

## WEEKLY

35D 30 December 1993-4 January 1994 Vol 2 No 57

## This Week

**Commodore 64 games**  
Mike Green puts hand to joystick as he reviews another selection of C64 64 games. See page 16.

**Charlestown, Canada**

Kraft and Mervin Brain present a program which enables you to print your own Christmas cards on the Christmas 92. See page 74.

Figure 1

David Kelly talks to Keith Clark, co-author of nano-Prolog for the Spectrum, about the program's development. See page 13

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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All the latest software games including Two Gun Turtle Shoot, Lashers and Kick Off from Double Bus. See more at:

**★ STAR**  
Santa's Mission  
on 16-40K Spectrum.  
See page 10.  
**GAME ★**

## News Desk

## Spiderman to star in new adventure

**ADVENTURE.** International has concluded a deal with the Marvel Comics Group to put characters from the comics into a new range of adventure games.

The agreement states that many of the Mafiosi came back later — Spadaro, the Esposito brothers, Di Stasio, the Fiumara Four, the N. Bros., and many more — and for the second or third

## Advancing International

The idea is to link the impacts of each adventure game with the publication of a Marvel comic illustrating the story.

The first of the Marvel adventure games will appear in May. Versions of each program will be developed to run on the Atari, Commodore 64, Spectrum, BBC and Electron.



The Access and Commission sides will be worked in the US while the Spectrum and Access agreements will be carried out in this country by Advanced Information and INC.

The U.S.  
Foreign  
Investment  
Commission

**This is the age of the robot**

**FEDERATIONAL** robots met in Bay-  
gon three months ago at Detroit's  
and again in 1970.

American company Audio-Data has concluded a deal with British distributor Prou to market the company's three computer-aided rolled boats — Ford, Ato A/R and Tige, beginning in January. Each of the boats will be compatible with the BBC, Spectrum and Commodore 64 series.

Plans to serve will be Togo, the most advanced of the southern nations, where one wants to a focus more by an advanced link. Togo has some very good computer and is capable of remembering its own, measured and creating an instruction set to it from the master computer. A number of additional units give Togo advanced capabilities — graphics, some voice options and a speech synthesizer. Manual control directly from the system is possible using a joystick.

Find the least squares regression line.

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

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 FEBRUARY 19 - MARCH 20

# WILSON

**Featured**

www.elsevier.com/locate/jmb

[illegible]

Charles M. O'Connell  
1900-1970  
1900-1970  
1900-1970

**VIDEO GAMES** (Continued from page 10)

Trademark Software Two super-lightweight games built for standard PC. **Trademark 1** — Automatic Action design. **Trademark Telephone Tunes** (rated 2) — **Trademark** Game System. Most like classic **Trademark** music.

[illegible]

## Findings

Quinn

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[illegible]

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**BRITAIN'S BEST-SELLING MICRO WEEKLY**

# PHOENIX

## SOFTWARE

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COMARADERS

DRAGON 32

TOM

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Phoenix Software, Spangles House, 116 Marsh Rd Pinner, Middlesex 01 868 3353



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**LUNAR JETMAN**—A fast-paced, action-packed game that's a real challenge. It's a real challenge to play, but it's a real challenge to win. It's a real challenge to win, but it's a real challenge to win.

**PSST! THANKS**  
Spectrum



**LUNAR JETMAN**—A fast-paced, action-packed game that's a real challenge. It's a real challenge to play, but it's a real challenge to win. It's a real challenge to win, but it's a real challenge to win.



**COOKIE**—A fast-paced, action-packed game that's a real challenge. It's a real challenge to play, but it's a real challenge to win. It's a real challenge to win, but it's a real challenge to win.



**TRANS-AM**

**TRANS-AM**—A fast-paced, action-packed game that's a real challenge. It's a real challenge to play, but it's a real challenge to win. It's a real challenge to win, but it's a real challenge to win.

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## Adventure

Continued from page 1

Mike Woodruff, a year ago, has put its name in for publishing Spectrum and Acorn versions of the exciting 12 Scott Adams adventures. All the conversions work as fast programs has been undertaken by Digital Pictures founder Brian Horowitz and it is likely that he will be involved as work on the Marvel comic program.



Mike Woodruff

Adventure International UK has recently released the first four Scott Adams adventures for the BBC, machine: *Adventureland*, *Vivian's Castle*, *Private Adventure* and *Secret Mission*, each priced at £9.95. The first Spectrum titles — *Adventureland* and *Private Adventure* both £9.95, will include graphics and appear in January 1984.

The remaining Scott Adams adventures will be released out by one unit, towards the end of 1984, all £12 will be available for the BBC, Electron and ALC Spectrum computers.

## ITV says 'No' to micro

THE independent television companies have decided not to market on ITV micro.

At a meeting held in London on Monday, December 12, representatives of the ITV companies voted against a plan to offer a trial for the BBC's Acorn computer. Talks have been in progress for some time between the ITV companies and London computer manufacturers Thomson with a

## Breaker, breaker

COMPUTER magazine publisher VNU has agreed to pay Acornsoft £55,000 damages. This follows the publication of an article by Guy Ramsey in the January edition of *Personal Computer World* accusing Acorn of breaching its protected Acornsoft program.

## Monopoly game makers in new battle

AUTOMATA has launched an appeal for funds to help continue its legal battle with board-game makers Waddingtons over its property trading computer game *Automatopolis*.

On Tuesday last week the disagreement, which began in June, took a more serious turn when Waddingtons began legal proceedings against Automata to gain an injunction to stop sales of the Automata game, preventing a full trial planned for late January.

Prior to the new Waddingtons action it seemed that the dispute between the two companies had been settled. In July Automata agreed to change the name of its game in its advertisements and packaging from *Automatopolis* to *Go To And on*. This followed a complaint from Waddingtons that the public might confuse the Automata company game with its own box board game *Monopoly*.

"As far as we know that's all that was asked for," commented Automata's Neil Croucher on Saturday, "but we had to go to And on and the notice of the injunction hearing on Friday came as a complete surprise."

Although Waddingtons intends to proceed with its court action in January it has now agreed to drop its injunction

attempt pending discussions between the two companies this Monday, December 19.

At present there are some 13 computer versions of property trading games on sale by software houses in the UK, and the named Waddingtons action against Automata seems to have arisen because the company is discussing with Parker Brothers the possibility of developing jointly an official computer version of *Monopoly*.

Automata however is claiming that the idea of a property trading game has passed into common usage. "You cannot patent words like go to and on," says Neil. Earlier this year Parker Brothers lost its rights to trademark the *Monopoly* name in the US. The UK court decided that *Monopoly* had entered passed into common usage. No such decision has been reached by a British court.

Automata has now launched a campaign to raise funds to fight its case. In so doing it has the support of the Computer Trade Association. CTA secretary Nigel Burkhart commented: "The Waddingtons action represents a major threat to the whole computing industry. If they win about 50 per cent of the games software on the market would become *chilling*."

Computer Association secretary, Neil Snodden.

He dismissed suggestions that individual ITV companies, originally in favour of the micro plan, might go ahead alone. "The debate has taken place at the most senior level and every company has come around — I think the decision will stick."

## More robots

QUINE Robotics has been given more money by its backers, Proton, to help it develop its low-cost computer-controlled robots.

The company has now been given a further £250,000 to add to the £150,000 it received in May 1981.

Colin manufacturers the Zenith micro robot and a five-axis robot arm — the *Armored 1*.

## Your robot

Continued from page 1

the three machines will serve sent and will sell for under £280. Although lacking the sophistication of Tape, Fred is still capable of remote control through an infra-red link.

Representing Proton's development manager Graham Durbey "In the UK the most direct work with Acorn development has been with the Apple



Graham Durbey

computer, but Proton is developing its own high-level robot language to make the robots compatible with the BBC, Spectrum and Commodore computers."

Another which manufactures Fred, Bob and Tape, was formed two years ago by Allen's founder Niles Bushnell. Bushnell told Allen to Warner Communications in 1979.

To complement the arrival of the personal robots in the UK, Proton's associated publishing company PCC plans a new monthly magazine *Yacht Robot* due to be launched in March.

## Im Spectrum

SINCLAIR has announced the manufacture of its semi-automatic Spectrum computer.

The second-breaking machine ruled off Titan's Duxie production line on December 9.



The Spectrum is fast catching up the ZX81 which has to the sold 1.1 million units — a fact expected that the Spectrum will overtake the ZX81 in early February.

Since the Spectrum was launched sales have been running at an average of over 20,000 a month.

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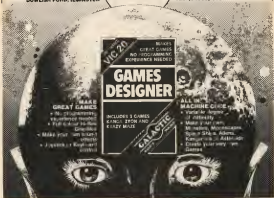
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# LETTERS

## Atic Atac evolution

I am writing to thank to be the first person to complete Ultimate's new adventure, Atic Atac. After completing it on 20th, I scored 32760 and finished 93 percent. My high score is 34670 and 95 percent.

The way to solve it is not, like Ultimate's other games, to simply blow all the monsters to bits, but to draw a map as you go. That's there are three points to the key — the round bit, one with 'AC' on it and one with 'H'.

PS My Cluskey Egg high score is 128,330.

Andrew Forrest  
Essex

## Save instruction

Thank you for publishing my letter in issue 48. Since then I have received a small error in my letter. I read that the machine code should be saved with:

SAVE COPY CODE WITH 94

This is slightly wrong. It should be:

SAVE COPY CODE WITH 97

This small error causes the last byte of the code to be missed out. The last byte is a "RET" instruction and without it the computer looks up after you type:

WANDERED OFF WITH

To save having to type the code in again just load the routine, type POKE 45537, 255, and save the code again using the correct save instruction above. The routine should now work once loaded.

Karl Thompson  
37 Harrogate  
North Carolina  
Sunderland  
Lancs WA6 6QA

## Dragon data files

Dragon discs have not been fully investigated yet, and the method of only a preliminary version, so there are many points that have not yet been discovered. One of these concerns the creating of data

files. If you use your discs for databases then you will need to use a string variable in conjunction with the Create command to:

10 INPUT NAME1

20 CREATE NAME1.DAT

This will create a Data file 100 bytes long and with the file name of NAME1. However, if NAME1 = " " then you will create a file that cannot be accessed in the normal way. It will appear on the directory as DAT 100.

No more? You may be able to find it that is to say Series 4 and if you know where it lives I suggest that you update another list in your program.

PS IF NAME1 = " " THEN  
GOTO 10

This will ensure you do not lose any valuable data files or waste disc space as you cannot kill the file because it has no name.

Hywel Francis  
1746 Software  
3 Ashton Close  
Exmouth  
Devon

## Escape from Jaws

I would like to hear from anyone who has got past the sharks in Aquaplane. I recently have and have now got to stage 6, stage 5 has the sharks while stage 3 includes logs, rocks, speed-boats and yachts. Stage 4 has logs, rocks, sharks and yachts. My score was 6680.

John Barker  
80 Trenton Road  
Trenton  
Cheshire  
Cheshire



'I'm sorry TV, I've been watching a video... I was rather looking forward to a second channel.'

## Torture, slavery...

How can Mr Crockett describe 'What's in it' games as the most negative in an Automata advertisement appears depicting certain, slavery, brutality and death, as well as a domesticated wild Father Christmas on the verge of shooting himself? That is what is sick (and hideously funny) — not Space Invaders.

What is more, the three commercial programmes that I have listed never even contemplate mass murder (although software critics may sometimes drive them towards it).

I think, however, that if Mr Crockett genuinely holds this opinion he does have a good point — but it is a point that pro-Christmas plug for Automata's non-violent games (as it is that, I suppose). Anyway, up with Atic Atac, Jack the Rapper, violent games and the Pumas.

Michael Clark  
14 South Street  
South Portsmouth  
Surrey TA9 3AD

PS Merry Christmas and a prosperous New Year to Automata and all the readers (that cover me a lot of Christmas cards).

## ... aggression and conflict

I like that I must write to you, to help you explore a few facts to the extremely narrow-minded Mr Crockett. I have just completed a social sciences course on aggression and conflict and would like to put Mr Crockett on a few points.

Through my studies I found that the most common cause of aggression was frustration and, although I also found that aggression is allowed to build up violence will result in many cases. I say to Mr Crockett to show a more human way of releasing natural tendencies in children than playing video games?

On a last note, as frustration is the biggest cause of violence, do you think that such

deliberately frustrating games as Pumas should be withdrawn from the market? Knowing Mr's feelings on protecting children, I am sure he will strongly now I have made the facts clear to him.

James Perkins (15)  
37 Fallow Way  
Spring Park  
Northampton

## High score answer

High scores — I have the answer

- 1 Build a backward program into games that reveals a programmed answer to each individual score.
- 2 High scores can then be matched with the ordered and then verified.
- 3 Split already done this in comparison with a 4000 comparison.
- 4 Some day all arcade games will be made this way.

Jon Andrew  
Inverness Software  
54 London Street  
Reading  
Berks

## Scrabble options

While playing Scrabble the other night I accidentally pressed the wrong keys and discovered two more 'options' not shown in the accompanying instruction booklet. These are D which gives you the letter distribution and T which gives you the 15 values.

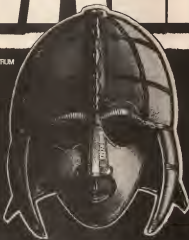
I also achieved a draw (the impossible?) against my Spectrum and the program self-destructed in this a bug. Peter's message or just my Spectrum getting tired is true?

Robert Steele  
37 Fallow Way  
Northampton  
Berks MK60 3DT

Scrabble obviously still has a few shortcomings willing to be discovered, though there should not detract from its otherwise excellent program.

# WALK

48K SPECTRUM





# ALFA

MOV  
SOFT



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1/1/81

# Santa's Mission

A new game for 16/88K Spectrum by Paul Selin

The object of the game for 16K or 48K Spectrum is to get Santa safely off his sleigh and on to a chimney-top. He must then visit every house where he will put down a present.

He can climb up and down chimneys and ladders, but he must be quick as his

escape route can be filled in behind him. Santa can also dig jumping keys (J) and eat food from the tables on the ground-floor (key E). Beware of getting drunk, as his stumbling will wake up the family if he goes upstairs, and if Santa is too fat he will not fit up the chimney.

Movement is by G and A for up and down and J and K for left and right. G will also call up the sleigh when Santa is on a chimney-top, and it will also let him jump on to the sleigh to win the game when every present has been put down.

```

04 000  SANTA'S MISSION
01 000  HIGHEST 1000
10 000
20 000  BELLOFT
30
40
500 LET SLEIGH PAPER 01 BOWDER 01 000 01 BOWDER 01
PAPER 01 PAPER 01 BOWDER 01 010
100 LET 000 LET 00 00
100 00 000 0000 00 000 0000
110 BOWDER 01 000 0000 LET 0000 LET 0000 000000 LET jump
110 LET 000000 LET 000000 LET 000000 LET 000000 LET
120000 LET 000000 LET 000000 LET 000000 LET 0000
130000 LET 000000 LET 000000 LET 000000 LET 000000
140000 LET 000000 LET 000000 LET 000000 LET 000000
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Figure 1

Figure 1 shows a schematic diagram of the experimental setup. The diagram illustrates the components and layout of the experimental setup, including the subject, the stimulus, and the response. The subject is shown interacting with the stimulus, which is presented on a screen. The response is recorded by the experimenter.

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# And now the Prolog

David Kelly talks to Keith Clark, co-author of micro-Prolog

**A**rtificial intelligence is no longer a dirty word in computing circles.

The days when the subject was regarded as being a preoccupation of ecclesiastical academics and of little practical use are long gone. On the contrary, AI is now one of the most important areas of computer development. Japan's Fifth Generation project is dedicating much of its energies in this direction and a great deal of interest has been shown in so-called expert systems — a practical offshoot of AI research.

It is this sort of work which now enables a robot not only to pick things up, but to carry on an undemanding even if the object to be supplied has fallen over and rolled from its proper position. The computer system driving the robot can immediately work out what has happened and alter its instructions to pick up from the new position.

The reason AI has caused a great deal of excitement is that this type of reaction is pretty much what a human would do in the same circumstances — hence the term artificial intelligence.

One of the people closely associated with the AI field is Keith Clark at Imperial College, London. He says "Robots can now plan for change."

"These so-called flexible robot systems mean that a machine can, for example, take a series of components in any order and still be able to assemble them together."

These sorts of techniques are now also beginning to appear in the more established areas of computing — word processing and data base management.

The interesting thing about AI research and its developments is that they are the results of a whole new way of thinking about computers representing a radical departure from traditional programming methods.

As programming is based around the manipulation of words and concepts rather than of numerical information. The idea involves communicating with the computer in ways much more closely aligned to natural language — beginning to approach the idea of talking to a computer in natural English.

**T**his is called Logic Programming. Bob Kowalski, also at Imperial, is credited with much of the early work in this field. The crucial device to use sets of sentences as programs — symbolic logic rather than numerical logic.

Different ways of thinking produce different solutions to problems and AI research has produced a number of symbolic programming languages. Lisp is one, but the up-and-coming star is Prolog.

Prolog was first devised in 1972 by Colmerauer and Roussellet, writing in Algol. The first version for a micro was written on a Sonoscan at Imperial by Frank McCabe in 1975.

Says Keith "Prolog is about reasoning with statements rather than with numbers."

With a Basic program you have to work through the program to find out what it is doing. Prolog says what it is doing. A Prolog program looks like a description of what you want it to do.

If all this sounds rather strange, then it is probably better to look at a specific example. Consider the simple Basic program to print the greater of two numbers.

```
10 INPUT X Y
20 IF X > Y THEN G
30 PRINT Y
40 GOTO 1
50 PRINT X
```

As a Prolog program this would be written as:

```
greater(X,Y) if X > Y
greater(X,Y) if Y > X
```

Using the Prolog program is also quite self-explanatory. To find the greater of two numbers 5 and 10 we:

```
write a greater-0 (5 10)
```

This is called Rule-Based programming. The logic for it goes back to Aristotle and the ancient Greeks, but more recently much work was achieved by the Logicians at the beginning of the century — people like Frege in Germany and Bertrand Russell in this country.

Husserl is fully with the computers now available that much progress has been made.

Prolog has been selected by Japan as the language for its Fifth Generation research work in the Expert Systems field.

"As a programming language, Prolog has a number of advantages," says Keith. "It has a very simple syntax. It can be read much like English and has the semantics of natural sentences."

"As an example of the sort of things it can do, Rand in the US wrote a war-crime simulation program in a similar rule-based language, Rascal. They were running it with all the American Generals there, but something was wrong with the strategy part of the program. They listed it out there and then the language was sufficiently high-level for the Generals, who had no knowledge of programming, to point out where the logic in the program was wrong."

If the program had been written in Pascal or Basic, then there is no way that would have been possible.

"Fundamentally, Prolog is describing rather than executing, unlike Basic. Prolog is termed a declarative language and it has no algorithms — Fortran loops and so on, as there are in Basic."

"It is only in the last 15 years that one work of Edinburgh has made symbolic

logic viable as a programming language. Prolog is just a formal version of symbolic logic using predefined statements to build up sentences and using inferences with those sentences to find answers."

A development of the has been the Intelligent Database. This is a database that is capable of acquiring new knowledge as it goes along. It is doesn't know the answer to a question. It will ask questions itself to try and get the information to answer the problem. Such a database starts off empty and asks questions and answer techniques to build up a store of "experience." It operates rather in the same way that a child learns.

In one sense, such an intelligent database can be thought of as a lot of people not building up and rearranging bits of facts.

**S**ays Frank McCabe and Keith Clark "Produced the first implementation on a micro in 1975, the versions of micro-Prolog have been continuously refined. There are now basically three different versions of the language designed to work with the Z80, 6800 and 6802 processors. These versions have been further refined to produce specific implementations on the Apple II/4 and Osborne computers."

In November, the team produced its most sophisticated version yet — for the 486 Spectrum. Published by Sinclair Research, the cassette-based version of micro-



Prolog costs £24.95 and comes with a hefty paperback book explaining the basics of logic programming in Prolog.

"For a long time Dave did not show much interest in Prolog, then he suddenly became very enthusiastic. Simon is now devoting quite a lot of effort to challenging the Japanese Fifth Generation project with its own work in AI — particularly now it has set up its Matsubara research facility."

The Spectrum version of micro-Prolog has over 50 pre-defined commands, words such as *Learn* and *in* Partin, there can be used to define other keywords, extending the language as required by a particular program. Micro-Prolog also features a built-in editor and error checking system.

Prolog will next be launched on the Acorn machine. The program is now finished and under test at Acorn. Acornsoft plans to release it for both the Electron and BBC machines in the late spring. At about the same time a Commodore 64 implementation should also appear, published by Commodore.

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# A stix in time

*Like Grace Jones has hand at another range of Commodore 64 software*

When the 64 first appeared on the scene, most of the software seemed to be unable to utilize the superb graphics and sound capabilities of the machine. But with the passage of time, better material has become available.

The latest batch of software contains quite a number of games, which illustrate the improved use of graphics and sound as well as the use of sprites, but I did find as I played them that I became increasingly annoyed at the "solitaire" facility of the console. What Commodore has done (in its wisdom) is make it easy for the programmer user to set the sprites so that if two sprites touch, then whatever you want will occur — usually the game ends!

But throughout this writing — on with the review.

The first game I tried was *Falcon Patrol* from Virgin Games (very competitively priced at £6.95). As most of you are aware, Virgin has recently moved from the music and record world into computer software and their experience shows. The cassette sleeve has a professional and refreshing appearance (more in line with music cassettes) in that there is none of that tiny script, so beloved of software cassette sleeves.

Instead we are given a nicely presented layout of instructions, picture and even a little story about the author (one Steve Lee — photograph and all). It appears Virgin are attempting to create personalities out of the programmers (not to see them recognised efficiently with potted biographies for all us punters to learn and dream about).

*Falcon Patrol* consists of a jet plane zooming along over a superbly depicted countryside (trees, houses and roads) trying to shoot down the badgers before you yourself run out of fuel (stated, gas! in the program — ugh). As soon as I began to play this game I had a feeling of awe so, as though I'd played the game before (sure enough, a glance through my post reveals the Vic revealed in *Popular Computing* (Weekly 14-20 July) a game distributed by Quickbase and called *Jethawk* which is very similar to *Falcon Patrol*, apart from the enhanced graphics that the 64 will allow. However, *Falcon Patrol* costs £1 less than *Jethawk* and is definitely superior in presentation.

The jet plane is able to bank, take and crash; it is especially exciting early on and the enemy fighters also look much better than in the Vic version. The bombs and explosions are more realistic and the sprite ability of passing in front of each other also allows a 3D effect as the plane zooms low in front of the buildings and roads on the ground. This game is one of the best I've seen for the 64 so far.

Let's move on now to Quickbase itself,

who have a release known as *Quinto Manor*. Priced at £7.95, this game is certainly quite considerably by *Falcon Patrol* in both visual graphics and concept. The cassette sleeve boasts a futuristic barbarian (brinkshag) has say (but what a slightly obscure inroad covers in front of him) (I assume the sound to be a matter from the gut of the explanation). The cover looks extremely professional, but this impression is lost immediately upon loading the game — not only is the first layout simple and unimaginative, but it's fairly obvious that whoever is responsible for error-checking missed out, as the word for a typed word in the instructions.

The instructions within the program are sparse in the extreme, consisting of several pages of text concerning our imaginary world — the *Quinto Manor* is here to fight the badgers while avoiding something known as the *Zad ray* and various other perils — but offering no reference to playing the game. As the language is really written designed to hide the fact that once again we have a type of *Squad Invaders* — the mutants and look like little fish and gradually move up the screen, whilst a pair of initial ray guns move up and down the sides of the screen blasting at you.

So the game is fairly original. But it is fun and my two sons (aged ten and six) seem to get immense enjoyment from playing. Shouts of anger, joy and frustration accompany the tape and beeps (the usual noises in other words) and I found the atmosphere of the game quite repetitive. There are 31 different levels (as you move up so you find the mutants increase in number and both they and the *Zad rays* move faster) and obviously we found that increasing the skill level increased the score dramatically.

Although is presumably a trade name for software from Superior Systems in Sheffield, but the cassette I received (called *Star Attack* (costing £7.95) might have been better left out than reviewed. On the cassette we are promised fast action machines, code, high-resolution graphics and imaginative sound effects — but I suppose you could use those words to describe virtually anything these days. *Star Attack* looked amateurish as it loaded,

and it was. At the start of the game a spaceship appears (graphics were okay) from the bottom of the screen as though it were rising from the deep. Along the top is a bar of status facilities also appear and begin to peel off and attack.

Up to now that could be one of any number of games, but unfortunately here the similarity ends, for *Star Attack* resembles some of the worst games I reviewed for the Vic back in the early days. The problem is that you cannot move your ship with the joystick, only fire your own rays by pressing the fire button. If you want to move, you have to press keys J or K.

I may have sounded harsh over *Star Attack* (after all, some people don't have joysticks) but it's not when I compare it with a game like *Star Wars* (Supersoft) that the poor quality shows. *Star Wars* (priced at £8.95, but worth it) is that rare event in a reviewer's life — a truly different game that sells for as well as speed and isn't really very complicated at all. I haven't seen a game quite so delightful for a long time.

Forget all the spiel on the cassette sleeve about hyperspace and field syntheses — what you have is a random bundle of energy which looks more like a bundle of sticks (hence the title I assume) which is constantly changing shape and moving around inside the screen area. Your task is to draw lines around this bundle (trapping it in an ever-decreasing



space, using a little trick which makes vertical and horizontal lines. To make life just a little difficult, you have two other little tricks: cheating you along the lines you have drawn and a line of the sticks should touch you line before it is completed — *crash!* You've lost a life.

More words cannot describe both the fun and the skill of this game. At a game, I found myself returning to it for enjoyment alone (not excited up for a slightly better review) and I'd put additively high. The game is my favourite of the bunch this time round.

Harvey Horace from Melbourne House (35 65) is really *Phantom* with a do-it-yourself facility. You have four levels of



meets its match with *Monster* (seeing the first as you go) and instead of groats, there are a few black 'jokers' after you if you eat the stars but the 'jokers' take flight (a real effect here as their hair stands on end) and you can 'eat' them instead otherwise it's *Pacman* to a 7.

As well as the standard game, though, you can also draw your own maze and save it to cassette once you've learned how to manipulate *Monster* through the maze provided. This is an excellent addition to the game, although drawing mazes isn't as easy as it looks and it's advice you to get out your pen and paper first.

This is not the best type of *Pacman* around and in level three I found it high impossible to beat the jokers. No doubt it is possible, but one of the few problems with arcade games is the difficulty level — just how hard do you make it?

Talking of difficulty brings me neatly to *Crusty Cavern* from Martin Software at £15.00. Quite a nice little handheld, a well-drawn scene of mountains in the background and a spine-less caverner who has to contend with a load of hazards that the environment is going to throw at him. It is far like *Atari King* in concept, but without the graphics.

First, a number of rocks come rolling along which you have to jump (by moving the joystick forward) and then if you

survive that along come another batch. Jumping these rocks is extremely hard so, thanks to the collision facility on the sprites, if you just touch one — bye bye caverner. Eventually, the rocks do stop and dinosaurs appear and come at you with remarkable ferocity. You need to top three lights on the head with your axe (which was never a strong point in computer games — was it?) to survive into the next stage.

This game illustrates a point I've made before — why is it that if you lose all your lives, you are forced to go right back to the beginning and start jumping rocks again? It would be nice to have three lives in each stage but be able to short-circuit a stage (if you want to) so that at least the older players like myself can actually get to see the later stages.

Anyway, *Crusty Cavern* is not going to set the word on fire — but it's well drawn and fairly priced.

Commodore produces its own software, usually pretty competitively priced, and to finish I have a cassette and a cartridge to look at. This cassette is called *Maggotopia* and costs £5.00 — a good price for a good game. The action is pretty fast and the game, whilst being the usual step-up type, has a touch of fun which seems to set it apart from much of the competition.

The idea isn't new, of course. This (like you are a creature in a field full of deadly



flowers, and a host of giant maggots, spiders and snails seems to want to get you. The cassette scene shows a man amongst three giant moths in the manner of *The Incredible Shrinking Man* (well I never forget that spider...) but the actual game is more like the traditional arcade monster type.

What is good is that the creature does not come at you with much speed you never have a chance to know what's going on and you have several tasks to accomplish to try and survive. First, you need to destroy a few of the poisonous flowers to clear some room so you can dodge the maggots should they reach the bottom of the screen. Next you must blast the maggots, spiders and snails with a certain degree of persistence if you wish to 'top four score' and stay alive.

The graphics are pretty good (although you are depicted as a slightly insignificant blue meerkat) and the spiders are excellent (but the thing I find best was the satisfactory noise my blaster made as I fired away. Surely this game may be built round it good for all well.

Finally, a Commodore cartridge called *Lazarus* priced at £5.00 (which seems excellent in view of those earlier cartridge costs in the 'mid-80 days of yore). Oh, the joy of instant loading (don't forget to switch your 64 off first) and off we go.

*Lazarus* comes with a small booklet of instructions (Commodore has always been excellent in providing clear and concise instructions) and has three phases to play. You are piloting a spaceship (which looks more like a lighter from some of the *Atari Kings* I've seen than a spaceship, but never mind) and you have to release various water ships to fall to the feet phase. If you manage this you end up by testing the deadly one-eyed space tentacles (Commodore's phrase — no mind who just happens to be called *Lazarus*).

The 64 is attracting better software now and some of it uses the sprite and other goodies so well. But as always with any of these games, it's not really the graphics and the sound effects (although they do help with another version of a well-established arcade hit) it's the originality that counts — and for my money *Star Trek* Supersoft were hardly down.

Firm	Program	Cost	Value-for-money
Commodore 275 Ross Avenue Slough Trading Estate Slough Bucks	<i>Maggotopia</i> <i>Lazarus</i>	£5.00 £5.00	7
Alphatec Sutton Systems 178 West Street Sheffield S1 4BT	<i>Big Attack</i>	£7.00	6
Vigor Games 4140 Potomac Road Lanham WI	<i>Pacman Patrol</i>	£5.00	8
Melbourne House Glenn College State House Station Road Oxfordshire Leighton Buzzard Beds LU2 3PA	<i>Hungry Monsters</i>	£5.00	8
Quintec Pinnerdon Park House 12 Pinnerdon Road Southampton SO1 1LL	<i>Quintec Wonder</i>	£7.00	8
Martin Software Business & Technology Centre Rensselaer Drive Savoygate Hertfordshire SG1 2DX	<i>Crusty Cavern</i>	£5.00	8
Supersoft Winchester House Canterbury Road Wickborne Warwick Middlesex HA3 7BJ	<i>Star</i>	£5.00	10

## Round the circuit

**Roy Macafield** presents a program to help select the optimum operating point for transistors.

Anyone who has had to design electronic circuits using transistors will have come up against the problem of selecting the best operating point for the transistor. The correct point is of particular importance when designing small-signal voltage amplifiers. While the use of integrated circuits has reduced the need for single transistors in a lot of applications, there are still many cases which call for the use of individual transistors.

directly used to bring us all up to date on theory, but it was what conditions must be met to leave the transistor happy. Figure 1 shows an npn transistor with the essential direct current (dc) potential differences (vdc) and currents indicated.  $V_{CC}$  is the collector dc emitter-geed used here to be large enough to maintain the required collector current  $I_C$ .  $V_{EE}$  is the collector to base geed, which must always be such as to reverse-bias the base-collector diode junction. In the case of an n-p-n transistor, this means  $V_{EE}$  must be at a lower potential than the collector — for a p-n-p transistor, this base-geed has become

$V_{BE}$  is the base to emitter gap and must be small as to forward bias the base-emitter diode junction as at a higher gap for  $n$ -pn and lower for  $p$ -np.  $I_E$ ,  $I_B$ , and  $I_C$  are the collector, base, and emitter currents respectively. Without going into transistor theory, it will suffice to say that small changes in base current can produce large changes in collector current, and this is seen in Fig. 10. The base current can be

**Keywords:** child sexual abuse; disclosure; social support

Now, suitable values of  $V_{DD}$ ,  $I_D$  and  $I_B$  can be found from the transistor manufacturer's literature, either from the tabulated data or from the characteristic curves. Figure 2 shows a typical set of collector characteristic Curves. collector current is plotted against collector-emitter pd for several different values of base current. We might choose as our quiescent operating point (a, with no applied signal) some central point like Q. This establishes  $V_{CEQ}$ ,  $I_{CQ}$  and  $I_{BQ}$ .

What we have to find out are the values of the components we shall need in the output circuitry to give these operating conditions. Figure 3 shows a simple circuit for this.

$R_1$  and  $R_2$  form a potential divider to provide the base bias.  $R_3$  is the collector load across which the output signal voltage is developed.  $R_4$  is a stabilising resistor to prevent thermal runaway, and it is usually heavily decoupled by a large electrolytic capacitor  $C$  so that all alternating current (ac) signal frequencies  $R_4$  is virtually shorted out. This capacitor has no effect on the dc.

Quite simple formulas can now be used to find the values of the first moments, if we know one or two initial conditions:

- [1] The current in the differential divider,  $I_D$ , is usually taken to be at least 10 times the bias current,  $I_{B1}$ , so as to have a swamping effect.

- (d) The supply voltage  $V_{DD}$  is taken as  $V_{DD} = V_0$ .
- (e) If  $V_{DD}$  cannot be found from the manufacturer's data, a good estimate is 0.6V for a silicon transistor, or 0.3V for germanium.

The formulas, all relying only on Othello's

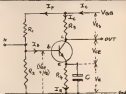
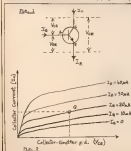
$$\begin{aligned} P_{11} &= \frac{V_{110} - (P_{110} + V_{10})}{I_1} & P_{12} &= \frac{V_{120} - V_{10}}{I_1 - I_2} \\ P_{13} &= \frac{V_{130} - (P_{110} + V_{10})}{I_1} & P_{14} &= \frac{V_{140}}{I_1 - I_2} \end{aligned}$$

Having worked out these values, it is now possible to check if the amplifier will give the desired results — load lines can be drawn, input and output impedances estimated, amplification and power dissipation checked. If they don't come up to specifications, then it may be the operating point must be re-set; it is here that the short accompanying computer program comes in useful since it will do the tedious work so that several different operating points can be tried and compared.

On Run, you will be asked for  $V_{100}$ ,  $I_1$ ,  $I_2$  and  $V_{20}$ . The program will be  $R_1$ ,  $R_2$ ,  $P_1$  and  $P_2$  together with the power rating suitable for each resistor. This is full-class mode. (The actual power dissipated

The program is written for the Sinclair Spectrum, but as no graphics are used it will translate for other machines very easily.

A final word of caution — don't expect your translator to behave exactly according to the calculations. Individual translators may vary from the published characterization by quite a large amount. All you can expect is a reasonable guide to the circuit values needed for correct bias. Some adjustment may be necessary once you get close to the actual construction.



```

T 2EN TRANSISTOR OPERATING PO
INT
1 DEN C U.S. Halfp14 1983
10 POINT TO 3 TRANSISTOR OPE
ATING POINT PRINT
30 POINT Select operate po
n100 trace -1000 collecting char
n1000 trace -1000 collecting char

```



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## A manipulative art

**Thriller** *Ten* unravels some of the mysteries of screen manipulation in the fourth of a six-part series

**T**his week's exercise is in the gentle art of screen manipulation — how to plot characters, draw lines, plot points, detect screen cues — there's a lot to cover and little space, so off we go!

The file can be used quite easily with most of the normal requirements and, since there are 1801 books available which give the chronological format of the Spectrum's Green map, I have omitted mention and slipped over it in these articles.

When printing normal text characters, the best approach to adopt is to use the flat 108 facility in the ROM. For newspapers, flat 108 is a single-byte Z80 instruction which is equivalent to Call 108. In the Spectrum, this command has the effect of transferring the character held in register A to the currently selected output device.

In most cases, this would be just the screen, but there is no reason why you cannot open a stream to any output device (for example, two lines of display or a Modem) or file (or FIFO), and output data to a device of your choosing. For this reason, you must always indicate to the Nam which device is to be used by calling a routine at address 00104 Register A must contain the stream number to be selected. Note that this does not open a stream, merely directs all subsequent output data to that stream, so to direct output to the screen.

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**Abstract**

117. **Reduction of the risk of the spread of**  
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Journal of Internal Medicine 255: 101–108

So, in order to print ASCII on the screen, you would code:

NO	AGE
CHL	20-29
LO	30-39
HT	40-49
LO	50-59
HT	60-69
LO	70-79
HT	80+

How about moving the print position? Easy! Any of the control codes listed in the Sinclair handbook (appendix A) can be sent to the screen and will act in the way you think for. Tab will be expanded into the full form and unused characters (eg, codes 0-5) will be printed as a question mark. If you want to print at line 4, column 27, you

LD-A 20	AT (antithrombin)
LD-B 10	
LD-A 1	new number
LD-B 10	
LD-A 1	old number
LD-B 10	

This feature holds equally for attribute control characters as well, so you are able to alter the nearest bright flash, over and over, attributes at will.

However, writing long chains of `Let` expressions in a program becomes extremely tedious, and you begin to feel that there must be an easier method of coding your instructions to a third new Star Trek game than that first rot, because a routine of address `8080C` will print a complete string, provided you have an

register pair `Di` to hold the address of the first character in the string and `R2` to hold the length.

Listing 1 contains three routines, one of which, `PemToAscii`, shows the way you can easily include this ASN routine in your own programs with the aid of a small subroutine. In most cases, strings are shorter than 256 characters so `PemToAscii` assumes that your data string includes an initial "large count" character which is a single byte. It is not too difficult to alter this to allow for a 16-bit string length, but I would only do it if necessary, since it forces every string to waste one byte if not required.

You can then print an entire string by

Full Name (Printed)	Living Address
Cellular Telephone	Home Phone

**RESEARCH**  
**DATA**  
**ANALYSIS**

On to points and lines. Points are especially easy — a single float routine addresses 20250h will plot the point whose co-ordinates are given in the AC register pair — register B holds the X-co-ordinate while C holds the Y-co-ordinate. Co-ordinates follow the standard convention of 0-255 in the x-direction, and 0-170 in the y-direction with (0,0) set at the bottom left-hand corner of the screen.

As an example you may like to write yourself a "joke printing" subscription time list for the "joking printing" subscription given in listing 1. This makes it quite easy to include phase divisions in programs.

Later the slightly more complicated  
since all drawing is relative to the first point  
plotted I have given a second routine to

[illegible][illegible]

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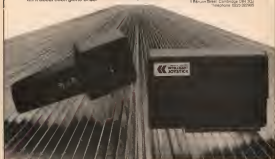
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# A message for Santa

Steven and Keith Brain show how to create computer Christmas cards

As the festive season approaches once again, most users everywhere are rubbing their hands with glee and hoping that Santa will be bringing them the latest game, book or add-on module, or that he might even squeeze a disc-drive or printer into his sack. The user must employ desperate tactics to make sure that his dreams are not forgotten. One of the most effective ways of doing this is to send suitably subtle Christmas cards to all of Santa's little helpers.

How does it go if you don't need to spend too much money on needless fatality, sending Christmas cards is a very expensive business these days. Of course you could get paper and coloured pencils and produce some home-made Christmas cards (but that's not going to impress anyone, is it? Why not design a series of Christmas cards using the excellent hi-res graphics of the Dragon and save these as machine code files on your humble tape unit.

The main problem is that drawing a Christmas card from scratch in Basic is very time consuming. Graphic designer programs give you a drawing cursor and allow you to access all the hi-res commands directly from the keyboard, but producing a whole series of different designs is still a mammoth task. However, if you look up a lot of Christmas cards you will soon realise that certain objects (like Christmas trees, bells, holly, snow, etc) occur with monotonous regularity, but in different combinations and colours. We have therefore put together the following program which produces pictures of a series of these standard Christmas objects and then allows you to place copies of these anywhere on the screen with a single key press. A text message can be added and the final designs are easily saved to tape or disc.

Notes are included in the program listing, but the general format is as follows — first of all, the system is initialised, eight graphics pages cleared and arrays set up to hold the screen areas we will draw and the cursor (C). The actual routines which form the objects reside from 10000-10100 and we draw these into arrays with lines 10110-10200. V0-1000 contains a list of valid keys and then the rest of the variables are set up. If no key is pressed the cursor flashes (1130-1140). If a key which has been defined in V0 is pressed, then the appropriate action subroutine is called (1040).

The cursor keys specify the screen position, provided that the limits are not exceeded (1090-1100). The functions of the control keys are listed in table 1. 'T', 'R', 'H' and 'B' respectively Put, Print the array containing the tree, pudding, holly or bell at the current cursor position. The number

keys 1-4 give circular decorations in the four colours, and 5-8 similarly produce stars (snow). As these small objects are drawn rather than being Put, Print they do not affect the background.

\* Translate you to text mode, where you can write your messages. 'Z' produces a temporary copy of the current screen on the top four graphics pages, and / retrieves this copy. This rubber-stamping feature enables you to test the result of a change in your design, without the danger of permanently ruining the whole picture. Shifted keys 1-4 change the size of the cursor movement. 'S' saves a machine code dump of the graphics pages onto tape and 'L' loads it back. Pressing shift and clear at the same time clears the screen if you have made a mess!

The hi-res text routine which is included simply draws characters. These are defined in line numbers which correspond to the Ascii codes (certain characters have not been included, so you can define your own in these positions — to avoid CP errors, fit any empty lines in this area with Print). Letters and numbers are defined the cursor keys control your position, and the colour can be changed with shifted keys 1-4 (sense by using the background colour).

To change the angle of the letters, press Enter and then a number from 0-9. The scale used gives 16x12 characters which seems a reasonable size, but if you want to change this alter the value of S in line 1420.

If you want a series of cards on tape, a simple loader program will call them back in turn. There is no need to specify filenames and, as each loads, it will replace the previous picture from the top down.

```
REM:LOAD 1:1 SCREEN 1:1 P0L
B0:DATA
44:GOTO 45
```

If you prefer each card to spring into place instantaneously, you can reserve eight pages from the top four, and only Pcopy from the first four when each load is complete.

```
10:POKE 10400:10410:10420:10430:10440:10450:10460:10470:10480:10490:10500:10510:10520:10530:10540:10550:10560:10570:10580:10590:10600:10610:10620:10630:10640:10650:10660:10670:10680:10690:10700:10710:10720:10730:10740:10750:10760:10770:10780:10790:10800:10810:10820:10830:10840:10850:10860:10870:10880:10890:10900:10910:10920:10930:10940:10950:10960:10970:10980:10990:11000:11010:11020:11030:11040:11050:11060:11070:11080:11090:11100:11110:11120:11130:11140:11150:11160:11170:11180:11190:11200:11210:11220:11230:11240:11250:11260:11270:11280:11290:11300:11310:11320:11330:11340:11350:11360:11370:11380:11390:11400:11410:11420:11430:11440:11450:11460:11470:11480:11490:11500:11510:11520:11530:11540:11550:11560:11570:11580:11590:11600:11610:11620:11630:11640:11650:11660:11670:11680:11690:11700:11710:11720:11730:11740:11750:11760:11770:11780:11790:11800:11810:11820:11830:11840:11850:11860:11870:11880:11890:11900:11910:11920:11930:11940:11950:11960:11970:11980:11990:12000:12010:12020:12030:12040:12050:12060:12070:12080:12090:12100:12110:12120:12130:12140:12150:12160:12170:12180:12190:12200:12210:12220:12230:12240:12250:12260:12270:12280:12290:12300:12310:12320:12330:12340:12350:12360:12370:12380:12390:12400:12410:12420:12430:12440:12450:12460:12470:12480:12490:12500:12510:12520:12530:12540:12550:12560:12570:12580:12590:12600:12610:12620:12630:12640:12650:12660:12670:12680:12690:12700:12710:12720:12730:12740:12750:12760:12770:12780:12790:12800:12810:12820:12830:12840:12850:12860:12870:12880:12890:12900:12910:12920:12930:12940:12950:12960:12970:12980:12990:13000:13010:13020:13030:13040:13050:13060:13070:13080:13090:13100:13110:13120:13130:13140:13150:13160:13170:13180:13190:13200:13210:13220:13230:13240:13250:13260:13270:13280:13290:13300:13310:13320:13330:13340:13350:13360:13370:13380:13390:13400:13410:13420:13430:13440:13450:13460:13470:13480:13490:13500:13510:13520:13530:13540:13550:13560:13570:13580:13590:13600:13610:13620:13630:13640:13650:13660:13670:13680:13690:13700:13710:13720:13730:13740:13750:13760:13770:13780:13790:13800:13810:13820:13830:13840:13850:13860:13870:13880:13890:13900:13910:13920:13930:13940:13950:13960:13970:13980:13990:14000:14010:14020:14030:14040:14050:14060:14070:14080:14090:14100:14110:14120:14130:14140:14150:14160:14170:14180:14190:14200:14210:14220:14230:14240:14250:14260:14270:14280:14290:14300:14310:14320:14330:14340:14350:14360:14370:14380:14390:14400:14410:14420:14430:14440:14450:14460:14470:14480:14490:14500:14510:14520:14530:14540:14550:14560:14570:14580:14590:14600:14610:14620:14630:14640:14650:14660:14670:14680:14690:14700:14710:14720:14730:14740:14750:14760:14770:14780:14790:14800:14810:14820:14830:14840:14850:14860:14870:14880:14890:14900:14910:14920:14930:14940:14950:14960:14970:14980:14990:15000:15010:15020:15030:15040:15050:15060:15070:15080:15090:15100:15110:15120:15130:15140:15150:15160:15170:15180:15190:15200:15210:15220:15230:15240:15250:15260:15270:15280:15290:15300:15310:15320:15330:15340:15350:15360:15370:15380:15390:15400:15410:15420:15430:15440:15450:15460:15470:15480:15490:15500:15510:15520:15530:15540:15550:15560:15570:15580:15590:15600:15610:15620:15630:15640:15650:15660:15670:15680:15690:15700:15710:15720:15730:15740:15750:15760:15770:15780:15790:15800:15810:15820:15830:15840:15850:15860:15870:15880:15890:15900:15910:15920:15930:15940:15950:15960:15970:15980:15990:16000:16010:16020:16030:16040:16050:16060:16070:16080:16090:16100:16110:16120:16130:16140:16150:16160:16170:16180:16190:16200:16210:16220:16230:16240:16250:16260:16270:16280:16290:16300:16310:16320:16330:16340:16350:16360:16370:16380:16390:16400:16410:16420:16430:16440:16450:16460:16470:16480:16490:16500:16510:16520:16530:16540:16550:16560:16570:16580:16590:16600:16610:16620:16630:16640:16650:16660:16670:16680:16690:16700:16710:16720:16730:16740:16750:16760:16770:16780:16790:16800:16810:16820:16830:16840:16850:16860:16870:16880:16890:16900:16910:16920:16930:16940:16950:16960:16970:16980:16990:17000:17010:17020:17030:17040:17050:17060:17070:17080:17090:17100:17110:17120:17130:17140:17150:17160:17170:17180:17190:17200:17210:17220:17230:17240:17250:17260:17270:17280:17290:17300:17310:17320:17330:17340:17350:17360:17370:17380:17390:17400:17410:17420:17430:17440:17450:17460:17470:17480:17490:17500:17510:17520:17530:17540:17550:17560:17570:17580:17590:17600:17610:17620:17630:17640:17650:17660:17670:17680:17690:17700:17710:17720:17730:17740:17750:17760:17770:17780:17790:17800:17810:17820:17830:17840:17850:17860:17870:17880:17890:17900:17910:17920:17930:17940:17950:17960:17970:17980:17990:18000:18010:18020:18030:18040:18050:18060:18070:18080:18090:18100:18110:18120:18130:18140:18150:18160:18170:18180:18190:18200:18210:18220:18230:18240:18250:18260:18270:18280:18290:18300:18310:18320:18330:18340:18350:18360:18370:18380:18390:18400:18410:18420:18430:18440:18450:18460:18470:18480:18490:18500:18510:18520:18530:18540:18550:18560:18570:18580:18590:18600:18610:18620:18630:18640:18650:18660:18670:18680:18690:18700:18710:18720:18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```





# SCREENPLAY

134 St. Vincent Street, Glasgow G2 5JU. Telephone 041-248 2481

**CHICKAROO:** A word recognition game for children. Find the missing letter in the name of this game which can be used by up to four players.

**PIRATES:** A childrens game based on word recognition. Identify the concealed word before you reach the end of the plank or else face the perils of the deep.  
A vocabulary of 100 words is supplied with both of these games, however, parents have the option of adding their own data files.

## BBC EDUCATIONAL

**MAD MONTY:** It's mauling by MONTY the MAD python and frogs are on the menu! Guide him round the garden gulping frogs and munching magic mushrooms — beware those toadstools and if you keep your cool mouse may be on the menu.

**THE ANIMATOR:** The perfect DRAGON graphics tool allows you to define your own characters and then make them spring to life on the screen. The animator machine can then be saved on tape and combined with others to create your own games.

## DRAGON 32

**THE ILLUSTRATOR:** A graphics design package which can be used in a graphics Modes 1 or 2 to generate full colour illustrations on the screen of your micro. This package allows graphics and text to be mixed on screen and saved on tape for later use.

**MAD MONTY:** A fast and furious version of the snake in the garden game for the MODEL B BBC MICRO. Monty — the well known python — lives in a garden inhabited by juicy flowers. Help him munch his lunch but mind those rocks and walls!

## BBC GAMES AND UTILITIES

**MAD MONTY:** This version of the snake game has 7 screen layouts and five speeds from sublime to ridiculous. Monty munches frogs for lunch and is perfect for the odd mouse for others.

**COMMODORE 800M:** Complete machine code toolkit for the 64. Assembler, Disassembler, Monitor, Hex dump.

## COMMODORE 64

## SCREENPLAY SOFTWARE MORE FUN THAN GAMES

Our range of software includes games but we believe that your micro should do more than test your reflexes. For example, **CHICKAROO** and **PIRATES** are educational products designed to help you extend your children's vocabulary.

**THE ILLUSTRATOR** turns your TV screen into an electronic canvas. The only limit is your imagination. **DRAGON** users are you bored with other people's games? Let **THE ANIMATOR** help you create your own.

## LIBERATE YOUR MICRO WITH SCREENPLAY SOFTWARE

BBC	800M	PRICE
CHICKAROO	<input type="checkbox"/>	£7.95
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# Programming by angles

Czes Kozmowski concludes his demonstration of trigonometry in programming

## Non right-angled triangles

The first two examples from the scale drawing section may be solved by using the Right-Angled Triangles program. The third example (usually) involves non right-angled triangles.

A triangle has three angles and three sides. If we know the values of any three of these (except three angles) then we can find the values of the other three. For example we might know the length of two sides and one angle. We can then find the length of the third side and the value of the other two angles. To do this we use a formula.

Let's call the three angles in our triangle  $x$ ,  $y$  and  $z$ , the three sides  $xx$ ,  $yy$  and  $zz$  where side  $xx$  is opposite angle  $x$ , etc. (see Figure 10).

Figure 10



The following formulae relate the various sides and angles.

The law of cosines:

$$\begin{aligned} xx^2 &= yy^2 + zz^2 - 2*yy*zz*\cos(z) \\ yy^2 &= xx^2 + zz^2 - 2*xx*zz*\cos(x) \\ zz^2 &= xx^2 + yy^2 - 2*xx*yy*\cos(y) \end{aligned}$$

The law of sines:

$$\frac{\sin(x)}{xx} = \frac{\sin(y)}{yy} = \frac{\sin(z)}{zz}$$

Notice that if  $z$  is a right-angle (that is  $90^\circ$ ) then  $\cos(z) = 0$  and so the first formula becomes:

$$xx^2 = yy^2 + zz^2 - 2*yy*zz$$

which is just Pythagoras' theorem.

Program 2 will find the remaining angles

and sides provided you know any of the following:

**Side Side Side:** You know all three sides and are looking for the measurements of the three angles.

**Side Side Angle:** You know two sides and an angle which is not between them (a non-inclusive angle) and you are looking for the other side and angles.

**Side Angle Side:** You know two sides and the angle between them (the inclusive angle) and you are looking for the other side and angles.

**Side Angle Angle:** You know two angles and a side which is not between them (a non-inclusive side) and you are looking for the other two sides and the third angle.

**Angle Side Angle:** You know two angles and the side between them (the inclusive side) and you are looking for the other two sides and the third angle.

Notice that in the second case (Side Side Angle) two different triangles are (usually) possible depending on whether the angle opposite side  $z$  is greater than or less than  $90^\circ$ . See Figure 11 which illustrates the point.



Figure 11

## Refraction

Things often look distorted when viewed through glass or plastic. Water looks shallower than it actually is. The reason is refraction. When a ray of light travels from one medium (air) to another (glass, water) it is bent or refracted. The angle that the ray takes the glass with is called the

angle of incidence, the angle after it has been refracted is called the angle of refraction (Figure 12).



Figure 12

For a given material there is a fixed relation between the angles of incidence and refraction. This is given by Snell's law which states that the ratio of the sine of constant for any material (n or  $\mu$ ). This ratio is called the refractive index.

$$\text{refractive index} = \frac{\sin(\text{angle of incidence})}{\sin(\text{angle of refraction})}$$

For glass the refractive index is about 1.5, for water it is 1.333, while for diamond it is 2.417.

Program 3 allows you to determine the angle of refraction, assuming that you know the angle of incidence and the refractive index.

## Reflection

A piece of glass or the surface of water occasionally behaves like an ordinary mirror, reflecting everything. This occurs when the angle of incidence is too great and the ray of light is reflected. The smallest angle at which this occurs is called the critical angle of the medium. This is given by the following simple formula:

$$\sin(\text{critical angle}) = \frac{1}{\text{refractive index}}$$

Thus the critical angle can be determined from the refractive index by using the Arc function described earlier (p. 10).

Circle 11 on Reader Card, information on this programme can be obtained from: Czes Kozmowski, 288, Gillingham, Dorset.

## Program 2

```
10 REM TRIANGLE
20 PRINT CHR$(147); " TRIANGLE" CHR$(17)
30 PRINT "THIS PROGRAM WILL FIND THE REM
  AIMING"
40 PRINT "SIDES AND ANGLES OF A TRIANGLE"
  CHR$(17)
50 PRINT "WHICH INFORMATION DO YOU HAVE?"
  CHR$(17)
60 PRINT "1) SSS = ALL 3 SIDES" CHR$(17)
70 PRINT "2) SSA = 2 SIDES AND NON-INCLU
  SIVE ANGLE"
80 PRINT "3) SAS = 2 SIDES AND INCLUSIVE
  ANGLE" CHR$(17)
90 PRINT "4) ASA = 2 ANGLES AND NON-INCL
  USIVE SIDE"
100 PRINT "5) AAS = 2 ANGLES AND INCLUSIVE
```

```
OR SIDE" CHR$(17)
110 REM MAKE SELECTION
120 INPUT "TYPE IN NUMBER: " N
130 IF N<1 OR N>5 OR N<>INT(N) THEN PRI
  T 7,"TRY 1, 2, 3, 4 OR 5" GOTO 120
140 REM DEFINE ARCOSINE FUNCTION, IN DEGR
  EES TO 2 DECIMAL PLACES
150 DEF FNARC(X) = INT(180000*ATHN(X)/3.1415
  9265) / 100
160 REM SPLIT OFF
170 PRINT:ON N GOSUB 310,510,710,910,100
  0
180 PRINT CHR$(17); "ANOTHER? Y OR N"
190 GET Q$ IF Q$<>"Y" AND Q$<>"N" THEN 1
  70
200 IF Q$="Y" THEN RUN
210 PRINT CHR$(147); "BYE FOR NOW." END
220 REM ALL 3 SIDES
310 PRINT "+++ ALL 3 SIDES KNOWN +++ CH
```

```

RPO173
320 A=1:GOSUB 1110:GOTO 330
330 M=2:GOSUB 1110:BYE
340 M=3:GOSUB 1110:GOTO 350
350 A=180*PI/180+2*PI/180-2*PI/180/12*BYE/223
360 IF ABS(A)>0 THEN PRINT "NOT A TRIAN
GLE":RETURN
370 PRINT "ANGLE OPPOSITE SIDE 1 IS " VE
-PI/180
380 A=180*PI/180+2*PI/180-2*PI/180/12*BYE/223
390 PRINT CHR$(17) "ANGLE OPPOSITE SIDE
2 IS " VE-PI/180
400 A=180*PI/180+2*PI/180-2*PI/180/12*BYE/223
410 PRINT CHR$(17) "ANGLE OPPOSITE SIDE
3 IS " VE-PI/180
420 RETURN
430 REM 2 SIDES AND A NON-INCLUSIVE ANG
LE
510 PRINT "2 SIDES AND A NON-INCLUSIV
E ANGLE ** "
520 PRINT "TYPE IN THE SIDE FOR WHICH T
HE OPPOSITE ANGLE IS KNOWN" CHR$(17)
530 M=1:GOSUB 1110:GOTO 540:GOSUB 1210:GOTO 550
540 M=2:GOSUB 1110:BYE
550 A=180*PI/180+2*PI/180-2*PI/180/12*BYE/223
560 PRINT "IS ANGLE OPPOSITE SIDE 2 GRE
ATER (1) OR LESS (2) THAN 90 DEGREES?"
570 INPUT "TYPE > OR < : " A$
580 IF A$<"<" AND A$>">" THEN 340
590 A=PI/180:IF A$>">" AND A$<"<" THEN
A=2*PI-A
600 PRINT CHR$(17) "ANGLE OPPOSITE SIDE
2 IS " A*PI/180
610 A=180-2*PI/180
620 PRINT "LENGTH OF SIDE 3 IS " 2*GOSUB
1110/PI/180
630 PRINT "ANGLE OPPOSITE SIDE 3 IS" INT
(180*PI/180+.5/180)
640 RETURN
650 REM 2 SIDES AND THE INCLUSIVE ANGLE
710 PRINT "2 SIDES AND THE INCLUSIVE
ANGLE ** "
720 M=1:GOSUB 1110:GOTO 730
730 M=2:GOSUB 1110:BYE
740 M=3:GOSUB 1110:GOTO 750
750 G=180*PI/180+2*PI/180-2*PI/180/12*BYE/223
760 IF G=0 THEN PRINT "NOT A TRIANGLE":
RETURN
770 PRINT "LENGTH OF SIDE 3 IS" 2*CHR$(
17)
780 A=180*PI/180+2*PI/180-2*PI/180/12*BYE/223
790 PRINT "ANGLE OPPOSITE SIDE 1 IS " VE
-PI/180
800 A=180*PI/180+2*PI/180-2*PI/180/12*BYE/223
810 PRINT CHR$(17) "ANGLE OPPOSITE SIDE
2 IS " VE-PI/180
820 A=180*PI/180+2*PI/180-2*PI/180/12*BYE/223
830 PRINT "LENGTH OF SIDE 3 IS " 2*GOSUB
1110/PI/180
840 PRINT "ANGLE OPPOSITE SIDE 3 IS " I
NT(180*PI/180+.5/180) CHR$(17)
850 PRINT "LENGTH OF SIDE 1 IS " 2*GOSUB
1110/PI/180
860 PRINT "LENGTH OF SIDE 2 IS " 2*GOSUB
1110/PI/180
870 RETURN
880 REM GET A SIDE
910 G=1:PRINT "TYPE LENGTH OF SIDE" M "
: "
920 INPUT G:PRINT CHR$(17)
930 IF G=0 THEN PRINT "NOT A TRIANGLE":
GOTO 910
940 RETURN
950 REM GET AN ANGLE
960 A=1:PRINT "TYPE ANGLE OPPOSITE SIDE
" M "
970 INPUT A:PRINT CHR$(17)
980 IF A=0:GOTO 990 OR A=180 THEN PRINT "N
OT A TRIANGLE":GOTO 960
990 A=PI/180:RETURN

```

## Program 3

```

10 REM REFRACTION PROGRAM
20 PRINT CHR$(147) " REFRACT
ION" CHR$(17)
30 PRINT "THIS PROGRAM CALCULATES THE AN
GLE OF
40 PRINT "REFRACTION WHEN A RAY OF LIGHT
HITS
50 PRINT "ANOTHER MEDIUM." CHR$(17)
60 REM INPUT DATA
70 PRINT "TYPE IN ANGLE OF INCIDENCE, I
N DEGREES."
80 INPUT "ANGLE: " X
90 IF X=0 OR X=90 THEN PRINT "ERROR -
NO REFRACTION":GOTO 220
100 PRINT CHR$(17) "WHAT IS THE REFRACTI
VE INDEX OF THE
110 PRINT "MEDIUM?"

```

```

120 INPUT "REFRACTIVE INDEX: " R
130 IF R=0 THEN PRINT "MAYBE - TRY AGAI
N":GOTO 100
140 REM CONVERT TO RADIANS
150 X=PI/180*X
160 REM CALCULATE
170 Y=1/180*(1/R-1)*SIN(X)/COS(X)
180 PRINT CHR$(17) "ANGLE OF REFRACTION
" A$=PI/180*ASIN(SIN(X)/R)
190 PRINT "PERCENTAGE OF ANGLE OF INCIDE
NCE" INT(100*SIN(X)/R/PI)
200 PRINT CHR$(17) " THAT IS IT - AND
HOW SO Y OR N?"
210 GET Y:IF Y="Y" AND Y<"N" THEN 2
20
220 IF Y="Y" THEN RUN
230 PRINT CHR$(147) "BYE FOR NOW."

```

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Q: How long will it take to build a new bridge? A: It will take as long as it takes to build a new bridge.

[illegible]

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# Character examination

Mike Winson presents a short utility program that uses the features of the BBC's 1.2 operating system

There is a short utility which uses the features of the BBC's particular 1.2 operating system to permit viewing of the byte structure of the internal character set. This could have educational uses, or could provide a starting point for creating other user-defined characters, eg. different alphabet styles. This technique is well documented in the user guide.

When Run, the program prompts for a character from the keyboard. The character typed will be displayed, in actual size and in large block graphics form, together with its ASCII code, the bytes making up the character (see p 170 of the user guide) are tabulated in decimal and hex alongside the large

format character representation

## Program notes

- 10 Assumes a 16 byte block of memory for storage of the character code and the 8 bytes making up the character
- 20 Defines character 255 as a block to be used in the printing of the large format character. Note the economical use of -1 to represent 255 in a comparison condition
- 30 Main program loop. Waits for a character from the keyboard, and calls PROCchar
- 40 PROC char is a procedure to store the first byte of the block of memory reserved in line 10
- 50 Loads the first location with the character C, and calls the GDBLOCK routine (p170) with A = 16. This copies the bytes, making up the character shape to the next 16 locations of the block
- 130-140 Loop to display each byte in binary, decimal

and hex. Note that the binary representation from program 8 (covering appropriate graphics form of the character for hex 1 to 255) is a binary representation (ASCII hex 70, and replace line 208 by 208 IF W < 255 THEN W = W - 255. 209 VDU 40 GDBLOCK W) Prints out the appropriate byte in decimal and in hex. Note that the print in hex system has printed on the ASCII control symbol as the letter. The character character is found on the BBC screen above the explanation area

## Use with other operating systems

The program was originally written to demonstrate the use of the Character routine in the 1.2 MOS, but for those who have not yet upgraded from the version 0.1, then the procedure PROCchar can be used to simulate the call. This is written specifically as a patch to the main program, so is not the most efficient way of doing things, but it required few details (see 150, and change line 160 to 160 PROCchar; ending lines 1000-1040 as in Listing 2

## Listing 1

```

30 L: ""
10 REM # & CHARACTER ANALYSER #
20 REM by Mike Winson
30 REM April 1983
40 REM (for BBC model A or B)
50 DIM block%
60 MODE1
70 VDU 30-15-15-15-15-15-15-15-15-15
80 REPEAT
90 PRINT "Character: ";C=GET
100 CLS: COLOUR 2: PRINT "CHARC: COLOUR 1
110 PRINT " = HEX: " C: DEC HEX " " COLOUR 3
120 PROCchar(C)
130 UNTIL FALSE
140 DEF PROCchar(C)
150 X% = block% + 255: Y% = block% + 255
160 "block% = C: A% = 16: CALL GDBLOCK
170 FOR byte% = 0 TO 7
180 H% = block% + byte%
190 FOR b% = 0 TO 7
200 COLOUR C
210 H = H + 7
220 IF H > 255 THEN H = H - 255: VDU 255: L% = VDU 255
230 NEXT b%
240 COLOUR 3
250 PRINT "block% " byte%: "block% " byte%
260 NEXT byte%
270 PRINT " " " " " "
280 ENDPROC

```

## Listing 2

```

30 L: ""
1000 DEF PROCchar
1010 FOR I = 0 TO 7
1020 block% = C: I + 1 = W: 255: C = C - 255
1030 NEXT I
1040 ENDPROC

```





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## Build the app

[illegible]

This is a real test of dexterity. The programme aims to prevent the man from falling into the chasm. There are also gaps in the bridges which can be filled independently by the player. To make things harder a gap cannot be bridged until the man is three metres away.

Should the man reach a gap without a bridge he will fall into the chasm thus ending the game. Each time a gap is successfully bridged, one point is scored. The game has a high-score facility allow-

ing a name compelling as characteristic of  
advertisers

The screen display is minimal, comprising the high-scores/round line and three bridges, each containing two gaps. The rear is poked into the display file as the method is quicker than printing onto the screen. As the rear is the only moving object, the concept is quite fast.

The instructions from line 9000 onwards give details of which key bridges which

**Abstract**

|           |                          |
|-----------|--------------------------|
| Model no. | High-Speed               |
| Model no. | High-Speed or High-Speed |
| Model no. | High-Speed               |

|             |                                                                          |
|-------------|--------------------------------------------------------------------------|
| <b>Q</b> =  | Improving contrast of the display by position of sun.                    |
| <b>R</b> =  | Position of sun?                                                         |
| <b>I</b> =  | Position of road?                                                        |
| <b>AD</b> = | Mobile navigation? For bridge                                            |
| <b>AD</b> = | Need to check the value of ADL70 and to the ADL71 of the navigation map. |

**Figure 1**

[illegible][illegible][illegible]

**Widom**

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20 GRAPHIC SCREEN ON:0,1,0:FORM=360:GOSUB 4
30 FOR I=1 TO 24:GOTO POINTS,3:GOTO 300:FOR J=1 TO 24:GOTO NEXT
40 FOR I=360:GOTO 70:FOR I=360:GOTO 7
50 FOR I=360:GOTO 7:FOR I=360:GOTO 7:FOR I=360:GOTO 7:FOR I=360:GOTO 7

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If you are working on a basic program, you will want to copy it to tape fairly often. If you are sick of pulling plugs out and snipping the plastic leader tape off every time, we'll appreciate the following routine:

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1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

1. Makes sure the cassette observed is closed (in Cassette test)
2. Allows you to rewind the tape without pulling plugs out
3. Automatically slides the plastic leader tape (if any)
4. Makes three copies with suffix numbers

[illegible]

Having added it to my program just type A+B 2000 and off it goes if none of your tapes have leaders you can miss lines 2070 2090 but personally I would leave them in for safety

Incidentally, there are no jumps in degree, so line numbers can start any where.

```

0000 GOTO 4
0001 PRINT "ENTER (Y/N) AND HIT ENTER"
0002 INPUT ANSWER$
0003 IF ANSWER$ = "Y" THEN
0004   PRINT "PUT IN RECORD (ENTER)"
0005   INPUT K
0006   GOTO 3
0007 ELSE
0008   GOTO 1
0009 END IF
0010 GOTO 1
0011 PRINT "COPIES MADE"
0012 END

```

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

1. **Introduction**  
 2. **Background**  
 3. **Methodology**  
 4. **Results**  
 5. **Conclusion**  
 6. **References**

### Large Characters

on 30/06/2010

These routines will produce large efficiencies on the 7N hardware — each other's

being a  $26 \times 3$  grid of graphics characters. The main program should be run initially to set up a number array with the codes of the graphics characters necessary to produce each letter. The routine which prints the characters should be merged into any process ensuring the facility together with

1999

1. *Journal of Management Studies*, 1997, 34, 1, 1-14.

Any word to print must not be more than 40 characters (can be either upper or lower case (all output is upper case) and must be loaded into the string `25` before calling the routine.

[illegible]



## OPEN FORUM

[illegible]

```

0005 PRINT AT 10,0;"SAVE NUMERIC
0006      DATA"
0007 SAVE "LARGECHARS" DATA T1
0008 PRINT AT 10,0;"VERIFY NUMER
0009      IC DATA"
0010 VERIFY "LARGECHARS" DATA T1

```

```
0000 REM *****1822-1827*****  
0001 REM * ROUTINE TO COUNT  
0002 REM * LARGE CHARACTERS  
0003 REM * FROM INPUT Z$  
0004 REM *****  
0005 REM  
0006 IF LEN Z$=0 THEN RETURN  
0007 LET U$=Z$:Z$=""  
0008 FOR Y=1 TO LEN Z$  
0009 IF CODE Z$(Y)>96 AND CODE Z$(Y+1) <> 97 THEN LET Z$=CHR$(CODE Z$(Y)+1)  
0010 IF CODE Z$(Y)=96 OR CODE Z$(Y+1)=97 THEN RETURN  
0011 NEXT Y  
0012 FOR U=1 TO 3:FOR V=1 TO 3  
0013 LET W$=""  
0014 LET Q$=U$*(V-1)+(V+W$)*CHR$(CODE Z$(Y)-31)  
0015 NEXT V  
0016 PRINT U$*(3)-(V-1)+(V+W$)*PR  
0017  
0018 RETURN
```

**Large Characters**  
 Are different colors

## Background

11/19/2013 12:00:00 PM

This program is designed to teach long multiplication to children. Even though you may think that the program is first

[illegible]

winded, you may find useful statistics for positioning numbers on the screen in the next column.

Figure 1 consists of two bar charts, (a) and (b), showing the percentage of respondents for different age groups (18-24, 25-34, 35-44, 45-54, 55-64, 65+) across two categories: 'No' and 'Yes'.

Chart (a) shows the percentage of respondents for the 'No' category. The percentages are approximately: 18-24 (45%), 25-34 (40%), 35-44 (35%), 45-54 (30%), 55-64 (25%), and 65+ (20%).

Chart (b) shows the percentage of respondents for the 'Yes' category. The percentages are approximately: 18-24 (15%), 25-34 (20%), 35-44 (25%), 45-54 (30%), 55-64 (35%), and 65+ (40%).

First it gives two random numbers from between 00 and 99. It then displays the question as it would be on the test and asks: "Is this true or false?"

around is a long multiplication problem, and 10% is the necessary extra change. Any system is only as solid and secure as the

The computer then adds the two numbers displayed on the led line, indicated by the symbol on the bottom screen. These are added together, and the computer (MATH) updates the screen to correct arithmetic relationship. You can then select to go on, stop, and transfer to other screens, and so on.

```

100 IF C=0, THEN PRINT "NO", C, " IS A PRIME NUMBER"
110 THEN GOTO PRINTING ONE
120 PRINT "NO", C, " IS NOT A PRIME NUMBER"
130 GOTO PRINTING TWO
140 PRINT "YES", C, " IS A PRIME NUMBER"
150 GOTO PRINTING TWO
160 PRINT "YES", C, " IS NOT A PRIME NUMBER"
170 GOTO PRINTING TWO
180 PRINT "YES", C, " IS A PRIME NUMBER"
190 GOTO PRINTING TWO
200 PRINT "YES", C, " IS NOT A PRIME NUMBER"
210 GOTO PRINTING TWO
220 PRINT "YES", C, " IS A PRIME NUMBER"
230 GOTO PRINTING TWO
240 PRINT "YES", C, " IS NOT A PRIME NUMBER"
250 GOTO PRINTING TWO
260 PRINT "YES", C, " IS A PRIME NUMBER"
270 GOTO PRINTING TWO
280 PRINT "YES", C, " IS NOT A PRIME NUMBER"
290 GOTO PRINTING TWO
300 PRINT "YES", C, " IS A PRIME NUMBER"
310 GOTO PRINTING TWO
320 PRINT "YES", C, " IS NOT A PRIME NUMBER"
330 GOTO PRINTING TWO
340 PRINT "YES", C, " IS A PRIME NUMBER"
350 GOTO PRINTING TWO
360 PRINT "YES", C, " IS NOT A PRIME NUMBER"
370 GOTO PRINTING TWO
380 PRINT "YES", C, " IS A PRIME NUMBER"
390 GOTO PRINTING TWO
400 PRINT "YES", C, " IS NOT A PRIME NUMBER"
410 GOTO PRINTING TWO
420 PRINT "YES", C, " IS A PRIME NUMBER"
430 GOTO PRINTING TWO
440 PRINT "YES", C, " IS NOT A PRIME NUMBER"
450 GOTO PRINTING TWO
460 PRINT "YES", C, " IS A PRIME NUMBER"
470 GOTO PRINTING TWO
480 PRINT "YES", C, " IS NOT A PRIME NUMBER"
490 GOTO PRINTING TWO
500 PRINT "YES", C, " IS A PRIME NUMBER"
510 GOTO PRINTING TWO
520 PRINT "YES", C, " IS NOT A PRIME NUMBER"
530 GOTO PRINTING TWO
540 PRINT "YES", C, " IS A PRIME NUMBER"
550 GOTO PRINTING TWO
560 PRINT "YES", C, " IS NOT A PRIME NUMBER"
570 GOTO PRINTING TWO
580 PRINT "YES", C, " IS A PRIME NUMBER"
590 GOTO PRINTING TWO
600 PRINT "YES", C, " IS NOT A PRIME NUMBER"
610 GOTO PRINTING TWO
620 PRINT "YES", C, " IS A PRIME NUMBER"
630 GOTO PRINTING TWO
640 PRINT "YES", C, " IS NOT A PRIME NUMBER"
650 GOTO PRINTING TWO
660 PRINT "YES", C, " IS A PRIME NUMBER"
670 GOTO PRINTING TWO
680 PRINT "YES", C, " IS NOT A PRIME NUMBER"
690 GOTO PRINTING TWO
700 PRINT "YES", C, " IS A PRIME NUMBER"
710 GOTO PRINTING TWO
720 PRINT "YES", C, " IS NOT A PRIME NUMBER"
730 GOTO PRINTING TWO
740 PRINT "YES", C, " IS A PRIME NUMBER"
750 GOTO PRINTING TWO
760 PRINT "YES", C, " IS NOT A PRIME NUMBER"
770 GOTO PRINTING TWO
780 PRINT "YES", C, " IS A PRIME NUMBER"
790 GOTO PRINTING TWO
800 PRINT "YES", C, " IS NOT A PRIME NUMBER"
810 GOTO PRINTING TWO
820 PRINT "YES", C, " IS A PRIME NUMBER"
830 GOTO PRINTING TWO
840 PRINT "YES", C, " IS NOT A PRIME NUMBER"
850 GOTO PRINTING TWO
860 PRINT "YES", C, " IS A PRIME NUMBER"
870 GOTO PRINTING TWO
880 PRINT "YES", C, " IS NOT A PRIME NUMBER"
890 GOTO PRINTING TWO
900 PRINT "YES", C, " IS A PRIME NUMBER"
910 GOTO PRINTING TWO
920 PRINT "YES", C, " IS NOT A PRIME NUMBER"
930 GOTO PRINTING TWO
940 PRINT "YES", C, " IS A PRIME NUMBER"
950 GOTO PRINTING TWO
960 PRINT "YES", C, " IS NOT A PRIME NUMBER"
970 GOTO PRINTING TWO
980 PRINT "YES", C, " IS A PRIME NUMBER"
990 GOTO PRINTING TWO
1000 PRINT "YES", C, " IS NOT A PRIME NUMBER"

```

### Identifying the User Audience

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## OPEN FORUM

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an *Artemisia* sp.

This program will play the Christmas carol "O Little Town of Bethlehem" in one, two or three voices. You have the option to sing

The larvae, descend or bask on their own or in some combinations

This allows you to hear a voice (for example, the bass) and enables you to play the lyrics on a musical instrument of your own. You can either do this of all back and listen to your Commodore 64 play its

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

**References**

PB Rate multiplier/divisor for rates 1-3 and 3  
 PB Rate type of control for the volume  
 PB Filter the output into the 800 chip  
 PB Time delay for each rate (bytes)

The words printed in **graying** in lines 130, 140 and 150 are **Turn**, **Command** and **Rate** respectively.

[illegible]

Christmas Eve  
Dec. 24th



# Mastercode Assembler

## for the Commodore 64

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**Mastercode is a substantial and complex program of use to anyone interested in writing machine code on the Commodore 64. Its features include:**

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- ☐ Disassembler
- ☐ Assembler

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- LOADING OF MACHINE CODE FILES FROM TAPE OR DISC ■ STEP BY STEP TRACING OF THE EXECUTION OF A MACHINE CODE PROGRAM INCLUDING DISPLAY OF REGISTER CONTENTS

The Disassembler will translate into assembly language the contents of any area of memory, whether the 64K ROM or a user program. Output may be sent either to the screen or a printer.

### The File Editor includes:

- ENTRY OF NUMBERED LINES OF ASSEMBLY LANGUAGE INSTRUCTIONS ■ LISTING INDIVIDUALLY OR IN BLOCKS OF PREVIOUSLY ENTERED LINES ■ DELETION INDIVIDUALLY OR IN BLOCKS OF EXISTING LINES ■ RENUMBERING OF EXISTING LINES ■ SAVING OF ASSEMBLY LANGUAGE FILES TO TAPE OR DISC ■ LOADING OF ASSEMBLY LANGUAGE FILES FROM TAPE OR DISC ■ ADDITION OF A BLOCK OF MEMORY SPECIFIED BY THE USER TO THE USER'S ASSEMBLY PROGRAM

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## OPEN FORUM

## Laddern Run

1998

This is a program for the unexpanded world. The program starts by drawing

**ladders and ladders.** The object of the game is to reach the top rail (before one of the falling bricks hits you). After reaching the top rail you are rewarded with 100 points and a new and harder screen of ladders and bricks.

Figure 1. (a) Schematic diagram of the experimental setup. (b) Photograph of the experimental setup.

8 Screenings  
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 70-81 Prices paid on imports  
 90-1000 Odds for winners  
 Country T = 100, 1000, 10000, 100000, 1000000

### PROGRAM OF THE WEEK

[illegible][illegible]

**Ladies: From  
Joe's Cleanest Floors**









## OPEN FORUM

## Wanda's Greeting

1000

The amount of this course is for you (the

pledged to pinch all of Santa's presents before they were being rung out.

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at the bottom of the screen or your time runs out. You lose a life if you run into a wall or Bambi.



## Student's Guide

## MicroMedico

**OVERVIEW**



## Radio Television

**T**his week finds me still trying to answer your letter. I am always pleased to receive inquiries from people who want to know more about how to organize a radio program. Books and leaflets are available from the Radio Society of Great Britain, Alma House, Cranborne Road, Poole, Dorset, BH12 9PW.

As I mentioned last week, many of you wrote to me asking how and where to find the software and/or hardware to transmit and receive Radio Teletype (RTTY) on your radio. This week I will give you the addresses to write to for some interesting machines.

**Commodore 40k:** A unit is available which will handle RTTY ASCII. More and other modes from ICS Electronics Ltd, PO Box 3, Asford, West Sussex, BN8 8DL.

**Dragon:** A machine code program is available from M Kerry 23 Quinceston Road, Blandford, Dorset.

ETX and Spectrum, an RTTY system is available from Spectrum Amateur Radio.

Youn Group, 3 Red House Lane, London, Suffolk IP16 6DT.

MMC Computer, There are a few sources of SP Electronics, 48 Ladbroke Road, Richmond, Middlesex TW9 1AB. The School, Wellingborough, Northants NN9 2BA. More MMC software is available from GSC Software, 47 Cherry Lane, Alinger, Rochester, Kent. GSC produces RTTY systems and various other programs.

I have had a letter or two from people with AIDS issues and I must admit that I do not know of a single source for an AIDS RHY system in the UK. I can only suggest that you write to Adam at the US

and States, we would suggest this  
message. If anyone has ATT's  
on an Active or Mail running,  
please let me know!

It seems to me that there is an awful lot of you out there looking for radio-related software for your macro. There is not very much software about and since more and more radio enthusiasts are becoming macro-users, a market is opening up in this area.

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

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## Christmas quiz

The last week of 1983 — and what a busy year it's been for everybody involved in home hobby computerising. The Spectrum, Commodore 64 and Amstrad machines have between them dragged computer games off the bookshelves. Space Invaders shall and into high-resolution space quality. In the same way these machines and others have done a similar job with adventure programs. Among the software houses little ever better products.

And what products we've been treated to in the last year! 1983 will go down in homecomputer history as The Year of the Hobbit — and its chronicle The Hobbit Hall of Fame! How this virtual world have been interested for computers other than the Spectrum. I imagine many of you will have a nice little package in your Christmas stocking and although I'll keep you busy for some while, I expect to see some non-Spectrum names appearing in the HHC.

Other 1983 programs I personally enjoyed were Kathal's and Level 9's adven-

tures. I'm glad to be able to report that Level 9, whose programs are in the classic style, have some new adventures but soon.

Sparking of little packages, the last review of 83 is of some book-type packages from Puffin/Penguin Books. The big book publishers have seen the light and decided that software can be sold just like books. They have taken one of their best-selling titles — "The Warlock of Firetop Mountain" — and converted it into a tape.

The book by Steve Jackson and Ian Livingstone is (as you haven't seen it or any of the reviews) follow-up, takes the form of a multiple-choice role fantasy adventure. Borrowing heavily from Zork and Text Fantasy role playing rules, the book takes the reader through a complex adventure. Starting from a dark cave entrance, and an evil wizard, the player makes choices which way to go, and then turns to the relevant page to find what lies in wait. Coming upon a monster, the player may sometimes choose to run, or engage in combat or have some other action.

The tape accompanying the book is of a Spectrum program written by Crystal Cans, giving. Regular readers of Adventure Corner will remember this program. Most of the things which I anthologised over a few weeks ago. Not really adventure, I know, but a very stylish Adventure, with more than touch of the magical about it.

Widdow is essentially a remake of Hot and I had lost quite a bit in the process. I'm afraid. The differences are too numerous to go into here — suffice to say that Hot will remain my favourite. Textual, however, means. Crystal Computing's, surprisingly perceptive, and only suffers in comparison with the earlier program — it is, in my opinion, it is a fast-moving, finger-snapping Adventure. It is not much to do with the book,

although some of the creatures from the book make an appearance, as does the basic idea that of collecting a number of keys in order to open the chest which contains the Warlock's treasure. As a package, The Warlock of Firetop Mountain is great value, and worth stocking in anybody's stocking.

Now if the family have started to complain about you playing The Hobbit over your Christmas lunch, and the plans in the crackers have got too boring, why not have a game of the Adventure Corner Christmas 83 Quiz? Just pick up a pencil, and put your answers on the back of a blank cheque.

1. You find an open can of baked beans. Do you:
  - a) Eat them cold.
  - b) Drain your steed and run it through.
  - c) Look round for a gold treasure.
2. You hear a rattling behind the door. Do you:
  - a) Run up the hallway with the Tack.
  - b) Open your sword and charge.
  - c) Put the Golden Key in the lock.
3. A giant dog with bloody round his neck blocks your path. Do you:
  - a) Look at him and pretend to have trouble.
  - b) Draw your sword and run him through.
  - c) Get out your club.
4. The ladder offers you a drink. Do you:
  - a) Say "Thanka."
  - b) Draw your sword.
  - c) Jump in the barrel.
5. A little green man is sitting on a mirror. Do you:
  - a) Give him a tip for the £30 of Amstrad.
  - b) Draw.
  - c) Put on your gloves.
6. You see a pair of Safety Breakers. Do you:
  - a) Turn up your nose.
  - b) Tear them to shreds.
  - c) Wear them.
7. A little plant whispers "Waaa ... water ...". Do you:
  - a) Pick the flower and put it in your bathtub.
  - b) Sprinkle some money.
  - c) Water it and stand well back.

Have a look at your answers — if you get mostly a's then you should probably be out night-dubbing instead of playing with computers. If you get mostly b's, then you are probably an older D.O. Or in search of a new home — keep trying! If you get mostly c's then you are a clever dog!

Have a Happy (Advertising) Christmas, and I hope you have them all try your computer using more Adventures! ■

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# PEEK & POKE



**ALL  
GREEK**

**Mr A** *Walls of Haverstock Place, Metropolitan, Lancashire, writes*

**Q** My son has a Vic20 computer, and though it all seems to be Greek to me, he obviously understands it. A friend whose son is sitting on Atari television computers, also has a joystick for sale. I have been told by my son that it is possible to use Atari joysticks on the Vic. Is this true and if it is, will it damage the computer?

**A** No, your son is quite right. The Atari and Vic joysticks are in fact the same, apart from minor differences in styling. So it is quite possible to use one type of joystick on the other type of computer.

## VIDEO SIGNAL

**Q** *Batterworth of Belper, Avon, Blackpool, Lancashire, writes*

**Q** With reference to your article in PCW, 17-23 November, about connecting a Spectrum 201c to a monitor. After reading this I wrote to Sinclair and they informed me that "There were unable to comment on adding a modification" and "in spite the fact subsequently to validate the guarantee". I then managed to purchase my first Spectrum for me and S. On arriving home, to my disappointment, I found that letter I do NOT give a video signal. Perhaps I have read your article wrongly?

How could you answer a couple of questions? What do you mean by a video signal and you tell me how I can hook up my Sharp 19-1600 colour television to my Spectrum?

His monitor has the usual type of phono socket, like my video recorder. If you can help me, and possibly other readers as well, I would be very grateful.

**A** The Spectrum runs 1 does put a composite video output from the tape-record port at the back. If you look at the shape on the handbook on the post you will see the lines 0 volts and 1 volt on the underside of the post. It is when you plug the composite video signal from, so all you need is an edge connector, and you should be able to use it on your 1600 television.

Perhaps I did not make myself clear, but in all fairness to Sinclair, they cannot be expected to extend the guarantee, or offer advice on any computer that has been "tampered" with. The reason I mentioned that question was that I have been asked a several times. I can tell people what to do, but going ahead must be at their own discretion.

## TORN INPUT

**Simon Dale of Southside, Richmond North Yorkshire, writes**

**Q** I have a Vic20 with 16K expansion. Though I will probably be getting a Commodore 64 sometime, I am pleased with my Vic.

A friend has shown me how to use logic input, to allow up to ten finger keys. However, he did not really seem to know how they worked. Can you explain?

**A** It is due to the operating system, which employs a 16K computer. All the key words used by the Vic are stored as a number from 0 to 255. If you write a keyboard scan input it will be stored as two bytes of screen memory. Unfortunately, it will have the input buffer at a single byte with a specific value (132 at the time).

However many bytes of screen memory are taken up, it will always be stored as just a single byte. When, in the case of input you use I shot N, all you are doing is telling the computer and checking that you have entered the full command. Indeed, you have, but it has only taken two bytes.

When you list the program the process is reversed.

## MINI COMPUTER

**John Mortenson of Dalston, Middleborough, Cleveland, writes**

**Q** I have been given a pair of mini-computer systems, made by Minolt. Each system comprises one console, including a dedicated tape deck. Our hard disc drive (main park with five megabyte capacity) use flat printer and a CPU with disk. I also have another hard disc drive and about 40 parts.

I fully appreciate that the system is long out of date, so has been demonstrated by the manufacturer who has recently withdrawn user support. My experience with computer hardware has been limited to none. I have been advised by one person to wrap the lot, by another to 'give' with it, or to take the gold from the edge connectors.

I am a fully expanded Vic20. I have interfaced a printer to it, which was previously used on the system to take hard disc material. I am now working on an interface for the two flat printers.

Can you advise me if the above system is going to be of use for anything other than just wrap? Can you tell me how to write to the system? The discs contained software, but no method for producing or writing code's own. I am keen to dispose of the equipment to the wrap man. The components alone might be very useful. Are there any reasons for computer yet?

**A** I wish someone would give me a couple of 5 megabyte hard discs. Do they work? It is important to remember that just because the computer is out-of-date, it does not mean that the peripherals are out-of-date.

There are several questions to ask yourself. Does the system run CP/M? If it does, then

it could still be very useful to a small business. Do the peripherals all work? How much would replacement hard discs cost? This will probably give you an insight into the possible value of the hardware you are considering stripping. From your letter I am assuming that you do not have the original instruction manuals. This is a major drawback to such things as not easy to replace.

All in all, if the system basically works and you had a office capacity beyond your needs, then I would suggest that you offer a for sale. On the other hand, if you are handy with a soldering iron with a Vic20 running with a hard disc drive would give your computer system a current in developing that would be difficult to match. Before you sell, so I do not know of any device made to interface a Vic with a hard disc.

## ARAB MEMORY

**Leena Walker of Newfield Road, Scarborough, Yorkshire, writes**

**Q** Please could you tell me how to find out how much memory an array takes up? Also, my father has a Silver Reed RS 44 Electric typewriter which I think has an RS1325 interface. Can I use this as a printer for my Beeb computer? Also could you advise me as to how to buy about BBC machine code, as I am an absolute beginner and would like to learn.

**A** I can not see reason why the Silver Reed should not be used with a BBC — I have heard of it being used with a Spectrum.

However it does not have an RS1325 interface. I telephoned them and they told me that the RS1325 was in fact an additional module that you would have to get through your dealer. The port on the typewriter is analog, and I have no details about it.

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Journal of Internal Medicine 247: 395–401



It is important to note that the above figures are not averages, but the maximum number of people that have been treated. In order to find out the actual number of people that have been treated, you can contact the local health department or the local health department's website. For more information, please contact the local health department or the local health department's website.

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**BRADON FORTYFOUR** Coeditor of marine program, *ENR*; Spill Response Sample Case 12, *ENR* program on page C; Sullivan 113; Standard Fuel Sampler Case 100.

separate group in 2001 entered into a full-time relationship with him and subsequently self-reported sexual activity in 2000.

[illegible]

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**Verbal abuse:** is an attempt to undermine someone's self-esteem.

Figure 10.10 shows the results of the regression analysis. The regression equation is  $\hat{y} = 1.00 + 0.0001x$ , where  $\hat{y}$  is the predicted number of hours per week and  $x$  is the number of years of experience. The regression line is nearly horizontal, indicating that the number of years of experience has little effect on the number of hours per week. The coefficient of determination is  $R^2 = 0.0001$ , which is very small, indicating that the model explains almost none of the variability in the data.

[illegible][illegible]

**Table 1**

[illegible]









## The best books for the Commodore 64



**The Working Commodore 64**  
A library of practical solutions and programs.  
The style is easy to follow and informative. — *Personal Comp News* August 1985 1982  
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**Commodore 64 Machine Code Master**  
A library of machine code routines. An essential useful book for the machine code programmer — *Personal Comp News* 23 August 1983  
only 24.95 (incl. p&h)



**Commodore 64 Adventures**  
A blueprint for the construction and playing of Adventure programs based on a full size Adventure.  
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**Graphics Art for the Commodore 64**  
How graphics routines can be fully developed by using the Graphics techniques.  
only 19.95 (incl. p&h)



**Business Applications for the Commodore 64**  
Learn how to write your own programs.  
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Mathematical routines for use in programs.  
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## NEW RELEASES

### HOLIDAY TOWN



Scoundrels wouldn't be any one's idea of a holiday town — even the dogs carry knives. Unfortunately, you find yourself trapped in Scoundrels and your attempts to find the exit from the town form the basis of the Lorne Richard Shepherd game, *Urban Upstart*.

It's an adventure in which every location is cluttered with gaudy items. The screen is split in two, with the graphics displayed in the top portion. The game understands quite a large vocabulary of words so that players can be connected to form a single sentence to its "Kill Fun and Take Trap".

I didn't have time to venture very far into the adventure, but it certainly seems to contain all the ingredients that you could want. I'm afraid there is not much I can offer by way of helpful advice, except to point out that *Urban Upstart* can be very hard for you.

**Program:** *Urban Upstart*  
**Price:** \$1.99  
**Micro:** Spectrum 48K  
**Supplier:** Archipel/Shepherd Software  
Clio House  
21-25 Elmwood Lane  
Coppensham  
Surrey  
RH11 5LJ

### A FORTUNE

If you have a Dragon 32 and are really committed to the idea of using it for education, then a new series of programs could be just what you need.

Maths O level for three part the next four programs so two

concentrate to teach things like area and volume, aspects of calculus, different parts of statistics, acceleration and how to construct various geometrical figures.

By writing the complete maths within the Maths O level syllabus, will be covered — you will also have spent an absolute fortune, each part costs £29.95. Now, perhaps, that isn't unreasonable for four programs, but a working prior for software contributions.

**Program:** Maths O level for three part one  
**Price:** £29.95  
**Micro:** Dragon 32  
**Supplier:** Archipel/Shepherd Software  
Clio House  
21-25 Elmwood Lane  
Coppensham  
Surrey RH11 5LJ

### SPEECH UNIT



A program to teach your children how to recognize letters and how to match upper and lower case. Although hardly the first educational program of this type, it is the first I've seen to make use of the BBC's natural speech unit.

That involves the computer actually speaking the letters the child is required to recognize. Correct answers are rewarded by the letter being added to a fish and a happy face appearing on screen. Mistakes result in the fish being eaten by crocodiles.

There are various realizations on the basic theme, as well as an "acknowledgement of child behaviour", which is you and I assume a score.

**Program:** Happy Letters  
**Price:** £5.95

**Micro Supplier:** BBC Review Educational Software  
Archipel Lane  
Archipel/Shepherd Software  
Clio House  
21-25 Elmwood Lane  
Coppensham  
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### GRAPHIC HAND

I've always thought it a bit silly using a computer to play board games on — unless the computer can be one of the players. Nevertheless, programs that do so make their players board, bridge, chess and computer chess do quite well.

The time it's *Ludo* that gets the marketing treatment in a new program for the VisiQ and Commodore 64. This one does have some nice touches like a graphics board that slides the dice in their number, but it does not take the part of one of the players. It's simply a matter of throwing dice and moving counters with other people — *Ludo* is not a computer game.

The Commodore 64 version also has an option to display the rules of the game at any time — well, it might stop a few arguments anyway.

**Program:** *Ludo*  
**Price:** £5  
**Micro:** VisiQ/Commodore 64  
**Supplier:** C.P. Software Services  
12 Horsfield Avenue  
Newcastle  
Tyne NE11 1BQ

### GIANT MAZE

Since *Archipel* I very little has been heard of *VisiQ* Software. Perhaps they have been serving themselves for *Archipel Two* which is definitely on my list of 10 best games for 1983.

For those who did not use the original, you control an ant — a talking machine which you must push through a maze to thwart the nasty malleons.

The game is beautifully depicted in 3D, most strange pieces being above and to the right in the past more. Apart from finding the malleons, your ant must also avoid various stones and other hazards in the form of burning alien mounds.

There are three zones of action, each extending over several screens. Like all the

best games in this year's list, seems completely impossible but after a few plays you start to have some success — just enough to keep you playing until the next dawn. Superb.

**Program:** *Archipel Two*  
**Price:** £7.99  
**Micro:** Spectrum 48K  
**Supplier:** VisiQ Software  
280 Elmwood Road  
Middlesbrough M21 9WD

### SUPERSONIC

*Striker 20* is an arcade game for the VisiQ. It is basically a version of *Defender* and has, amazingly enough, been fixed into the retrograde position.

The game involves piloting a supersonic ship past various hazards and through narrowing tunnels to destroy an enemy base. This version has six screens of hazards, the last of which contains the enemy base which you are attempting to destroy.

**Program:** *Striker 20*  
**Price:** £3.99  
**Micro:** VisiQ  
**Supplier:** Alpha Computing  
Unit 5  
Broadmeadow  
Donfield  
Works T620 9AL

### MARAUDERS



*Two Gun Tug* is another in Lorkhoran's Anticomputer series, which represents the computer's move into arcade style games.

Your role is that of a truck defending his piton members from attack by attacking bugs.



As you might expect, you shoot away at the bugs in some points. However, it isn't quite as punishing as that — some of the bugs are quite harmless and will do nothing but score some starbursts, say hello, unless you fire at them first. This means there's time to be appreciable with your trigger finger.

The game is not as wacky as those that in time since can be expected to fall — this will mean increased danger and the chance for bonus points.

**Program** Two Gun Tenth  
**Price** £3.95  
**More** One  
**Supplier** M C Lombard  
94A Port Lane  
Fyfeville  
Soc Lym  
Chesham G62 5AE

This one is a bit different though, being based not on the rugged game for 11 players but on an American counterpart — table football — the version where you spin balls of little size to try and get the ball in the back of the net.

The game features specially composed music and a graphically interesting. Although you can play against the computer, the two player version is particularly recommended. There is some specially composed, jaunty, football music to go with it and it's great fun.

**Program** Kick Off  
**Price** £3.95  
**More** Commodore 64  
Spectrum  
**Supplier** The Computer Store  
37 High Street  
Basingstoke  
Hampshire RG24 0AB

happening in the region.

The program is divided into three sections: the regional assembly, the committee, and your own program. The first of these explains the general workings of a computer and the simple ideas behind 280 codes. The second section goes on to explain the main commands in the 280 assembly instruction set. Finally, using these concepts, you can run your own program watching the changing display of storage and register values.

**Program** Beyond Basic  
**Price** £7.95  
**More** Spectrum 48K  
**Supplier** Spectrum Research  
25 Macclesfield Street  
London W4 1AL

**Supplier** Sander Software  
1 Mervyn Close  
Lewisham  
Southampton SO4 4BM

## FAST FOOD



At Mervyn's a computer game featuring, pictures and characters from the streets of advertisements by the well known burger company.

The game proves to be a version of the arcade game Burger Time, which is possibly my favourite game ever.

The game involves steering Mervyn's across a screen of burning machines, collecting ingredients for the burgers. If you manage this, then Mervyn has to actually make the burgers by running across doors and dropping them onto the plates below. Some of the other ingredients roast this and chase him around the screen — the egg is particularly noisy.

The game is beautifully done with graphics more or less as good as those from Ultimate, and includes a demo mode and options to use nearly every kind of joystick.

**Program** Mervyn's  
**Price** £7.95  
**More** Spectrum 48K  
**Supplier** Ocean Software  
84a Chesham Street  
Manchester M2 9PD

Many people are in danger of not getting their share of software as coming on to the market. If you have a few games or more which you are about to release and a copy and photographing them to show them. People Computing Weekly 12/13, later version, 1984, London W4 1AL

## KILLER ROBOTS

Floyd's Bank is a wacky screen space game for the Lynx computer. Each screen contains part of the delicious, precious gold and valuables stored in a bank vault.

The first section is a race of plasma masts where the slightest vibration will set them off. Other sections involve constantly changing mazes and corridors patrolled by killer robots.

On each screen there is a time limit for completion of that section — take too long and quickly come you will be returned into the atmosphere.

**Program** Floyd's Bank  
**Price** £7.95  
**More** Lynx  
**Supplier** Ocean Software  
272 Ayrton Avenue  
Sough  
Dorset

## SNOWY WASTES

Bingo is an arcade/shooting game for the Commodore Vic set in the wintry wastes of, well, somewhere very cold anyway.

Bingo, an innocent victim, is being chased around some blocks of ice by a gun. Bingo, naturally enough, wants to avoid being on the pit's side.

Bingo's only defenses are to hide behind the blocks of ice and, at the right moment, hurl them across the snowy wastes, squashing the snow job. If you defeat the snow job, you can rest assured that his friends will come to find him and so multiply your problems.

**Program** Bingo  
**Price** £3.95  
**More** Vic  
**Supplier** M C Micro  
PO Box 24  
Sutton  
Worcester WR7 5AJ

## TARMAC TIM



Double Trouble is a version of Asterix with some nice touches, for the Spectrum 48K.

Tarmac Tim (that's you) has to paint the yellow lines of Sector Road One employed by Spectromobile District Council. The problem is that Tarmac has to deal with drivers who are positively blind to their driving style and who are not to get him.

Tarmac also has to protect various pedestrians who are wandering in the middle of the road.

If a car gets through, your time will go by. If the services are staff, he will be awarded a bonus according to the number of pedestrians he has managed to save.

**Program** Double Trouble  
**Price** £7.95  
**More** Spectrum 48K

## TABLE GAME



Rock Off is a football simulation for the Commodore 64 — quite a brave claim for the time it's up against Commodore's mighty International Soccer challenge.

## 3 SECTIONS

Beyond Basic is what looks like a useful utility from Ocean Software marketed by Sander.

It is aimed at those people who are just beginning to investigate the subject of machine code and is a kind of mini-manual, where all the commands are explained on screens in terms of what is

## This Week

| Program Title | Type | Movie    | Price   | Supporter |
|---------------|------|----------|---------|-----------|
| Amateur       | 1    | Spectrum | \$9.99  | Amateur   |
| Amateur       | 2    | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 3    | Dragon 2 | \$9.99  | Amateur   |
| Amateur       | 4    | Dragon 3 | \$9.99  | Amateur   |
| Amateur       | 5    | Dragon 4 | \$9.99  | Amateur   |
| Amateur       | 6    | Spectrum | \$12.99 | Amateur   |
| Amateur       | 7    | Dragon 5 | \$9.99  | Amateur   |
| Amateur       | 8    | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 9    | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 10   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 11   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 12   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 13   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 14   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 15   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 16   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 17   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 18   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 19   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 20   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 21   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 22   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 23   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 24   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 25   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 26   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 27   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 28   | BBG 2    | \$9.99  | Amateur   |
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| Amateur       | 63   | BBG 2    | \$9.99  | Amateur   |
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| Amateur       | 67   | BBG 2    | \$9.99  | Amateur   |
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| Amateur       | 69   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 70   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 71   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 72   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 73   | BBG 2    | \$9.99  | Amateur   |
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| Amateur       | 80   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 81   | BBG 2    | \$9.99  | Amateur   |
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| Amateur       | 83   | BBG 2    | \$9.99  | Amateur   |
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| Amateur       | 85   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 86   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 87   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 88   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 89   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 90   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 91   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 92   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 93   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 94   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 95   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 96   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 97   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 98   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 99   | BBG 2    | \$9.99  | Amateur   |
| Amateur       | 100  | BBG 2    | \$9.99  | Amateur   |

## Book Ends

**EXPERIMENT**

Mostly patients of the time, when we research aspects that advance, all we are really doing is making for a fact derived from a series of known other facts, as find an illness that produces symptoms  $x$ ,  $y$ , and  $z$  but not  $u$ ,  $v$ , and  $w$  — whatever. The, often highly paid, professional is being asked to do no more than a computer running a fairly simple program — manipulate a list of data. Hence, cancer research

The idea of the expert system is to use computers to put this task — going through large databases of information from which they match known facts with given answers to a series of questions, producing a conclusion.

Even on a microcomputer it is now possible (using the device) to produce expert systems for some simple problems.

All this is by way of introduction for saying that *Black* just won Expert System by Chris Mayhew is one of the most interesting new books I've read recently — a combination of useful information, as well as some expert-system innuendo for the reader's enjoyment.

| Feature (a-f) | 1990 | 2000 |
|---------------|------|------|
| Landings      | 1.0  | 0.5  |
| Effort        | 1.0  | 0.5  |
| Harvest       | 1.0  | 0.5  |
| Stock         | 1.0  | 0.5  |
| Recruitment   | 1.0  | 0.5  |

This Week is a new profile that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, Popular Computing Magazine, 40-41 Lisle Road, London SE20 2BJ.

|                 |                                                                                  |
|-----------------|----------------------------------------------------------------------------------|
| <b>Book</b>     | World's new open Expert System                                                   |
| <b>Pages</b>    | 200                                                                              |
| <b>Notes</b>    | General (programs: Spectroscopy and Apple)                                       |
| <b>Supplier</b> | John Wiley & Sons<br>Baffins Lane<br>Chichester<br>West Sussex<br>PO19 1UD, U.K. |

## STRUCTURE

As we all know, the BBC has excellent news which allows for things like structural programming and other delights by the way of *Prose*.

A book devoted to the subject is *Young JRC: Space which looks a definitive guide to the subject.*

It is the sort of book you would buy after you have read through the 'absolute beginner's guide to making the machine do something' type books. It deals with things like turbo graphics, data types, use of C++'s function definitions, structures, and so on.

|                 |                                                                            |
|-----------------|----------------------------------------------------------------------------|
| <b>Book</b>     | Caring, BPC, Beale                                                         |
| <b>Price</b>    | \$6.95                                                                     |
| <b>ISBN</b>     | 0007                                                                       |
| <b>Supplier</b> | John Wiley & Sons<br>Baffins Lane<br>Chichester<br>West Sussex<br>PO19 1UD |

## Top 10

| Information Source | Percentage of Respondents |
|--------------------|---------------------------|
| Family             | 45%                       |
| Friends            | 35%                       |
| Teacher            | 25%                       |
| Classmate          | 20%                       |
| Mass media         | 15%                       |
| Library            | 10%                       |
| Computer           | 10%                       |

Figure 1. Information sources used to learn about the Internet.

## Top 10

| Model | Country | Year | Model | Country | Year   |
|-------|---------|------|-------|---------|--------|
| 1     | France  | 1990 | 10    | France  | 1990   |
| 2     | France  | 1990 | 11    | France  | 1990   |
| 3     | France  | 1990 | 12    | France  | 1990   |
| 4     | France  | 1990 | 13    | France  | 1990   |
| 5     | France  | 1990 | 14    | France  | 1990   |
| 6     | France  | 1990 | 15    | France  | 1990   |
| 7     | France  | 1990 | 16    | France  | 1990   |
| 8     | France  | 1990 | 17    | France  | 1990   |
| 9     | France  | 1990 | 18    | France  | 1990   |
| 10    | France  | 1990 | 19    | France  | 1990   |
| 11    | France  | 1990 | 20    | France  | 1990   |
| 12    | France  | 1990 | 21    | France  | 1990   |
| 13    | France  | 1990 | 22    | France  | 1990   |
| 14    | France  | 1990 | 23    | France  | 1990   |
| 15    | France  | 1990 | 24    | France  | 1990   |
| 16    | France  | 1990 | 25    | France  | 1990   |
| 17    | France  | 1990 | 26    | France  | 1990   |
| 18    | France  | 1990 | 27    | France  | 1990   |
| 19    | France  | 1990 | 28    | France  | 1990   |
| 20    | France  | 1990 | 29    | France  | 1990   |
| 21    | France  | 1990 | 30    | France  | 1990   |
| 22    | France  | 1990 | 31    | France  | 1990   |
| 23    | France  | 1990 | 32    | France  | 1990   |
| 24    | France  | 1990 | 33    | France  | 1990   |
| 25    | France  | 1990 | 34    | France  | 1990   |
| 26    | France  | 1990 | 35    | France  | 1990   |
| 27    | France  | 1990 | 36    | France  | 1990   |
| 28    | France  | 1990 | 37    | France  | 1990   |
| 29    | France  | 1990 | 38    | France  | 1990   |
| 30    | France  | 1990 | 39    | France  | 1990   |
| 31    | France  | 1990 | 40    | France  | 1990   |
| 32    | France  | 1990 | 41    | France  | 1990   |
| 33    | France  | 1990 | 42    | France  | 1990   |
| 34    | France  | 1990 | 43    | France  | 1990   |
| 35    | France  | 1990 | 44    | France  | 1990   |
| 36    | France  | 1990 | 45    | France  | 1990   |
| 37    | France  | 1990 | 46    | France  | 1990   |
| 38    | France  | 1990 | 47    | France  | 1990   |
| 39    | France  | 1990 | 48    | France  | 1990   |
| 40    | France  | 1990 | 49    | France  | 1990   |
| 41    | France  | 1990 | 50    | France  | 1990   |
| 42    | France  | 1990 | 51    | France  | 1990   |
| 43    | France  | 1990 | 52    | France  | 1990   |
| 44    | France  | 1990 | 53    | France  | 1990   |
| 45    | France  | 1990 | 54    | France  | 1990   |
| 46    | France  | 1990 | 55    | France  | 1990   |
| 47    | France  | 1990 | 56    | France  | 1990   |
| 48    | France  | 1990 | 57    | France  | 1990   |
| 49    | France  | 1990 | 58    | France  | 1990   |
| 50    | France  | 1990 | 59    | France  | 1990   |
| 51    | France  | 1990 | 60    | France  | 1990   |
| 52    | France  | 1990 | 61    | France  | 1990   |
| 53    | France  | 1990 | 62    | France  | 1990   |
| 54    | France  | 1990 | 63    | France  | 1990   |
| 55    | France  | 1990 | 64    | France  | 1990   |
| 56    | France  | 1990 | 65    | France  | 1990   |
| 57    | France  | 1990 | 66    | France  | 1990   |
| 58    | France  | 1990 | 67    | France  | 1990   |
| 59    | France  | 1990 | 68    | France  | 1990   |
| 60    | France  | 1990 | 69    | France  | 1990   |
| 61    | France  | 1990 | 70    | France  | 1990   |
| 62    | France  | 1990 | 71    | France  | 1990   |
| 63    | France  | 1990 | 72    | France  | 1990   |
| 64    | France  | 1990 | 73    | France  | 1990   |
| 65    | France  | 1990 | 74    | France  | 1990   |
| 66    | France  | 1990 | 75    | France  | 1990   |
| 67    | France  | 1990 | 76    | France  | 1990   |
| 68    | France  | 1990 | 77    | France  | 1990   |
| 69    | France  | 1990 | 78    | France  | 1990   |
| 70    | France  | 1990 | 79    | France  | 1990   |
| 71    | France  | 1990 | 80    | France  | 1990</ |

## Top 10

[illegible]

## Top 10

| Year | Spreads | Spreads and the Polymers |
|------|---------|--------------------------|
| 1990 | 100     | 100                      |
| 1991 | 100     | 100                      |
| 1992 | 100     | 100                      |
| 1993 | 100     | 100                      |
| 1994 | 100     | 100                      |
| 1995 | 100     | 100                      |
| 1996 | 100     | 100                      |
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| 2005 | 100     | 100                      |
| 2006 | 100     | 100                      |
| 2007 | 100     | 100                      |
| 2008 | 100     | 100                      |
| 2009 | 100     | 100                      |
| 2010 | 100     | 100                      |
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| 2012 | 100     | 100                      |
| 2013 | 100     | 100                      |
| 2014 | 100     | 100                      |
| 2015 | 100     | 100                      |
| 2016 | 100     | 100                      |
| 2017 | 100     | 100                      |
| 2018 | 100     | 100                      |
| 2019 | 100     | 100                      |
| 2020 | 100     | 100                      |
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| 2095 | 100     | 100                      |
| 2096 | 100     | 100                      |
| 2097 | 100     | 100                      |
| 2098 | 100     | 100                      |
| 2099 | 100     | 100                      |
| 2100 | 100     | 100                      |

11 **Figure 1**

Figure 10. Comparison of the results of the two models. The results of the two models are compared for the same set of parameters. The results of the two models are compared for the same set of parameters. The results of the two models are compared for the same set of parameters.

100

| Rank | Country        | Number of students |
|------|----------------|--------------------|
| 1    | United States  | 1,000,000          |
| 2    | France         | 500,000            |
| 3    | Germany        | 400,000            |
| 4    | Japan          | 300,000            |
| 5    | United Kingdom | 200,000            |
| 6    | Italy          | 150,000            |
| 7    | Spain          | 100,000            |
| 8    | Sweden         | 50,000             |
| 9    | Canada         | 40,000             |
| 10   | Australia      | 30,000             |

(Figures compiled by United Nations)

1. **Introduction**  
 2. **Background**  
 3. **Methodology**  
 4. **Results**  
 5. **Discussion**  
 6. **Conclusion**  
 7. **References**  
 8. **Appendix**  
 9. **Index**  
 10. **Table of Contents**  
 11. **Abstract**  
 12. **Summary**  
 13. **Key Words**  
 14. **Keywords**  
 15. **Subject Headings**  
 16. **Classification**  
 17. **Indexing**  
 18. **Abstracting**  
 19. **Indexing**  
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| 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|

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## THE FOLLOWING LISTED ARE THE FEATURES:

THE FIRST: A PERSONAL ADDRESS, INCLUDING  
NAME, ADDRESS AND PHONE NO. (OPTIONAL) & A  
NAME AND PHONE NO. (OPTIONAL) FOR THE  
SECOND: A PERSONAL MESSAGE TO THE  
RECIPIENT.

THE SECOND: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE THIRD: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE FOURTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE FIFTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE SIXTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE SEVENTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE EIGHTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE NINTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE TENTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE ELEVENTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE TWELFTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE THIRTEENTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE FOURTEENTH: A PERSONAL MESSAGE TO THE  
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THE SIXTEENTH: A PERSONAL MESSAGE TO THE  
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THE SEVENTEENTH: A PERSONAL MESSAGE TO THE  
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phone no. if you wish.) (Optional) (Optional) (Optional)

THE EIGHTEENTH: A PERSONAL MESSAGE TO THE  
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THE NINETEENTH: A PERSONAL MESSAGE TO THE  
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THE TWENTIETH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE TWENTY-FIRST: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE TWENTY-SECOND: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE TWENTY-THIRD: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE TWENTY-FOURTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE TWENTY-FIFTH: A PERSONAL MESSAGE TO THE  
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phone no. if you wish.) (Optional) (Optional) (Optional)

THE TWENTY-SIXTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

THE TWENTY-SEVENTH: A PERSONAL MESSAGE TO THE  
RECIPIENT. (You can add a name, address & a  
phone no. if you wish.) (Optional) (Optional) (Optional)

'TIS TIME TO BE JOLLY AND 'ARRY  
'TIS TIME FOR TO LAUGH, NOT TO CRY  
'TIS TIME FOR A SEASONAL GIGGLE  
OF AUTOMATA'S



IT'S CHRISTMAS! HURRY IN THE  
HOMER'S LOUNGE (IF YOU'RE LUCKY)  
AND SEE LITTLE BOY, HILTONS AND HIS  
WOMEN FRIENDS AND RELATIVES ARE  
CRYING THEIR JOYFUL DREAMS.



**A VERY HAPPY CHRISTMAS &  
A PEACEFUL NEW YEAR to EVERYONE!**

from Mal & Company

P.S. DON'T FORGET THE LITTLE BOY, HILTONS AND HIS WOMEN FRIENDS AND RELATIVES ARE CRYING THEIR JOYFUL DREAMS.

POPULAR/COMPUTING WEEKLY