Use the following procedure:

- How it works**
Data File
 14 screen and border black
 16-28 text for data file
 30-40 DATA entry for m/c routine to save completed program (this routine can be used for your own use to save m/c files)
 42-52 DATA for hi-res character set
 54-64 DATA for sprite graphics
 66-76 DATA for screen memory map
 78-88 DATA entry for m/c routines
 90-92 check for keyboard entry
 94 clear screen
 96 check for 'N'
 98 m/c routine to save as a file between locations 32768 and 37887 inclusive
 100 m/c routine to save as a file between locations 38912 and 39361 inclusive
 102 m/c routine to display on the screen the working page for the main program
 104 check for keyboard entry
 108 cold start

- Ensure that the MASTER tape which contains the main program is fully re-wound

- LOAD proff date file (slave) into memory

- Verify master tape to establish end of MAIN PROGRAM

- RUN proff data file (slave) and when prompted to SAVE press Y and the m/c section will now be LOADED onto the master tape to produce the completed copy

- When completed self LOAD by using the SHIFT and RUN/STOP keys together.

Acknowledgements to Ken Picton, of Maesteg, South Wales, for checking this program through.

- The Little Professor is a registered trademark of Texas Instruments. Permission for publication of this mark has been obtained, but there is no connection between Texas Instruments and the program printed here. No rights are implied for further use of the trademark in any program which may subsequently be published.

The program is entered in two parts:

Part 1 PROFF DATA FILE (slave)

This provides the basic 'boot' for the user defined graphics, sprite graphics and machine code routines which are temporarily SAVED as a file at decimal address 32768.

The program must be entered and SAVED prior to running. Extreme care must be taken to ensure that the data is correct as a missed comma can make all the difference. Error trapping routines are provided where the mistake occurred.

When the program has been correctly entered it must be saved prior to running onto the SLAVE tape. The effect of the graphics can then be seen by running the program and when prompted to save press N to view the screen. Press any key to end.

Warning: SYS 64738 will cold start and erase your program so please SAVE first. You have been warned!

Part 2 MAIN PROGRAM (master)

This provides the working section of the completed program by loading the hi-res screen and machine code at the

- Variables**
- A counter to enter files from tape
 - K number of keyboard entries
 - T general counter
 - CA number of correct answers
 - CL number of figures in correct answer
 - LL length of line indicates size of answer
 - OP function selected
 - QA number of questions answered
 - QT answer to question set
 - QX, QY random values to first, second parts of question
 - RP repeat counter
 - SL range of random number
 - SU sum of question by user
 - SA screen address
 - SI, S2 character stores
 - VR use in multiplication and division
 - WR number of wrong answers
 - S home, cursor down * 25
 - RS cursor down, cursor left
 - NS(x) string to print number between 0 and 9
 - KEYS keyboard entry

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184 DTR254.199.6.254.224.224.254.0.254.6.6.62.14.14.254.0
186 DTR198.198.198.254.14.14.14.0.254.198.192.252.28.28.252.0
188 DTR254.198.192.254.230.230.254.0.254.198.12.24.56.56.0
190 DTR124.100.100.254.230.230.254.0.254.198.196.254.14.206.254.0
202 DTR4.4.4.32.0.0.24.16.32.32.30.48.16.24.0
194 DTR90.0.0.0.1.3.6.28.16.16.48.240.32.48.60.126
196 DTR90.0.0.0.1.3.7.14.0.3.31.126.240.192.0.0
200 DTR90.192.248.126.15.3.0.0.0.0.0.128.192.224.112
202 DTR96.0.12.15.5.12.68.126.0.0.0.0.128.192.96.56
204 DTR90.0.0.0.1.1.3.2.48.33.103.199.143.31.63.63
204 DTR231.227.193.192.192.192.192.192.0.128.224.120.63.15.3.1
206 DTR255.255.192.192.192.192.192.192.255.255.0.0.0.0.0.1
208 DTR255.255.0.15.56.96.192.128.255.255.0.240.28.6.3.1
210 DTR255.255.0.0.0.0.128.252.248.48.48.48.48.48.48
212 DTR93.31.12.12.12.12.12.12.255.255.3.3.3.3.3.3
214 DTR90.1.7.30.124.248.192.128.231.195.131.3.3.3.3.3
216 DTR12.132.230.227.241.248.252.252.0.0.0.128.128.192.64
218 DTR6.4.12.8.9.5.25.19.127.127.255.255.255.255.255
220 DTR128.128.128.128.128.128.128.128.192.192.192.192.192.192
222 DTR1.3.2.2.2.3.1.3.1.3.1.63.63.127.127.127
224 DTR192.248.248.252.252.254.254.254.128.192.64.64.192.128
226 DTR48.48.48.48.48.48.48.48.12.12.12.12.12.12.12
228 DTR93.3.3.3.3.3.3.1.1.1.1.1.1.1.1
230 DTR254.254.255.255.255.255.255.255.32.48.16.144.144.152.200
232 DTR19.19.19.19.19.19.19.19.192.192.192.192.192.192.255.255
234 DTR1.0.0.0.0.125.224.65.0.0.0.0.131.240
236 DTR255.255.254.252.248.224.255.255.128.0.0.0.0.255.255
238 DTR48.48.48.48.48.48.48.48.240.240.12.12.12.12.12.15.15
240 DTR93.3.3.3.3.255.255.1.1.1.1.1.1.1.1
242 DTR200.200.200.200.200.200.200.200.255.9.12.4.4.6.2
244 DTR255.255.255.255.255.127.127.63.0.128.128.128.192.64.64.96
246 DTR90.1.1.1.3.2.6.255.255.255.255.255.254.254.252
248 DTR152.144.16.48.32.36.96.64.3.1.1.0.0.0.0.0
250 DTR63.31.1.147.195.95.49.24.128.128.128.128.192.192.64
252 DTR90.0.7.15.15.7.0.0.0.128.224.240.248.254
254 DTR32.48.16.24.14.3.0.0.32.48.24.28.119.193.0.0
256 DTR90.0.0.0.128.248.15.0.0.0.0.1.31.240
258 DTR4.12.24.56.230.131.0.0.4.12.8.24.112.192.0.0
260 DTR90.0.0.1.7.15.31.127.0.0.224.240.240.224.224.192
262 DTR1.1.1.1.3.7.6.252.248.249.241.225.198.140.24
264 DTR192.128.128.0.0.0.0.15.6.3.1.0.0.0.0.0
266 DTR64.64.64.224.32.32.32.48.3.1.0.0.0.0.0.0
268 DTR255.255.255.127.63.31.15.128.224.248.254.255.255.255.255
270 DTR90.0.0.0.192.252.255.255.0.0.0.0.0.192.255
272 DTR90.0.0.0.0.3.255.0.0.0.0.3.63.255.255
274 DTR1.7.31.127.255.255.255.255.255.255.255.254.252.248.240
276 DTR192.128.0.0.0.0.0.2.2.2.7.4.4.12
278 DTR96.192.128.0.0.0.16.16.16.16.16.24.8.8
280 DTR15.3.9.8.24.16.16.16.255.255.255.127.63.15.7
282 DTR255.255.255.254.252.248.224.240.192.144.16.24.8.8.8
284 DTR6.8.8.8.24.16.16.8.8.12.4.4.6.2.0
286 DTR16.24.8.8.8.8.8.8.3.0.0.0.0.0.0
288 DTR255.255.63.31.3.0.2.3.255.255.255.255.255.255.31.1
290 DTR255.255.255.255.255.252.128.255.255.252.248.192.64.192
292 DTR192.0.0.0.0.0.0.0.24.16.16.16.16.16
294 DTR255.255.255.255.255.255.255.255.16.16.48.32.32.96.64.64
296 DTR3.1.1.1.0.0.0.0.0.128.128.128.128
298 DTR9.0.12.4.6.2.3.1.1.1.0.0.0.0.0.0
300 DTR9.128.128.192.96.24.14.0.1.1.3.6.12.24.112
302 DTR128.128.0.0.0.0.16.16.48.32.96.64.192.128
304 DTR90.0.0.1.1.1.1.192.128.128.128.128.0.0.0
306 DTR224.48.24.14.3.1.0.0.0.0.0.128.192.112
308 DTR1.1.0.0.0.0.0.128.192.64.96.48.12.12
310 DTR3.0.0.0.0.0.0.192.128.15.0.0.0.0.0
312 DTR3.30.240.0.0.0.0.192.0.0.0.0.0.0.0
314 DTR90.1.3.6.12.24.48.128.128.0.0.0.0.0
316 DTR90.0.0.0.1.3.6.7.12.24.48.192.128.0.0
318 DTR28.6.3.0.0.0.0.0.128.224.56.14.3.0
320 DTR90.0.0.0.128.224.6.3.0.0.0.0.0.0.0
322 DTR90.0.128.192.96.14.3.0.0.0.0.0.0.128
324 DTR90.0.0.0.0.1.0.0.1.3.6.28.112.192
326 DTR96.192.128.0.0.0.0.0.0.0.0.0.1.7
328 DTR90.0.1.7.25.112.192.0.56.96.192.0.0.0.0
330 DTR90.7.1.0.0.0.0.0.224.62.3.0.0.0
332 DTR90.0.0.192.126.3.0.224.56.15.0.0.252.7
334 DTR90.0.128.254.3.0.0.255.0.1.63.224.0.0.255
336 DTR7.28.240.0.0.0.63.224.0.0.0.126.192.0
338 DTR90.7.124.192.0.0.126.192.128.0.0.0.0
340 DTR255.128.128.128.128.128.128.128.128.128.128.128.128.255
342 DTR255.1.1.1.1.1.1.1.1.1.1.1.1.1.255
344 DTR255.0.0.0.0.0.0.0.0.0.0.0.0.0.255
346 DTR126.126.126.182.182.182.182.182.182.182.230.230.230.230
348 DTR230.230.230.230.230.230.230.230.254.254.254.254.0.0.0
350 DTR24.24.24.24.24.24.24.24.24.24.24.24.56.56.56.56
352 DTR56.56.56.56.56.56.56.56.56.56.56.56.56.56.56.56
354 DTR254.254.254.254.198.198.198.198.6.6.6.254.254.254.254
356 DTR224.224.224.224.224.224.224.224.254.254.254.254.0.0.0.0
358 DTR254.254.254.254.6.6.6.6.6.6.6.6.6.6.6.6.6.6
360 DTR14.14.14.14.14.14.14.14.254.254.254.254.0.0.0.0
362 DTR198.198.198.198.198.198.198.198.198.198.254.254.254.254
    
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COMMODORE 64 PROGRAM

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364 DATA14,14,14,14,14,14,14,14,14,14,0,0,0,0,0,0
365 DATA24,24,24,24,24,24,24,24,24,24,192,192,252,252,252,252
366 DATA28,28,28,28,28,28,28,28,28,28,252,252,252,252,0,0,0,0
370 DATA254,254,254,254,198,198,198,198,192,192,192,192,254,254,254,254
372 DATA230,230,230,230,230,230,230,230,254,254,254,254,0,0,0,0
374 DATA254,254,254,254,198,198,198,198,192,192,192,192,254,254,254,254
376 DATA56,56,56,56,56,56,56,56,56,56,56,56,0,0,0,0,0,0
378 DATA126,126,126,126,102,102,102,102,102,102,102,102,254,254,254,254
380 DATA230,230,230,230,230,230,230,230,254,254,254,254,0,0,0,0,0,0
382 DATA254,254,254,254,230,230,230,230,198,198,198,198,254,254,254,254
384 DATA14,14,14,14,206,206,206,206,254,254,254,254,0,0,0,0,0,0
386 DATA0,0,0,0,0,0,0,0,255,0,0,0,0,0,0,255
388 DATA255,255,255,255,254,252,248,246,245,255,255,255,255,127,63,31,15
390 DATA-1
392
394
396
398
399 REN ***** SPRITE DATA *****
400
402 DATA96,0,0,96,0,0,96,0,0,96,24,24,96,24,96,24,96
404 DATA24,24,96,0,126,96,0,126,96,0,126,96,56,24,96,56
406 DATA24,96,56,24,96,24,96,24,96,24,96,24,96,24,96,24,96
408 DATA96,24,24,96,24,126,60,14,126,60,14,126,60,14,0,0,0,0
410 DATA0,0,0,0,0,0,0,0,0,24,56,0,0,24,56,0,0,24
412 DATA24,24,96,24,24,96,14,60,60,14,60,60,14,60,60,24,96
414 DATA0,0,0,0,124,0,0,124,0,0,102,0,0,102,0,0,102
416 DATA102,102,124,60,102,124,60,102,124,60,124,102,124,102
418 DATA102,102,102,96,96,102,96,96,102,96,96,102,96,102,96,102
420 DATA96,96,102,96,96,102,96,96,102,96,96,96,96,96,96,0,0
422 DATA0,0,0,0,0,0,0,0,14,0,0,0,14,0,0,14
424 DATA0,24,60,62,24,60,62,24,60,62,62,102,62,102,62,102,62
426 DATA96,62,102,96,24,126,60,24,126,60,24,126,60,24,96,6
428 DATA24,96,6,24,96,6,24,60,60,24,60,60,24,60,60,0,0
430 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
432 DATA0,62,60,124,62,60,124,62,60,124,96,102,102,96,102,96
434 DATA102,96,102,102,60,102,96,60,102,96,60,102,96,60,102,96
436 DATA96,102,96,6,102,96,124,60,96,124,60,96,124,60,96,0,0
438 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
440 DATA24,0,0,24,96,0,24,96,0,24,96,0,24,96,0,24,96
442 DATA121,176,24,121,176,24,109,176,24,109,176,24,108,24,108,24
444 DATA108,240,24,120,96,31,120,96,31,152,0,1,152,0,1,152,0,1
446 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
448 DATA14,0,0,14,0,0,27,0,0,27,0,0,27,0,0,27,0,0
450 DATA27,109,128,31,109,128,27,124,224,27,124,224,27,96,48,27
452 DATA96,48,27,52,224,27,52,224,27,52,224,27,52,224,27,52,224
454 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
456 DATA0,0,0,0,0,113,192,0,113,192,0,48,199,158,48,199
458 DATA158,48,192,215,48,192,215,48,199,219,48,199,219,48,204,219
460 DATA48,204,219,121,231,219,121,231,219,121,231,219,121,231,219
462 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
464 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
466 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
468 DATA96,96,96,96,102,96,96,96,96,96,96,96,96,96,96,96
470 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
472 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
474 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
476 DATA0,0,0,0,0,0,0,0,96,120,96,0,108
478 DATA96,0,102,96,0,102,96,0,102,96,0,108,126,0,120,0
480 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
482 DATA0,0,0,0,0,0,0,0,60,102,126,102,118,96
484 DATA102,126,96,102,126,120,102,118,96,102,102,96,60,102,126,0
486 DATA0,0,0,0,0,0,0,0,0,0,99,0,99,0
488 DATA99,0,0,187,0,0,127,0,0,119,0,99,0,99,0
490 DATA0,0,0,0,0,0,0,0,0,126,124,102,24,102,24,102,24,0
492 DATA0,0,0,0,0,0,0,0,0,126,124,102,24,102,24,102,24,0
494 DATA0,0,0,0,0,0,0,0,124,60,102,102,118,102
496 DATA126,126,124,102,126,126,102,118,102,102,102,102,102,0,0
498 DATA0,0,0,0,0,0,0,0,0,182,102,182,102,182,102,182,0,0
500 DATA102,96,0,126,110,0,182,102,0,182,102,0,182,102,0,0
502 DATA0,0,0,0,0,0,0,0,0,60,0,60,102,0,60,102,0
504 DATA0,110,0,102,0,0,102,0,60,0,60,102,0,60,102,0
506 DATA0,0,0,0,0,0,0,0,0,24,60,102,60,24,118
508 DATA102,24,126,126,24,126,102,24,110,102,24,102,60,102,60,102,0
510 DATA0,0,0,0,0,0,0,0,0,60,60,0,102,102,0
512 DATA96,102,96,102,96,102,96,102,96,102,96,102,96,102,96,102
514 DATA0,0,0,0,0,0,0,0,0,24,102,60,0,118,102
516 DATA102,126,96,126,126,60,102,118,0,102,102,102,102,102,60,0
518 DATA0,0,0,0,0,0,0,0,0,124,126,126,102,102,102,102,102,60,0
520 DATA102,96,124,124,120,120,120,96,108,108,96,102,102,126,0,0
522 DATA0,0,0,0,0,0,0,0,0,99,126,124,99,96,102
524 DATA99,96,102,102,130,132,127,96,108,99,126,102,0
526 DATA0,0,0,0,0,0,0,0,0,60,102,0,102,24,96,0
528 DATA24,96,24,96,24,96,24,0,102,24,60,24,0,0,0,0
530 DATA0,0,0,0,0,0,0,0,0,60,60,0,24,102,0,60,60,0
532 DATA24,96,0,24,60,0,24,6,24,102,0,60,60,0,0
534 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
536 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
540 DATA102,102,102,126,102,102,102,102,102,108,108,102,120,120,0
542 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
544 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
546 DATA0,0,0,0,0,0,0,0,0,3,190,103,6,102,102
548 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
550 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
552 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
554 DATA0,0,0,0,0,0,0,0,0,159,231,159,97,134,99
556 DATA97,134,102,129,135,199,97,135,134,97,134,199,134,102,0
558 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

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560 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
562 DATA0,0,0,0,0,0,0,0,0,131,129,24,190,97,128
564 DATA102,1,129,230,1,128,102,1,128,102,97,129,99,129,128,0
566 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
568 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
570 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
572 DATA7,246,102,6,182,102,6,54,102,6,54,102,6,51,199,0
574 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
576 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
578 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
580 DATA1,129,134,1,129,135,1,127,139,1,129,134,225,131,198,0
582 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
584 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
586 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
588 DATA102,6,96,198,3,152,6,1,128,6,1,128,7,225,128,0
590 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
592 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
594 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
596 DATA0,6,97,0,6,97,0,6,97,0,6,153,0,6,153,0,6,153,0
598 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
600 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
602 DATA0,0,0,0,0,0,0,0,0,0,199,99,199,134,97,134
604 DATA134,97,134,97,134,97,134,97,134,131,133,134,133,131,199,0
606 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
608 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
610 DATA0,0,0,0,0,0,0,0,0,0,135,224,0,136,0,0
612 DATA102,0,0,102,102,0,102,0,102,0,135,224,0,0,135,224,0,0
614 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
616 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
618 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
620 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
622 DATA-1
624
626 REN ***** SCREEN MEMORY MHP *****
628
630 DATA206,210,210,210,210,210,210,210,210,210,210,210,210,210,210,210
632 DATA110,210,210,210,210,210,210,210,210,210,210,210,210,210,210
634 DATA210,210,210,210,210,210,210,210,210,210,210,210,210,210,210
636 DATA160,160,160,160,160,160,160,160,160,160,160,160,160,160,160
638 DATA160,160,160,160,160,160,160,160,160,160,160,160,160,160,160
640 DATA96,160,160,160,160,160,160,160,160,160,160,160,160,160,160
642 DATA160,160,160,160,160,160,160,160,160,160,160,160,160,160,160
644 DATA160,160,160,160,160,160,160,160,160,160,160,160,160,160,160
646 DATA160,160,160,160,160,160,160,160,160,160,160,160,160,160,160
648 DATA160,160,160,160,160,160,160,160,160,160,160,160,160,160,160
650 DATA96,32,32,160,160,160,160,160,160,160,160,160,160,160,160
652 DATA160,160,160,160,160,160,160,160,160,160,160,160,160,160,160
654 DATA160,160,160,160,160,160,160,160,160,160,160,160,160,160,160
656 DATA160,160,160,160,160,160,160,160,160,160,160,160,160,160,160
658 DATA160,160,160,160,160,160,160,160,160,160,160,160,160,160,160
660 DATA96,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32
662 DATA96,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32
664 DATA32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32
666 DATA160,160,160,160,160,160,160,160,160,160,160,160,160,160,160
668 DATA96,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32
670 DATA96,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32
672 DATA27,27,28,32,32,32,20,5,1,3,8,9,14,7,32
674 DATA1,9,4,32,6,15,18,107,86,32,32,29,30,31,33,34
676 DATA96,36,37,38,39,40,41,42,43,45,46,47,32,32,32
678 DATA15,21,14,7,32,32,32,3,8,9,12,4,10,5,14,10,18
680 DATA96,32,32,58,32,32,32,32,32,32,32,32,32,32,32,32
682 DATA32,32,32,32,59,32,32,32,32,32,32,32,32,32,32,32
684 DATA32,32,32,32,32,32,187,86,187,86,61,32,32,32,32
686 DATA32,32,63,64,65,32,32,32,32,32,32,32,32,66,67,32,25
688 DATA15,21,32,1,19,5,32,19,5,28,32,32,20,5,14,10,18
690 DATA96,68,70,71,72,73,74,75,76,77,32,32,78,73,74
692 DATA75,76,75,70,81,82,83,17,21,5,19,20,9,15,14,19
694 DATA32,32,32,32,2,25,107,86,94,85,86,32,87,88,89
696 DATA90,91,92,32,32,93,89,89,30,91,94,32,95,96,97,13
698 DATA15,5,3,20,19,14,32,15,6,28,19,8,10,7
700 DATA96,106,106,86,32,99,100,101,102,103,104,32,105,100,101
702 DATA102,103,106,102,106,106,108,6,15,12,12,15,23,9,14,7
704 DATA15,25,19,107,96,108,110,86,110,86,110,86,110,86,110
706 DATA32,32,111,32,32,112,32,32,32,32,32,32,32,107,113,114,32
708 DATA32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32
710 DATA96,115,116,117,117,118,119,121,121,122,123,124,125,32
712 DATA126,127,32,128,129,130,32,6,6,6,6,6,6,6,6,6,6,6,6
714 DATA32,32,1,4,32,32,32,32,32,32,32,32,32,32,32,32,32
716 DATA35,136,137,32,138,139,140,141,142,32,32,143,144,32,32
718 DATA99,99,99,99,19,21,2,20,10,1,3,28,10,1,3,28,10,1,3,28
720 DATA99,32,145,32,32,146,147,148,160,160,160,160,160,148
722 DATA149,32,32,150,32,32,32,32,32,6,93,32,32,13,21,12
724 DATA90,9,16,12,25,32,32,107,86,32,32,151,32,32,152
726 DATA153,154,32,284,285,156,157,158,159,32,32,161,32,32,32
728 DATA32,6,85,32,32,32,4,9,21,9,4,5,3,32,32,107
730 DATA96,32,32,162,163,32,32,164,32,32,165,166,32,167,168,32
732 DATA169,32,32,170,171,32,32,32,32,32,32,32,32,32,32,32
734 DATA32,32,32,32,32,32,107,86,32,32,32,32,172,173,32,174
736 DATA175,32,176,177,178,179,32,180,181,32,182,183,32,32,32
738 DATA32,19,11,9,12,32,32,19,5,22,5,12,32,32,107
740 DATA96,32,32,194,196,196,197,198,199,32,200,200,200,200,200,200
742 DATA199,194,195,32,32,32,32,32,32,32,32,211,211,211,211,211
744 DATA211,211,211,211,32,32,32,107,86,32,32,32,32,32,32,32,196
746 DATA197,198,199,200,201,200,203,204,205,32,32,32,32,32,32
748 DATA32,32,86,49,32,89,15,32,87,107,32,32,32,107
750 DATA207,211,211,211,211,211,211,211,211,211,211,211,211,211,211
752 DATA211,211,211,211,211,211,211,211,211,211,211,211,211,211,211
754 DATA253,253,253,211,211,211,211,209
756 DATA-1
758
760 REN ***** I/O ROUTINE FOR DATA TRANSFER *****
762
764 DATA169,48,133,52,133,56,162,0,189,0,126,157,0,48,189,0
766 DATA129,157,49,189,0,130,157,0,50,189,0,131,157,0,51
768 DATA189,0,132,157,0,52,189,0,133,157,0,53,189,0,134,157
770 DATA54,189,0,135,157,0,55,189,0,136,157,0,56,189,0,137
772 DATA137,157,0,57,189,0,138,157,0,58,189,0,139,157,0,59
774 DATA189,0,140,157,0,60,189,0,141,157,0,61,189,0,142,157
776 DATA62,240,3,76,6,152,169,240,3,76,6,152,169,240,3,76
778 DATA24,288,162,0,189,0,144,157,0,6,189,250,144,157,250,4
780 DATA189,244,145,157,244,5,189,230,146,157,238,6,169,6,167,0,0
782 DATA162,0,159,32,187,47,157,87,5,157,87,5,157,87,5,162,0
784 DATA16,152,162,0,169,14,157,43,216,157,83,216,157,123,216,157
786 DATA163,216,157,203,216,157,244,216,232,244,24,240,3,76,166,152
788 DATA169,14,141,32,288,169,15,141,33,288,169,67,141,1,286,141
790 DATA208,141,5,208,141,7,208,141,9,208,141,11,208,141,13
792 DATA208,141,15,208,169,60,141,0,208,169,84,1,2,208,169,132
794 DATA14,1,208,169,156,141,6,208,169,180,141,0,208,169,236,141
796 DATA180,180,180,180,141,12,208,169,238,141,1,208,169,284,141
798 DATA97,29,208,232,224,8,240,3,76,16,153,169,255,141,21,208
800 DATA169,162,14,16,288,162,0,160,224,152,157,246,7,208,232,224
802 DATA248,3,76,41,153,169,0,141,23,208,141,23,208,141,23,208,141
804 DATA62,0,159,32,187,47,157,87,5,157,87,5,157,87,5,167,0,0
806 DATA157,287,5,157,247,5,157,31,6,157,7,16,157,11,6,157
808 DATA151,6,157,191,6,157,231,6,157,15,7,157,15,7,157,15,7
810 DATA157,157,157,157,234,234,234,234,234,234,234,234,234,234,234
812 DATA3,74,152,83,264,1,146,214,146,214,146,214,146,214,146,214
814 DATA173,0,148,141,253,7,173,1,146,214,146,214,146,214,146,214
816 DATA255,7,173,3,148,141,1,208,141,1,208,141,1,208,141,1,208,141
818 DATA48,141,44,208,141,45,208,141,46,208,141,47,208,141,48,208
820 DATA96,-1

```

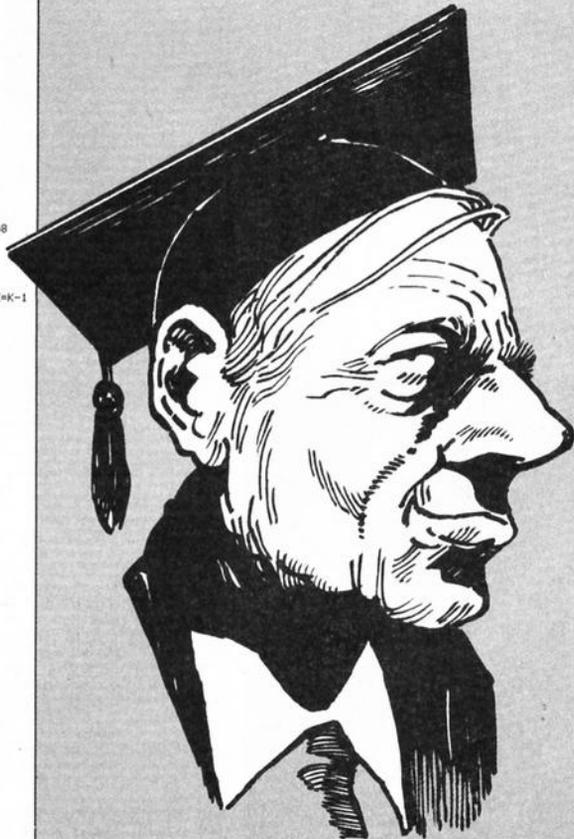
Here's proof for the family that your computer doesn't spend all its time on games. Les Allen's two-part program for the Commodore 64 uses sophisticated graphics to ask arithmetic questions

COMMODORE 64 PROGRAM

Little Professor main program

```
10 REM ***** LITTLE PROFESSOR MAIN PROGRAM *****
11
12 PRINTCHR$(147);CHR$(5)"LITTLE PROFESSOR" POKES3280,0 POKES3281,0
13 IFPEEK(52)=10 THENG24
14 IF#0 THEN#1 FORT=1 TO2500: NEXT
20 IF#1 THEN#2 LOAD"PROFF.DAT",1,1
22 IF#2 THEN#3 LOAD"PROFF.D",1,1
24 FORT=1 TO25: R#=#CHR$(17): NEXT R#;CHR$(19)+#R#
26 R#;CHR$(17)+CHR$(157)
28 S#=#CHR$(32)+#R#;CHR$(32)+#R#;CHR$(32)+#R#;CHR$(32)
30 N#(0)=CHR$(19)+CHR$(212)+#R#;CHR$(212)+#R#;CHR$(214)+#R#;CHR$(215)
32 N#(1)=CHR$(19)+CHR$(216)+#R#;CHR$(217)+#R#;CHR$(218)+#R#;CHR$(219)
34 N#(2)=CHR$(19)+CHR$(220)+#R#;CHR$(221)+#R#;CHR$(222)+#R#;CHR$(223)
36 N#(3)=CHR$(19)+CHR$(224)+#R#;CHR$(225)+#R#;CHR$(226)+#R#;CHR$(227)
38 N#(4)=CHR$(19)+CHR$(228)+#R#;CHR$(229)+#R#;CHR$(230)+#R#;CHR$(231)
40 N#(5)=CHR$(19)+CHR$(232)+#R#;CHR$(233)+#R#;CHR$(234)+#R#;CHR$(235)
42 N#(6)=CHR$(19)+CHR$(236)+#R#;CHR$(237)+#R#;CHR$(238)+#R#;CHR$(239)
44 N#(7)=CHR$(19)+CHR$(240)+#R#;CHR$(241)+#R#;CHR$(242)+#R#;CHR$(243)
46 N#(8)=CHR$(19)+CHR$(244)+#R#;CHR$(245)+#R#;CHR$(246)+#R#;CHR$(247)
48 N#(9)=CHR$(19)+CHR$(248)+#R#;CHR$(249)+#R#;CHR$(250)+#R#;CHR$(251)
50 SYS36912: R#=#0
52 SR=1689: S1=# S2=#49
54 GETKEY: IFKEY#C="" THENOP=ASC(KEY#)
56 IFRP=5 THENSR=1689: S1=#32: S2=#32: S3=#49
58 IFRP=10 THENSR=16: S2=#49
60 IFRP=15 THENSR=1729: S1=#32: S2=#32: S3=#51
62 IFRP=20 THENSR=16: S2=#51
64 IFRP=25 THENSR=1769: S1=#32: S2=#32: S3=#53
66 IFRP=30 THENSR=16: S2=#53
68 IFRP=35 THENSR=1809: S1=#32: S2=#32: S3=#55
70 IFRP=40 THENSR=16: S2=#55: R#=#0
72 POKESR,S1 POKESR+1,S2
74 IFOP(1330RPT)=13 THENR#=#R+1: GOT054
76 POKESR,6 POKESR+1,S3: R#=#0
78 IFRP=37891,44: POKES37892,6: POKES37893,224
80 IFRP=133 THENP=POKE37888,231: POKES37889,241: POKES37890,251
82 IFRP=134 THENP=POKE37888,242: POKES37889,243: POKES37890,244
84 IFRP=135 THENP=POKE37888,245: POKES37889,246: POKES37890,247
86 IFRP=136 THENP=POKE37888,248: POKES37889,249: POKES37890,250
88 GETKEY: SL=VAL(KEY#)
90 IFRP=10 THENPOKE1972,32: POKES1974,32: POKES1975,32: POKES1976,32
92 IFRP=20 THENPOKE1972,49: POKES1974,20: POKES1975,10: POKES1976,10
94 IFKEY#="" ORSL(10RSL)=9 THENR#=#R+1: GOT088
96
100 REM ***** RANDOM NUMBERS *****
102 CR#=#0#0#0: V#=#SL: W#=#0: IFOP=1330RPT=134 THENV#=#1
104 SK=#0: ISOR=(SL): OS=#INT(SL/3)
106 OS=#INT(RND(1)*SK)
108 OS=#INT(RND(1)*SK)/V#*+1
110 IFOP=133 THENOT#OS+OV
112 IFOP=134 THENOT#OS+OV: IFOT#0 THEN#06
114 IFOP=135 THENOT#OS+OV
116 IFOP=136 THENOT#INT(OS/OV): OS#OV#OT
118 OS#OS+1: IFOP#10 THENG22
120 CL=LEN(STR#(OT)): LL=CL#2-3
122 SYS39232: SYS39312
124 REM ***** PRINT X *****
126
128 X=#: L1=#LL: X#0#0: Y#=#0: XT=#0
130 X#OV
132 X1=#(INT(X/10)*10): X#(X-X1): L1#(X-X1): IFX#0 THEN#132
134 PRINTLEFT$(R#,10)SPC(33+OS-X#2)CHR$(31)X#(X1): IFX#0 THEN#132
136
138 REM ***** PRINT Y *****
140
142 Y#OV
144 Y1=#(INT(Y/10)*10): Y#(Y-Y1): L1#(Y-Y1)
146 PRINTLEFT$(R#,15)SPC(33+OS-Y#2)N#(Y1): IFY#0 THEN#144
148 PRINTLEFT$(R#,19)SPC(32+OS-L1)CHR$(18)CHR$(210): L1#L1-1: IFL1#0 THEN#148
150
152 REM ***** KEYBOARD ENTRY *****
154
156 POKES198,0
158 GETKEY#
160 IFKEY#=#CHR$(20)+RND(0) THENPRINTLEFT$(R#,20)SPC(33+OS-K#2)CHR$(146)S#K#K-1
162 IFKEY#=#CHR$(13)+RND(0) THEN#180
164 IFKEY#="" ORKEY#=#C"Q" ORKEY#=#" THEN#158
166 K#=#1: IFK#CL+1 THENN#VAL(KEY#): N#(K#)N#
168 IFK#CL+1 THENK#=#K-1: GOT0180
170 PRINTLEFT$(R#,20)SPC(33+OS-K#2)N#(N#)
172 GOT0188
174
176 REM ***** SUM *****
178
180 SUM#0: S#0
182 SUM#SUM+10*(S#N#(S+1)): S#S+1: IFS#0 THEN#182
184 IFRS#0 THENSUM#SUM,5 THEN#208
186 POKES37894,PEEK(37898): POKES37895,PEEK(37889)
188 POKES37896,PEEK(37890): POKES37897,PEEK(37891)
190 POKES37888,232: POKES37889,233: POKES37890,234: POKES37891,44: POKES37892,13
192 SYS39312
194 FORT=1 TO2000: NEXT
196 POKES37888,PEEK(37894): POKES37889,PEEK(37895)
198 POKES37890,PEEK(37896): POKES37891,PEEK(37897)
200 POKES37892,6: CHR#R1: W#=#0: GOT0186
202
204 REM ***** ERROR *****
206
208 POKES37894,PEEK(37888): POKES37895,PEEK(37889)
210 POKES37896,PEEK(37890): POKES37897,PEEK(37891)
212 POKES37888,235: POKES37889,236: POKES37890,237: POKES37891,54: POKES37892,2
214 SYS39312
216 FORT=1 TO2000: NEXT
218 W#=#R+1: IFR#=#3 THEN#228
220 POKES37888,PEEK(37894): POKES37889,PEEK(37895)
222 POKES37890,PEEK(37896): POKES37891,PEEK(37897)
224 POKES37892,6
226 GOT0122
228 POKES37888,238: POKES37889,239: POKES37890,240: POKES37891,54: POKES37892,9
230 SYS39312
232 XT=#0
234 X2#XT-(INT(XT/10)*10): XT#(XT-X2)/10: X3#X2+1
236 PRINTLEFT$(R#,20)SPC(33+OS-X2#2)N#(X2): IFRX#0 THEN#234
238 POKINTLEFT$(R#,20)SPC(33+OS-(X3+1)*2)CHR$(146)S#
240 FORT=1 TO2000: NEXT
242 POKES37888,PEEK(37894): POKES37889,PEEK(37895)
244 POKES37890,PEEK(37896): POKES37891,PEEK(37897)
246 POKES37892,6
248 W#=#0: X3#0: GOT0186
250
252 REM ***** FINISH *****
254
256 POKES37894,PEEK(37888): POKES37895,PEEK(37889)
258 POKES37896,PEEK(37890): POKES37897,PEEK(37891)
260 POKES37888,229: POKES37889,230: POKES37890,231: POKES37891,67: POKES37892,1
262 POKES37893,0
```

```
204 SYS39312: SYS39232
206 PKINTLEFT$(R#,9)SPC(25)CHR$(146)CHR$(31)"YOU HAVE NOW"
208 PKINTLEFT$(R#,11)SPC(25)"ANGHERED ALL"
210 PKINTLEFT$(R#,13)SPC(25)"10 QUESTIONS"
212 IFR#10 THENPRINTLEFT$(R#,15)SPC(30)N#(1)
214 IFR#10 THENPRINTLEFT$(R#,15)SPC(32)N#(8)
216 IFR#10 THENPRINTLEFT$(R#,15)SPC(31)N#(CR)
218 PKINTLEFT$(R#,19)SPC(30)CHR$(18)CHR$(210)CHR$(210)CHR$(210)
220 PKINTLEFT$(R#,20)SPC(30)N#(1)
222 PKINTLEFT$(R#,20)SPC(32)N#(0)
224 IFR#10 THENPRINTLEFT$(R#,24)SPC(27)"EXCELLENT"
226 IFR#10 THENPRINTLEFT$(R#,24)SPC(23)"VERY GOOD EFFORT"
228 IFR#10 THENPRINTLEFT$(R#,24)SPC(25)"NOT TOO GOOD"
230 FUKI=1 TO2000: NEXT
232 SYS39232: R#=#0
234 PKINTLEFT$(R#,10)SPC(24)"YOU MAY CARRY"
236 PKINTLEFT$(R#,11)SPC(24)"ON OR CHANGE"
238 PKINTLEFT$(R#,12)SPC(24)"FUNCTION AND"
240 PKINTLEFT$(R#,13)SPC(24)"SKILL LEVEL"
242 PKINTLEFT$(R#,14)SPC(24)"BY PRESSING"
244 PKINTLEFT$(R#,15)SPC(24)"THE FOLLOWING"
246 PKINTLEFT$(R#,10)SPC(25)"F1 SAME"
248 PKINTLEFT$(R#,20)SPC(25)"F3 CHANGE"
250 PKINTLEFT$(R#,22)SPC(25)"F7 GUIT"
252 SR#1729: S1=# S2=#49
254 GETKEY: IFKEY#C="" THENR#=#R+ASC(KEY#)
256 IFRP=5 THENSR=1729: S1=#32: S2=#32
258 IFRP=10 THENSR=16: S2=#49
260 IFRP=15 THENSR=1809: S1=#32: S2=#32
262 IFRP=20 THENSR=16: S2=#51
264 IFRP=25 THENSR=1809: S1=#32: S2=#32
266 IFRP=30 THENSR=16: S2=#55: R#=#0
268 IFRP=35 THENSR=1809: S1=#32: S2=#32: S3=#55
270 IFRP=40 THENSR=16: S2=#55: R#=#0
272 POKESR,S1 POKESR+1,S2
274 IFRP(1330RPT)=13 THENR#=#R+1: GOT0314
276 IFRP(1330RPT)=134 THENR#=#R+1: GOT0314
278 IFRP(1330RPT)=134 THENR#=#R+1: GOT0314
280 POKES3248+1,0: POKES3248+24,21: POKES3288,14: POKES3281,6
282 ENJ
284 POKES37888,PEEK(37894): POKES37889,PEEK(37895)
286 POKES37890,PEEK(37896): POKES37891,PEEK(37897)
288 POKES37892,6: POKES37893,224
290 SYS39232: SYS39312
292 K1#0: GOT0182
```



Landspeed by Ian Andrews

This program puts you in the cockpit of a jet powered car, attempting to break the land speed record.

After the Instructions, your view through the windscreen is drawn along with the day's conditions.

The thermometer is important, as low temperatures cause the speed of sound to fall, and your vehicle has not been designed to withstand sonic shock waves.

Pressing t displays tomorrow's conditions, but your sponsors will send you a prompting Telemessage if you delay your attempt too many days.

How it works

25-45	title page
65-70	graphics character data list
100-130	POKE graphics data
227-420	instructions
500-850	drawing view from cockpit
860-1060	drawing thermometer etc
1080-1090	set conditions variables
1095-1142	print in track conditions values
1144-1163	telemessage
1180-1540	draw facia
1700-2007	preparations for run "whine" etc
2020	start loop line
2050	exceed speed of sound check line
2500-2580	track lines
2521-2522	off track check
2629-2645	timing for flying mile
3010-3025	accelerating
3030-3100	speedometer needle
4000-4200	crash routine
5000-5030	finish results routine
5035-5120	records and drivers of the past
5130-5180	national anthem
9990-9997	returning routine

When y is pressed the facia is drawn complete with analogue and digital speedometers, milometers and measured mile start and finish indicators.

After the turbine has reached top speed, use o to accelerate, p and q to steer.

Listing for Landspeed

```

1 REM SAVE "landspeed": REM 12/4/84 Ian Andrews
5 RANDOMIZE
10 BRIGHT 0: PAPER 7: CLS
20 INK 2: PAPER 6: OVER 0: BRIGHT 0: BORDER 7: FLASH 0
25 INPUT ""
30 PRINT "LAND"
31 PRINT "SPEED"
32 PRINT "RECORD"
33 PRINT " "
34 PRINT ""
35 PRINT " "
36 PRINT " "
37 PRINT " "
38 PRINT " "
40 PRINT AT 13,0: FLASH 1:"BREAK THE WORLD"
45 PRINT FLASH 1:"LAND SPEED RECORD."
65 REM Set Graphics ABCDE
66 DATA 0,60,126,126,126,126,60,0
67 DATA 120,252,252,252,252,252,252,120
68 DATA 72,72,72,72,79,72,72,72
69 DATA 60,31,15,135,207,255,126,60
70 DATA 0,0,255,255,255,255,0,0
80 FOR x=0 TO 245
81 IF x>20 THEN PLOT INK 7;x-19,5
85 PLOT INK 6;x,5
86 PLOT x+1,5: DRAW INK 1;2,0
87 NEXT x

```

Rev up your Spectrum, fight off starving cats!

```

100 FOR n=0 TO 39
110 READ data
120 POKE USR "A"+n,data
130 NEXT n
190 INK 4: PAPER 0: OVER 0: BORDER 0: FLASH 0: CLS
227 REM Instructions
228 PRINT AT 0,9: INVERSE 1:" LANDSPEED "
22 PRINT ""
230 PRINT " You are at the controls of"
240 PRINT "the Fastest land vehicle ever."
250 PRINT "Ahead is the cleared track,"
260 PRINT "the Front of your car, and"
270 PRINT "the distant horizon."
280 PRINT "First you see the day's weather"
290 PRINT "etc. You can choose to run Today"
300 PRINT "or the next, but remember your"
310 PRINT "Sponsors have limited finance !"
320 PRINT ""
330 PRINT "When you decide to run,"
340 PRINT "(Q) steers you to the Left"
350 PRINT "(P) steers you to the Right"
360 PRINT "(O) is the Throttle (on)"
370 PRINT ""
380 PRINT "Two Lights show when you pass"
390 PRINT "the Timing Markers."
400 PRINT "Your Speed is shown at the end."
410 PRINT INVERSE 1:" Press any key to Start "
420 PAUSE 0

```

Smell the tyres burning as you try for the land speed record. Something's fishy: keep the crafty cats from your dustbins

If you finish your run without straying over the track lines, your average speed is displayed, together with any past record you may have broken.

Variables

f final average speed (mph)
 s velocity (mph)
 d distance travelled (miles)
 t time (hours)
 day day number
 w cross wind (knots)
 h temperature (°C)
 ss speed of sound (mph)
 v engine power factor
 spon limit on day before Tele-message
 x, y speedometer needle coords
 xo,xa,etc track lines x coordinates
 yo,yr,etc track lines y coordinates
 cra siren flag
 i,j,i1,i2,j2 screen drawing variables
 a angle in radians

It's a dog's life by Andrew Bird

The alley cats are giving Rex the Red Setter a headache. They can smell the fish in the dustbins and are frantic to eat it.

Rex's owner hates cats (as does Rex) and has told him to keep the cats off the garden wall. He will get a bone for each cat he stops from reaching the wall.

How it works

1-90 sets up variables (skill level etc)
 100-190 draws game
 200-370 cat movements (main loop)
 400-460 dog movement
 500-630 selects correct dog
 700-740 turns cat back
 7000-7030 instructions
 8000-8550 music (how much is that doggy and what's new pussycat)
 9000-9090 graphics

The cats are not easily put off, however. They know that once they reach the garden wall they can eat the fish they have found in the dustbin.

Help Rex fight off the marauding cats, and give the dog a bone.

Variables

level skill level
 fish score to cat
 bones score to dog
 x,y position of dog
 dSoSgS dog on screen
 Dim a 20 dustbin positions
 Dim b duplicate dustbin illuminator
 c vertical cat position
 s data for dustbin
 t which dustbin
 m counter

```

500 REM Screen Drawing
501 BORDER 3
502 PAPER 5: CLS
503 PAPER 7: FOR j=9 TO 13
504 PRINT AT j,0;"
": NEXT j
505 REM bonnet
507 INK 4
510 FOR j=1 TO 19
520 LET i1=j*127/40
530 LET i2=255-i1
540 LET j2=j+62
550 PLOT 0,j2
560 DRAW i2,0
570 NEXT j
580 REM fuselage
600 FOR a=-PI/10 TO PI/2 STEP .03
610 LET i=38*COS (a)
620 LET j=38*SIN (a)
630 PLOT 40,82
640 DRAW i,j
650 DRAW -(40+38*COS (a)),12
660 NEXT a
670 REM horizon
680 INK 1
690 FOR i=72 TO 254 STEP 2
700 LET j=RND*(i/100)+ABS (SIN ((i+30)/50))*5
710 PLOT i,104
720 DRAW 0,j
725 PLOT i+1,104
728 DRAW 0,j
730 NEXT i
740 REM Border
797 INK 3
800 FOR a=0 TO PI/2 STEP .02
810 LET i=50-(50*COS (a))
820 LET j=125+(50*SIN (a))
830 PLOT 255,j
840 DRAW -(i),0
850 NEXT a
860 REM Track Conditions
865 LET spon=RND*6+4
870 BRIGHT 0: INK 1: BORDER 3: INPUT "": PAPER 7
880 FOR j=21 TO 14 STEP -1
890 PRINT AT j,0; BRIGHT 0;"
": NEXT j
910 FOR j=15 TO 20
920 PRINT AT j,3; INK 2;"Q";INT (((20-j)*20)/1)*1: REM G
925 NEXT j
930 PRINT AT 21,3;"E": REM G
940 CIRCLE 80,50,8: CIRCLE 120,50,8
950 PLOT 88,50: DRAW 24,0
960 PLOT 100,50: DRAW 0,-20
970 FOR j=18 TO 20
975 PAPER 4
980 PRINT AT j,10;"
": NEXT j
1000 PRINT AT 18,11; INK 6;"Wind"
1003 PRINT AT 20,11; INK 6;"kts"
1005 PAPER 7: INK 1
1010 PRINT AT 15,20;"DEEEE": REM G
1020 PRINT AT 16,18;"Mechanic"s"
1030 PRINT AT 17,18;"Report:-"
1040 PRINT AT 19,18;"Engine on"
1060 PRINT AT 21,18;"Power"
1090 REM Conditions Variables
1081 LET day=0: REM Restart
1082 LET day=day+1
1083 LET w=RND*(.2)-.1
1084 LET h=RND*70+20
1085 LET ss=660+h
1086 LET v=75-RND*50
1090 LET cra=0
1095 INK 2
1097 PLOT INK 7;26,8
1098 DRAW OVER 1;0,50: DRAW OVER 1;1,0: DRAW INK 7;0,-50
1100 PLOT 26,8
1110 DRAW 0,h*4/10+5: DRAW 1,0: DRAW 0,-(h*4/10+5)
1115 PRINT AT 19,11; PAPER 4;"
": NEXT j
1120 PRINT AT 19,11;ABS (INT (w*500)/1)
1125 PRINT AT 20,18;"
": NEXT j
1130 PRINT AT 20,18;INT (v/75*100)/1;"%"
1140 PRINT AT 0,10; PAPER 5;"
":AT 0,10;"DAY ";day
1142 IF day<spon THEN INPUT "": PRINT 0;"Press (Y)es or (T)omorrow: GO TO 116
5
1144 FOR n=1 TO 25
1146 BEEP INT (RND*2+1)/15,35
1147 NEXT n
1148 INK 1: PAPER 6: PRINT AT 14,0;"
": NEXT j
1149 FOR j=14 TO 21
1150 PRINT "
": NEXT j
1151 NEXT j
1152 PRINT AT 14,8; INVERSE 1;"TELEMESSAGE"

```

SPECTRUM PROGRAMS

```

1153 PRINT ""
1154 PRINT TAB 5;"MUST RUN TODAY"
1155 PRINT TAB 5;"NO MORE FUNDS."
1156 PRINT ""
1158 PRINT TAB 14;"MONOGRAM SERVICES"
1160 FOR n=1 TO 25: BEEP INT (RND*2+1)/15,35: NEXT n
1163 GO TO 1200
1165 IF INKEY#="y" THEN GO TO 1200
1170 IF INKEY#="t" THEN GO TO 1082
1180 GO TO 1165
1200 PAPER 3
1205 INPUT ""
1210 FOR j=21 TO 14 STEP -1
1220 PRINT AT j,0;"
1230 NEXT j
1350 REM Facia
1360 PRINT AT 15,0; INK 6;"1stMkr"
1370 PRINT AT 17,0; INK 6;"2ndMkr"
1400 REM clock
1405 LET n=-2
1410 INK 6
1420 FOR a=PI*4/3 TO -PI/3 STEP -PI/3
1430 LET n=n+2
1440 LET i=16+4*COS a
1450 LET j=21-(4+4*SIN a)
1460 PRINT AT j,i;n
1470 NEXT a
1480 CIRCLE 130,35,26
1490 PLOT 130,35
1580 DRAW 25*COS 4.189,25*SIN 4.189
1510 PRINT AT 17,16;"B"; REM G
1530 PRINT AT 17,25;"mls"
1540 PRINT AT 19,25;"mph"
1700 REM Whine
1710 FOR n=25 TO 35 STEP .18
1730 BEEP n/1000.n
1740 NEXT n
1750 PRINT 0; FLASH 1;"MAX RPM"
1760 BEEP 3,n
1770 INPUT ""

```

```

3090 LET xo=x: LET yo=y
3100 GO TO 2010
4000 REM Crash
4010 PAPER 6; INK 2; BRIGHT 1; FLASH 1; OVER 0; BORDER 2
4020 PRINT AT 15,5;"YOU CRASHED AT ";INT (s/1)*1;" MPH"
4050 PRINT AT 16,5;"BECAUSE YOUR CAR LEFT"
4060 PRINT AT 17,5;"THE CLEARED TRACK"
4130 IF s<=s THEN GO TO 4170
4140 PRINT AT 16,5;"BECAUSE YOUR CAR EXCEEDED"
4150 PRINT AT 17,5;"THE SPEED OF SOUND"
4170 FOR n=1 TO 35
4180 BEEP .03,RND*99-30
4185 NEXT n
4190 FLASH 0
4195 LET cra=1
4200 GO TO 9990

```

```

5000 REM Results
5010 BORDER 5; PAPER 5; INK 0; BRIGHT 1
5020 PRINT AT 15,2;"YOUR AVERAGE SPEED OVER THE"
5030 PRINT AT 16,2;"FLYING MILE WAS ";INT (f/.01)*.01;" MPH"
5035 REM Past Records
5040 IF f>301.13 THEN PRINT AT 18,0;"WHICH EXCEEDS"
5050 IF f>301.13 THEN PRINT AT 19,2;"301.13mph -M.Campbell (GB)"
5060 IF f>369.74 THEN PRINT AT 19,2;"369.74mph -J.Cobb (GB)"
5070 IF f>403.10 THEN PRINT AT 19,2;"403.10mph -D.Campbell (GB)"
5080 IF f>576.55 THEN PRINT AT 19,2;"576.55mph -A.Arjons (USA)"
5090 IF f>600.60 THEN PRINT AT 19,2;"600.60mph -C.Breedlove (USA)"
5100 IF f>622.4 THEN PRINT AT 19,2;"622.41mph -G.Gabelich (USA)"
5105 IF f<633.468 THEN GO TO 9990
5110 PRINT AT 19,2;"633.468mph -R.Noble (GB)"
5130 RESTORE 5140
5140 DATA 7.6,7.6,9.6,6.9,7.3,9.6,11.6,11.6,12.6,11.9,9.3,7.6,9.6,
7.6,6.6,7.6,7.6,7.6
5150 FOR n=1 TO 18
5160 READ d
5170 BEEP d-INT d,INT d

```

```

2005 LET xo=0: LET yo=0: LET n=0: LET xa=125: LET xlo=0: LET ylo=0: LET xro=0: L
ET yro=0: LET t=0: LET s=.0000001
2007 INK 0; PAPER 7
2020 IF INKEY#="q" THEN LET xa=xa-s/7
2030 IF INKEY#="p" THEN LET xa=xa+s/7
2040 LET xa=xa+(w*s)/1
2050 IF d>=s THEN BEEP .3,-30: BEEP .1,69: BEEP .3,-30: GO TO 4000
2500 REM Track Lines
2505 PAPER 4; INK 4
2510 LET x1=(25-xa)*1.5
2520 LET xr=(225-xa)*1.5
2521 IF x1>135 THEN GO TO 4000
2522 IF xr<115 THEN GO TO 4000
2525 LET yr=-22: LET yl=-22
2530 IF x1<=22 THEN LET yl=-((78-x1)/(125-x1)*42): LET xls=-46
2535 IF x1>22 THEN LET xls=-((125-x1)*20/42)
2540 IF xr>=257 THEN LET yr=-42+(42*(xr-255)/255): LET xrs=130
2541 IF xr<=255 THEN LET xrs=((xr-125)*20/42)
2542 PLOT 125,104
2544 DRAW OVER 1;xlo,ylo
2546 PLOT 125,104
2548 DRAW OVER 1;xro,yro
2550 PLOT 125,104
2560 DRAW xls,yl
2570 PLOT 125,104
2580 DRAW xrs,yr
2590 LET xlo=x1: LET xro=xr
2600 LET ylo=yl: LET yro=yr
2610 LET t=t+.0001
2620 LET d=(s*t)
2625 PRINT AT 16,25; INK 6; PAPER 1;INT (d/1)*1
2627 PRINT AT 18,25; INK 6; PAPER 1;INT (s/1)*1
2628 IF d<5 THEN GO TO 2650
2629 REM Timing
2630 IF d<6 THEN LET f=s
2635 IF d>6 THEN PRINT AT 15,6; INK 7; BRIGHT 1;"B": REM G
2640 IF d>6 AND d<7 THEN LET f=(f+s)/2
2642 IF d>7 THEN PRINT AT 17,6; INK 7; BRIGHT 1;"B": REM G
2644 IF d>7.2 THEN PRINT AT 21,0; FLASH 1; INK 2;"BRAKE CHUTE AWAY"
2645 IF d>7.5 THEN GO TO 5000
2650 IF INKEY#="o" THEN GO TO 3010
3000 GO TO 2020
3010 REM Accelerate
3015 PAPER 3; INK 6
3020 LET n=n+2: LET s=v+SQR (n+.0001)
3025 LET t=t+.0001
3030 PLOT 130,35
3040 DRAW OVER 1;x0,y0
3050 LET x=23*COS (4.189*(1-s/800))
3060 LET y=23*SIN (4.189*(1-s/800))
3070 PLOT 130,35
3080 DRAW x,y

```

```

5180 NEXT n
9990 PRINT 0;"Press C to Restart"
9991 INK 4; PLOT 125,104: DRAW OVER 1;xro,yro
9992 PLOT 125,104: DRAW OVER 1;xro,yro
9993 IF INKEY#="c" THEN GO TO 860
9994 IF cra=1 THEN BEEP .5,15: BEEP .5,13.5
9997 GO TO 9993

```



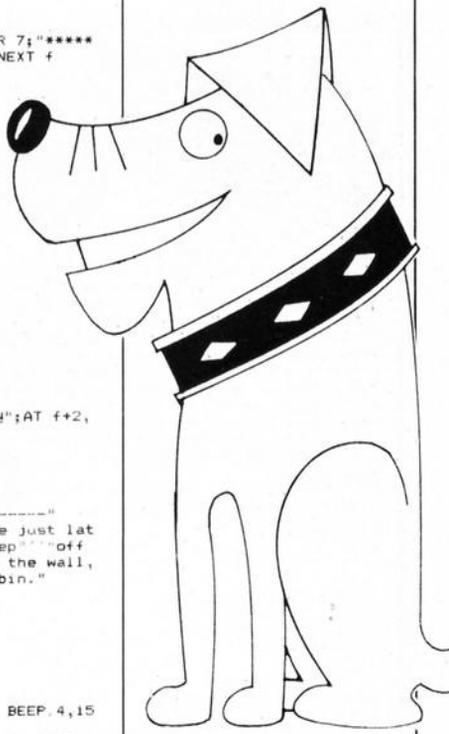
SPECTRUM PROGRAMS

Listing for It's a dog's life

```

1 REM ITS A DOGS LIFE
2 LET m=0
3 GO SUB 7000
10 INPUT AT 21,5;"SKILL LEVEL 1 - 3 ? ";level
20 IF level<1 OR level>3 THEN GO TO 10
30 LET x=18-level; LET y=29; LET fish=0; LET bones=0
40 LET d$="CQ"; LET o$="QH"; LET g$="L"
50 IF m=0 THEN PRINT AT 10,10;"Please Wait."
60 DIM a(20); DIM b(20)
70 FOR f=1 TO 20: READ s: LET a(f)=s: NEXT f
80 DATA 1,2,4,5,7,8,10,11,13,14,16,17,19,20,22,23,25,26,28,29
90 IF m=0 THEN GO SUB 9000
100 REM Draw Set
110 BORDER 6: PAPER 6: CLS
120 PRINT AT 0,6; INK 2;"ITS A DOGS LIFE. ";AT 1,0; INK 0;"Bones";AT 3,0;"Fish"
130 PRINT AT 2,24; PAPER 7;"Dustbin";AT 3,24;" Alley "
140 PLOT 190,142: DRAW 0,18: DRAW 60,0: DRAW 0,-18: DRAW -60,0: PLOT 217,132: DRAW 2,9: PLOT 222,132: DRAW 2,9
150 FOR f=6 TO 8: PRINT AT f,0; PAPER 5; BRIGHT 1;" "; NEXT f
160 FOR f=6 TO 8: FOR n=0 TO 30 STEP 3: PRINT AT f,n; INK 6;"■";AT f,31;"■": NEXT n
170 FOR f=8 TO 224 STEP 24: PLOT f,104: DRAW 0,23: DRAW 15,0: DRAW 0,-23: DRAW -15,0: PLOT f,127: DRAW 15,0,-2: PLOT f+4,106: DRAW 0,18: PLOT f+8,106: DRAW 0,18: PLOT f+12,106: DRAW 0,18: NEXT f
180 PRINT AT 21,0; INK 3;"=====
190 PAUSE 50
200 REM Cat Movements
210 FOR n=1 TO 20
220 LET c=11
230 LET t=INT (RND*20)+1: IF b(t)=1 THEN GO TO 230
240 LET b(t)=1
250 PRINT AT c,a(t); INK 0;"N";AT c-1,a(t);"M";AT c-2,a(t); "
260 IF ATTR.(c+1,a(t))=50 THEN GO TO 700
270 BEEP .01,-10
280 IF c>19 THEN PRINT AT 18,a(t); " ";AT 19,a(t); INK 0;"Q";AT 20,a(t);"E": L
T fish=fish+1: PRINT AT 4,1+fish; INK 1;"B": GO TO 320
290 LET c=c+RND
300 GO SUB 400
310 IF c<20 THEN GO TO 250
320 NEXT n
330 IF fish>bones THEN FOR f=10 TO 20: PRINT AT f,0; INK RND*6; PAPER 7;"*****
**** ITS A DRAW *****": BEEP .05,f*2: BEEP .03,f*1.75: PAUSE 5: NEXT f
340 IF fish<bones THEN GO SUB 8000
350 IF fish>bones THEN GO SUB 8500
360 PAUSE 200: CLS : PRINT AT 21,10;"ANOTHER GO ?"
370 RESTORE : GO TO 10
400 REM Dog Movement
410 IF INKEY$="" THEN PRINT AT x,y; INK 2;d$;AT x+1,y;g$
420 IF INKEY$="8" THEN GO SUB 500
430 IF INKEY$="5" THEN GO SUB 600
440 BEEP RND/10,-30
450 PRINT AT x,y; INK 2;d$;AT x+1,y;g$
460 RETURN
500 LET d$="BB"; LET o$="EE"; LET g$="I"
510 LET y=y+1: IF y>30 THEN LET y=y-1
520 PRINT AT x,y-1;" ";AT x+1,y-1;" ";AT x,y; INK 2;d$;AT x+1,y;o$
530 RETURN
600 LET d$="QQ"; LET o$="QH"; LET g$="L"
610 LET y=y-1: IF y<0 THEN -LET y=y+1
620 PRINT AT x,y+2;" ";AT x+1,y+2;" ";AT x,y; INK 2;d$;AT x+1,y;o$
630 RETURN
700 LET bones=bones+1: PRINT AT 2,1+bones; INK 7;"Q"
710 PRINT AT c,a(t); "
720 FOR f=c-2 TO 9 STEP -1: PRINT AT f,a(t); INK 0;"M";AT f+1,a(t);"N";AT f+2,
a
(t); " ";AT x,y; INK 2;d$; BEEP .01,f*3: NEXT f
730 PRINT AT 11,a(t); " ";AT 10,a(t); " ";AT 9,a(t); " ": NEXT n
740 GO TO 330
7000 BORDER 7: PAPER 7: INK 1: CLS
7010 PRINT AT 0,6; INK 2;"ITS A DOGS LIFE. ";AT 1,5;"-----"
7020 PRINT AT 2,0;" Rex the Red Setter has been " "having a busy time just lat
ely" " His owner has promised him a " "bone for every cat he can keep " "off
the garden wall. " " The cats on the other hand " "should they reach the wall,
have " "a chance to eat the fish they " "have pinched out of the dustbin."
7030 GO SUB 8000
7040 PRINT AT 20,0; INK 3;" < 5 < CONTROLS > 8 > "
7050 PRINT AT 21,0; PAPER 4; INK 0;" Press any key to play. "
7060 PAUSE 0: CLS : RETURN
8000 BEEP .3,13: BEEP .3,18: BEEP .3,13: BEEP .3,10: BEEP .5,6
8010 BEEP .1,15: BEEP .1,13: BEEP .1,10: BEEP .3,13: BEEP .6,8
8020 PAUSE 50: RETURN
8500 BEEP .4,17: BEEP .4,13: BEEP .1,10: PAUSE 2: BEEP .1,10: PAUSE 2: BEEP .4,15
: PAUSE 20
8510 BEEP .6,17: BEEP .1,15: BEEP .1,17: PAUSE 2: BEEP .1,15: BEEP .6,17: BEEP .
4,15
8550 PAUSE 50: RETURN

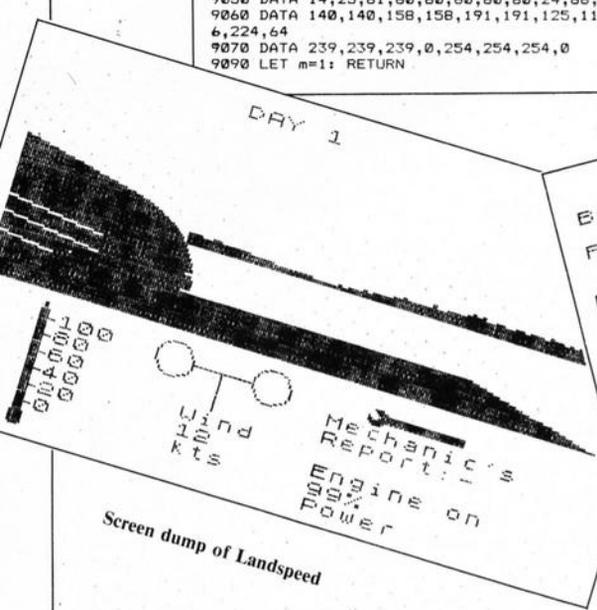
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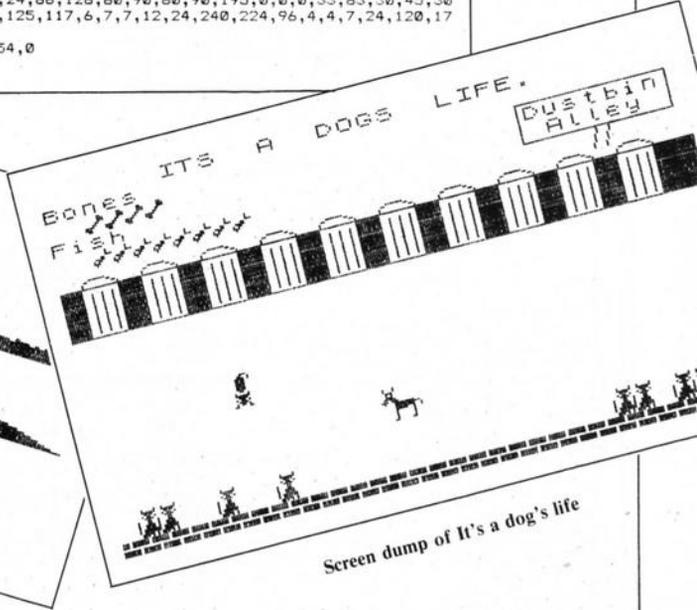
SPECTRUM PROGRAMS

```

9000 FOR f=144 TO 162: FOR n=0 TO 7: READ a: POKE USR (CHR$ ++)+n,a: NEXT n: NEX
T f
9010 DATA 0,0,0,0,0,0,0,0,31,34,34,28,20,28,62,119,226,68,68,56,40,56,124,238,71
9020 DATA 0,0,0,0,0,0,0,248,127,159,155,40,37,229,132,6,224,224,40,200,4,4,6
9030 DATA 7,7,15,20,19,32,32,96,254,249,217,20,164,167,33,96,127,159,147,16,16,1
6,16,24
9040 DATA 224,224,224,32,32,32,32,48,7,7,7,4,4,4,4,12,254,249,201,8,8,8,8,24
9050 DATA 14,25,61,60,60,60,60,60,24,66,126,60,90,60,90,195,0,0,0,33,63,30,45,30
9060 DATA 140,140,158,158,191,191,125,117,6,7,7,12,24,240,224,96,4,4,7,24,120,17
6,224,64
9070 DATA 239,239,239,0,254,254,254,0
9090 LET m=1: RETURN
    
```



Screen dump of Landspeed



Screen dump of It's a dog's life

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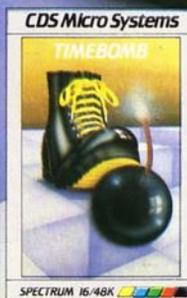
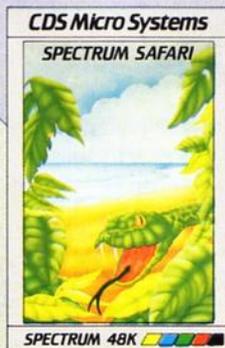
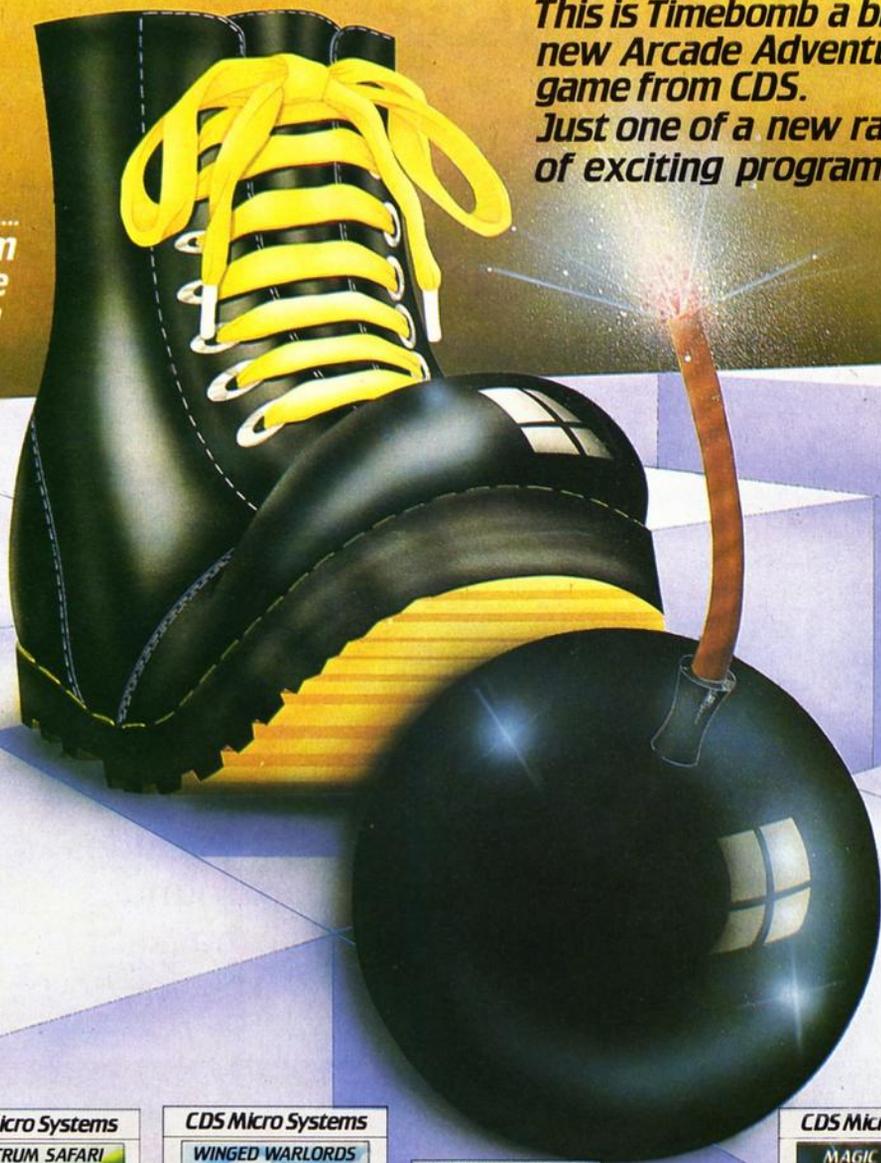
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4 Blue Thunder	Richard Wilcox	Spectrum (-)
5 Flight Path 737	Anirog	CBM 64 (-)
6 Space Pilot	Anirog	CBM 64 (7)
7 Code Name MAT	Micromega	Spectrum (8)
8 Night Gunner	Digital Integration	Spectrum (-)
9 Chequered Flag	Software Projects	Spectrum (-)
10 Manic Miner	Software Projects	Spectrum (-)

NON-ARCADE

1 Twin Kingdom Valley	Bug-Byte	CBM 64 (1)
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4 Heroes of Khan	Interceptor	CBM 64 (-)
5 The Forest	Phipps	Spectrum (-)
6 Fall of Rome	APS	BBC (-)
7 Transylvanian Tower	Richard Shepherd	Spectrum (-)
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1 Hunchback	Ocean (5)
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9 Dragonfly 2	Hewson (-)
10 S.A.S.	Peaksoft (-)

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VIC-20

1 Flight 015	Ferranti Davenport (3)
2 Sub Commander	Thorn EMI (4)
3 Tank Commander	Thorn EMI (-)
4 Tower of Evil	Thorn EMI (-)
5 Snooker	Visions (1)
6 Crazy Kong	Interceptor (2)
7 Gridrunner	Llamosoft (10)
8 M.L.B.A.T.E.T	Llamosoft (-)
9 Mine Madness	Thorn (-)
10 Jet Pac	Ultimate (8)

BBC

1 Demolator	Visions (1)
2 Q Man	MRM (3)
3 Q Man's Brother	MRM (2)
4 3D Munchy	MRM (4)
5 Chess	BBC (-)
6 Diamond Mine	MRM (5)
7 Killer Gorilla	Precision (5)
8 GB Ltd	Simon Hessel (-)
9 737 Simulator	Doctor Soft (10)
10 Felix In the Factory	Micro Power (-)

ZX81

1 Crazy Kong	PSS (-)
2 Chess	Sinclair (10)
3 Skramble	Quicksilva (4)
4 Football Manager	Addictive (5)
5 Mothership	Sinclair (3)
6 Flight Simulation	Sinclair (2)
7 Space Raiders	Sinclair (7)
8 Defenders	Quicksilva (9)
9 Invaders	Quicksilva (6)
10 Asteroids	Quicksilva (8)

TI-994A PROGRAM

Deal yourself in and risk the turn of the cards

Forget the cards — with Jon Dempsey's program for the unexpanded TI-994A it's just as easy to win (or lose) on the screen



Variables
H Points high score
Points points scored
BET bet
P,H ASCII values of cards
PS ASCII value of points for use in PRINT AT routine
AS string to be printed
RW row number
A ASCII value of string to be printed at
KK graphics characters for cards
Q column number for cards
PP,Y graphics characters
QW ASCII value of card position
X value returned by CAL
GCHAR to check card
M,K card variables
OS string variables

In my program for the standard TI-99/4A you are in the position of one of the contestants in TV's Play Your Cards Right.

After the screen titles and rules have cleared, you are shown one of five cards. You must then bet points (from one to nine) on whether the next card will be higher or lower.

How it works

100-150 reset
180-350 redefine characters
360-410 set colours
420-810 print screen titles and instructions
860-940 high-score routine
1030-1790 main sequence
1850-2440 select and print cards
2470-2510 PRINT AT routine
2750-2970 check cards
3000-3270 end

Hints on conversion
 TI BASIC is fairly standard with two main exceptions. Single statement lines are used and subroutines for graphics and sound are available, prefixed with CALL, as detailed below.
CALL CLEAR clears screen
CALL SCREEN defines screen colour
CALL CHAR defines a character with a 16-digit hex string from an eight by eight grid. Other machines will use a different method
CALL COLOUR (character set, foreground, background) sets colour of character
CALL HCHAR (row, column, character code, number of repeats) places character on screen at co-ordinates specified and optionally repeats character horizontally
CALL VCHAR similar to HCHAR but repeats character vertically
CALL GCHAR (row, column, variable) similar to a screen PEEK on other machines. Gives the ASCII code at the given screen co-ordinates
CALL SOUND (D,F,V) gives sound of duration D, frequency F and volume V. Three sounds can be produced at once

High score and highest scorer is stored and displayed on the screen.

An unusual routine in the program is the storing of values and strings for print at routines in DATA statements.

```

100 RESTORE
110 DIM W(8:14)
120 DIM L(14)
130 H="HI SCORE"
140 HPOINTS=25
150 RANDOMIZE
160 CALL CLEAR
170 CALL SCREEN(2)
180 CALL CHR(128) "#####"
190 CALL CHR(152) "0123456789"
200 CALL CHR(127) "0123456789"
210 CALL CHR(153) "0123456789"
220 CALL CHR(154) "#####"
230 CALL CHR(155) "#####"
240 CALL CHR(156) "0123456789"
250 CALL CHR(157) "0123456789"
260 CALL CHR(158) "#####"
270 CALL CHR(159) "#####"
280 CALL CHR(144) "0123456789"
290 CALL CHR(145) "0123456789"
300 CALL CHR(146) "#####"
310 CALL CHR(147) "#####"
320 CALL CHR(148) "#####"
330 CALL CHR(149) "#####"
340 CALL CHR(150) "#####"
350 CALL CHR(151) "#####"
360 CALL COLOR(15,7,1)
370 CALL COLOR(16,5,1)
380 CALL COLOR(12,16,1)
390 FOR I=2 TO 9
400 CALL COLOR(I,14,1)
410 NEXT I
420 FOR I=1 TO 4
430 READ W(I),K(1),Z(1)
440 H=H+K(1)
450 W=K(1)
460 P=Z(1)
470 GOSUB 2470
480 NEXT I
490 DATA CARD SHARK,5,11,*****6,10, J.DEMPSEY ,8,6,PRESS ANY KEY
500 FOR RR=1 TO 4
510 IF RR=3 THEN 530
520 RESTORE 630
530 CALL KEY(0,K,S)
540 IF S<>0 THEN 700
550 READ T(RR),Q(C,RR)
560 H=T(RR)
570 Y=Q(C,RR)
580 RW=15
590 F=12
600 GOSUB 650
610 GOSUB 2470
620 NEXT RR
630 DATA "SPADES",152," CLUBS",156,"DIAMONDS",144," HEARTS",148
640 GOTO 580
650 CALL HCHAR(12,16,Y)
660 CALL HCHAR(12,17,Y+1)
670 CALL HCHAR(13,16,Y+2)
680 CALL HCHAR(13,17,Y+3)
    
```

```

690 RETURN
700 CALL CLEAR
710 RESTORE 790
720 FOR I=1 TO 12
730 READ W(I),L(I)
740 R=H+(I)
750 RW=I+12
760 F=L(I)
770 GOSUB 2470
780 NEXT I
790 DATA *****10,RULES:11,*****10,THIS IS A GAME OF PLAY YOUR CARDS HIGH
    ET CARD,3
800 DATA YOU GUESS WHETHER THE NEXT CARD WILL BE HIGHER OR LOWER THAN THE LA
    ST CARD,3
810 DATA USE THE ARROW KEYS E AND X,3,TO SELECT VALUES,3,MORE INSTRUCTIONS,5,WI
    L APPEAR DURING PLAY,3
820 FOR D=1 TO 1000
830 NEXT D
840 CALL CLEAR
850 GOTO 950
860 CALL SOUND(200,370,2,440,2,294,2)
870 CALL SOUND(600,392,2,494,2,294,2)
880 CALL SOUND(200,391,2,494,2,292,2)
890 CALL SOUND(600,294,2,440,2,370,2)
900 INPUT "ENTER YOUR NAME "B$
910 IF LEN(B$)>16 THEN 840
920 CALL SCREEN(13)
930 CALL CLEAR
940 RETURN
950 CALL SCREEN(13)
960 FOR I=2 TO 9
970 CALL COLOR(I,2,16)
980 NEXT I
990 CALL COLOR(13,16,16)
1000 CALL COLOR(15,7,16)
1010 CALL COLOR(16,2,16)
1020 GOSUB 3180
1030 CALL CLEAR
1040 H=H+K "STR" HPOINTS)
1050 RW=3
1060 F=3
1070 GOSUB 2470
1080 H=HPOINTS+1
1090 RW=20
1100 F=16
1110 GOSUB 2470
1120 GOSUB 2690
1130 FOR I=5 TO 25 STEP 5
1140 FOR D=1 TO 10
1150 CALL HCHAR(D,1,127)
1160 CALL HCHAR(D,1,127)
1170 NEXT D
1180 NEXT I
1190 FOR Q=5 TO 25 STEP 5
1200 K=INT(4*RD)+1
1210 ON K GOSUB 1080,1900,1520,1340
1220 M=INT(13*RD)+1
1230 ON M GOSUB 1960,1990,2020,2050,2080,2110,2140,2170,2200,2230,2260,2290,2320
1240 FOR C=5 TO 25 STEP 5
1250 CALL GCHAR(12,2,K)
1260 IF C<>K THEN 1290
1270 GOTO 1300
    
```

TI-99/4A PROGRAM

```

1290 NEXT J
1295 GOTO 1350
1300 FOR I=5 TO 25 STEP 5
1310 CALL GCHRR(10,T,X)
1320 IF K<P THEN 1340
1330 GOTO 1220
1340 NEXT T
1350 SH=COL(STR$(0.5))
1360 CALL HCHRR(7,Q,04)
1370 IF GUK<49 THEN 1420
1380 POINTS=10
1390 BE=0
1400 K=0
1410 GOTO 1650
1420 GOSUB 2650
1430 IF POINTS<1 THEN 1700
1440 RM="ENTER BET"
1450 R=0
1460 F=4
1470 GOSUB 2470
1480 CALL HCHRR(20,15,32)
1490 CALL KEY(O,K,S)
1500 IF S=0 THEN KK(49)+(K<57) THEN 1490
1510 BET=49
1520 CALL HCHRR(20,15,K)
1530 POINTS=POINTS-BET
1540 GOSUB 2650
1550 CALL HCHRR(20,4,32,6)
1560 CALL KEY(O,K,S)
1570 IF S=0 THEN 1560
1580 IF (K=69)+(K=88) THEN 1590 ELSE 1560
1590 CALL GCHRR(10,0.5,H)
1600 IF K<P THEN 1650
1610 GOSUB 2370
1620 GOSUB 1850
1630 GOSUB 2520
1640 GOTO 1700
1650 GOSUB 2370
1660 GOSUB 2750
1670 GOSUB 1820
1680 GOSUB 1810
1690 NEXT Q
1700 RM="WIN (Y/N)"
1710 R=24
1720 F=0
1730 GOSUB 2470
1740 GOSUB 2650
1750 CALL KEY(O,K,S)
1760 IF S=0 THEN 1750
1770 GOSUB 3180
1780 IF K=69 THEN 1030
1790 IF K=70 THEN 2480
1800 GOTO 1750
1810 FOR I=0 TO 30 STEP 5
1820 CALL SOUND(59,2000,1,4,1)
1830 NEXT I
1840 RETURN
1850 CALL HCHRR(10,0,P)
1860 CALL HCHRR(10,0,1,PP)
1870 RETURN
1880 KK=144
1890 RETURN
1900 KK=148
1910 RETURN
1920 KK=152
1930 RETURN
1940 KK=156
1950 RETURN
1960 P=49
1970 PP=48
1980 RETURN
1990 P=50
2000 GOSUB 2350
2010 RETURN
2020 P=51
2030 GOSUB 2350
2040 RETURN
2050 P=52
2060 GOSUB 2350
2070 RETURN
2080 P=53
2090 GOSUB 2350
2100 RETURN
2110 P=54
2120 GOSUB 2350
2130 RETURN
2140 P=55
2150 GOSUB 2350
2160 RETURN
2170 P=56
2180 GOSUB 2350
2190 RETURN
2200 P=57
2210 GOSUB 2350
2220 RETURN
2230 P=58
2240 GOSUB 2350
2250 RETURN
2260 P=8
2270 GOSUB 2350
2280 RETURN
2290 P=75
2300 GOSUB 2350
2310 RETURN
2320 P=65
2330 GOSUB 2350
2340 RETURN
2350 P=120
2360 RETURN
2370 CALL HCHRR(10,0,120)
2380 CALL HCHRR(10,0,1,120)
2390 CALL HCHRR(11,0,120)
2400 CALL HCHRR(11,0,1,120)
2410 CALL HCHRR(12,0,KK)
2420 CALL HCHRR(12,0,1,KK+1)
2430 CALL HCHRR(13,0,KK+2)
2440 CALL HCHRR(13,0,1,KK+3)
2450 RETURN
2460 GOTO 3000
2470 FOR I=1 TO LEV:RB
2480 P=RC(SEG$(STR$(POINTS)),I,1)
2490 CALL HCHRR(RI,F,1,R)
2500 NEXT I
2510 RETURN
2520 RM="YOU GET NOTHING FOR A PAIR"
2530 POINTS=0

```

```

2540 FOR I=30 TO 0 STEP -3
2550 CALL SOUND(59,111,1,1,1,2200,1,4000,1)
2560 NEXT I
2570 FOR I=0 TO 30
2580 CALL SOUND(59,1000,1,-7,1)
2590 NEXT I
2600 R=6
2610 CALL HCHRR(7,1,32,25)
2620 F=0
2630 GOSUB 2470
2640 RM="NOT IN THIS GAME"
2650 R=6
2660 F=0
2670 GOSUB 2470
2680 RETURN
2690 CALL HCHRR(20,24,32,5)
2700 FOR I=1 TO LEV*(POINTS)
2710 P=RC(SEG$(STR$(POINTS)),I,1)
2720 CALL HCHRR(20,24,1,P)
2730 NEXT I
2740 RETURN
2750 IF K<49 THEN 2770
2760 H=69
2770 IF K<69 THEN 2080
2780 IF P=5 THEN 2390
2790 IF P<75 THEN 2810
2800 IF H=5 THEN 2590 ELSE 2980
2810 IF P<81 THEN 2830
2820 IF (H=5)+(H=75) THEN 2990 ELSE 2990
2830 IF P<74 THEN 2050
2840 IF (H<74)+(H=5) THEN 2990 ELSE 2990
2850 IF P<49 THEN 2870
2860 IF H<64 THEN 2990 ELSE 2990
2870 IF P=H THEN 2980 ELSE 2990
2880 H=5 THEN 2990
2890 IF P<75 THEN 2910
2900 IF H=5 THEN 2980 ELSE 2990
2910 IF P<81 THEN 2930
2920 IF (H=5)+(H=75) THEN 2980 ELSE 2990
2930 IF P<74 THEN 2950
2940 IF (H<74)+(H=5) THEN 2980 ELSE 2990
2950 IF P<49 THEN 2970
2960 IF H<64 THEN 2990 ELSE 2990
2970 IF P=H THEN 2990
2980 POINTS=POINTS+(K<26)
2990 RETURN
3000 CALL CLEAR
3010 CALL SCREEN(2)
3020 PRINT "*****2*"
3030 PRINT "*****2*"
3040 PRINT "*****2*"
3050 PRINT "*****2*"
3060 RM="TOP SCORER "688
3070 R=3
3080 F=6
3090 GOSUB 2470
3100 CL="INT:14RND+3"
3110 CALL COLOR(12,CL,CL)
3120 FOR D=1 TO 50
3130 NEXT D
3140 FOR J=2 TO 6

```

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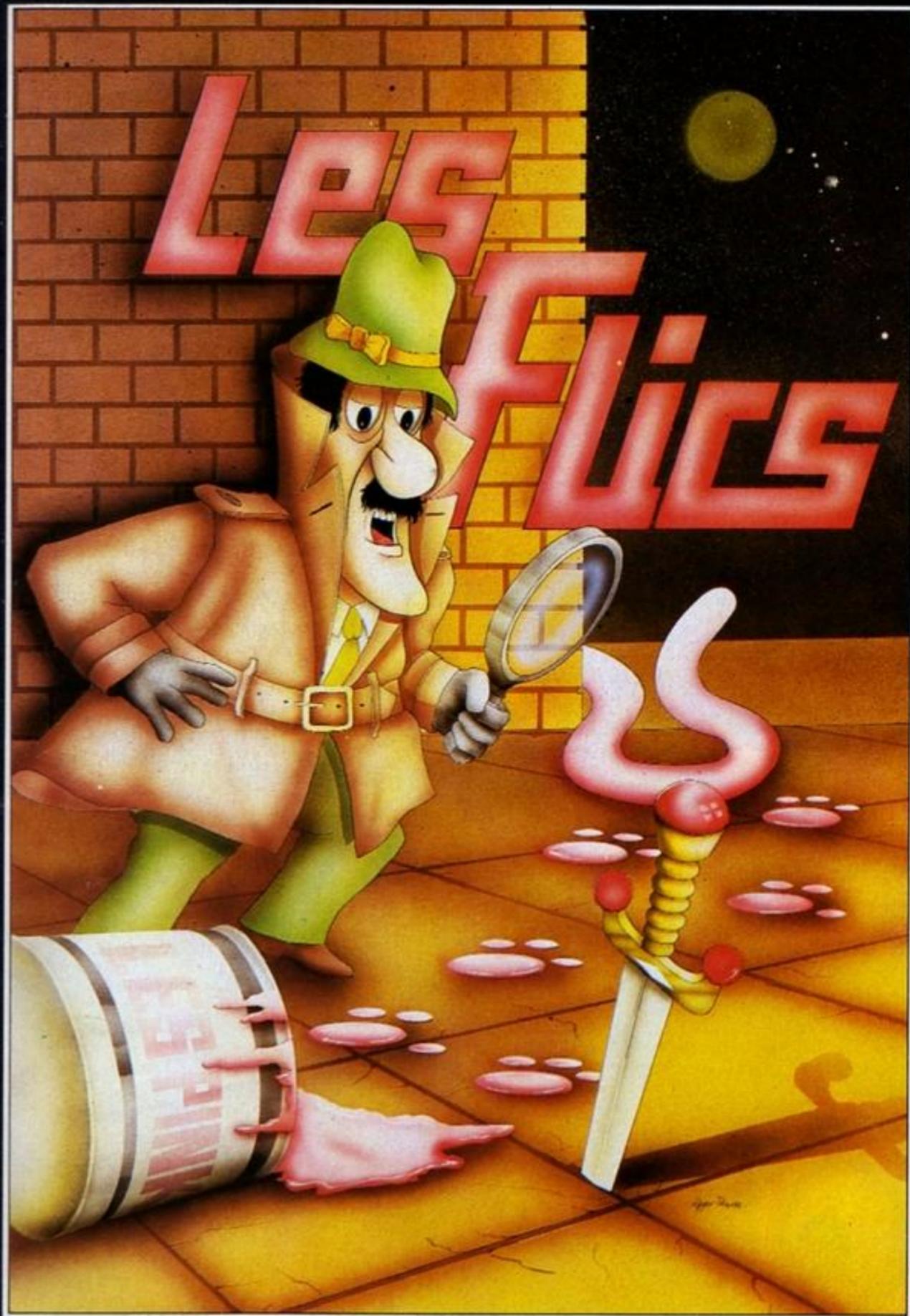
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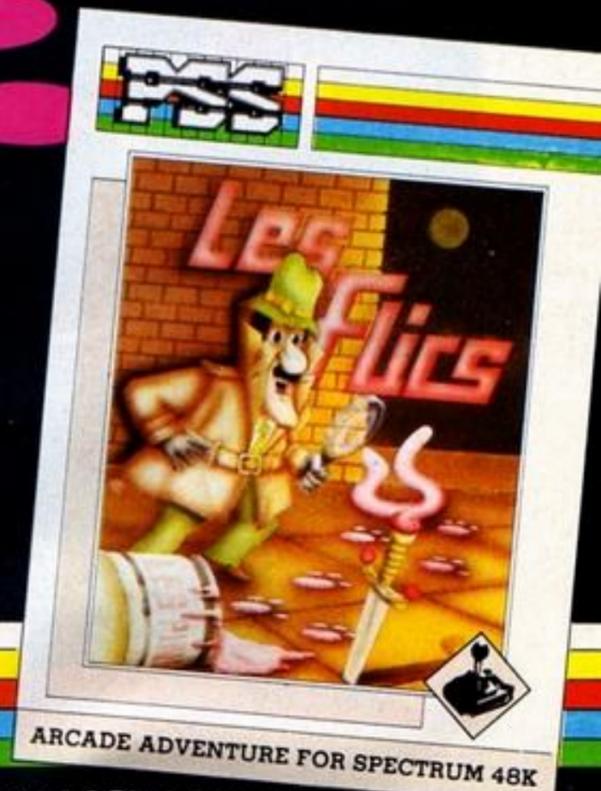
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