Dec/Jan 1990/91 Vol 4. No.6

COCO LINK

The Color Computer Magazine

A Merry Xmas

and a

Happy New Year

To all our readers

Featuring:

- 1991 COCO-LINK Award
- Small Investor Pt.3
- Games and Much More

Australian Peripheral Developments

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Ph. 08 252 4541

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25 Sitella Pl.
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COCO LINK

EDITOR:

Robbie Dalzell

ASST. EDITOR:

Garry Holder

SUB-EDITORS:

OS9:
Ken Wagnitz

Hardware:
Darren Ramsey

Correspondence:
Garry Holder

Submissions:
Robbie Dalzell

COCO LINK

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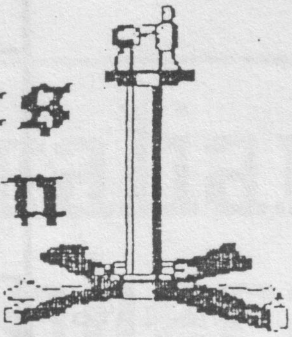
Robbies Column



XMAS GREETINGS

On behalf of Garry and myself I would like to wish you all the very best for Xmas and the New Year. I would also like to thank all those who have contributed articles , programmes, letters and helped in answering some of the queries put to us by readers.

We look forward to another year of good computing and as usual call on your help to help us accomplish this. We look forward to receiving your submissions to COCO-LINK for 1992.

And just remember during this holiday season............ DRIVE CAREFULLY!!!

****

LOOKING TO 1992

Looking into the COCO-LINK crystal ball I can see some things to really look forward to in 1992:

a) A Coco 3 graphics dump programme
b) A PMODE graphics dump programme.
c) More 1st class tutorials.
d) Application programmes for Business, Surflife-saving clubs, homehelp and much more.
e) More exclusive US software made available through SOS.
f) The further expansion of our Public Domain Library. The cheapest software available for the Coco.

Plus, most importantly, the holding together of this Coco Community using this magazine as the link.

****

COCO-LINK AWARD

Also in these pages is the announcement of the winner of the 1991 COCO-LINK AWARD. I am sure the recipient of the award will be a name familiar to all readers of this magazine.

The winner is George McLintock.

****

SOAPBOX TIME AGAIN

Australia Post, in their wisdom, has seen fit to again increase the postal rates for registered publications. this is the third increase in the last 12 months and does not even include the increase of the registration fee from $50.00 to $75.00 which occurred at the beginning of 1991.

In the last 12 months our postal charges have increased from 36cents to 45cents an increase of 9cents or, to put it another way, 25%. Considering that the CPI is down to under 4% this increase of 25% plus the fees increase of 50% does seem somewhat excessive. Is this what is meant by a recession?

When I made my complaint to the PO I was told that they were considering doing away with registered publications all together and if that was done, all mail would be charged at the normal applicable rates. This, I was told, was because of the losses being incurred by this type of business.

In my opinion, should they decide on this course of action, not only will they loss even more revenue but many people will be deprived of many of the small individually based magazines and newsletters such as those turned out by the Muscular Dystrophy Association and other club magazines like COCO-LINK. People in outback areas or those who are unable to pick up their favourite magazine from a local newsagent will be discriminated against because the high cost of postage will send the price of their subscriptions sky high.

I wonder if the Australia Post are considering the discontinuance of using the postman to fill my letterbox with countless fliers from a variety of retail sources who get this "junkmail" delivered by the PO at very special rates.

Many of what we used to consider as the Government service industries (Post Office, Telecom, etc.) seem to have lost most of the SERVICE and reverted, along with the banks (Lower interest and higher charges) in an almost Lemming like rush towards higher and higher profits and Lord help anyone or anything which might stand in their way of their goal.

I will now stand down from my soapbox for 1991 at the same time as assuring you that we at COCO-LINK have no intention of raising our subscription fees over the next year.

****

BACK ISSUES

May I remind you that copies of Volume 3 of COCO-LINK will no longer be printed after the end of December 1991. Anyone wishing back copies of these or of Volume 4 should do so now. They are available from COCO-LINK for $2.50 each.

****

THIS ISSUE

We have tried in this magazine to give you all something to think about and keep your fingers on the keyboard. Because of the length of the STARTREK programme we have reverted to the 3X32 column listing to save some paper.

We have made this magazine more games orientated than usual to help add to the Xmas spirit.
We have also included a word puzzle to give your brain a little exercise. This puzzle carries a small prize (See the appropriate page in this magazine).

****

COMPETITIONS
I think we have finally proved to ourselves that running competitions is a waste of time and energy. The amount of output from COCO-LINK does not equate with the results from the readers end.
This does not demean the effort put in by the THREE people who put time and energy into writing and submitting material for this competition. It is a pity that we could not afford prizes for all the competitors, however, a winner had to be chosen.
Our choice as the winning entry appears on page 7 of this magazine.

****

EXCHANGE AND MART
Please inform us if the goods you advertise in the Exchange and Mart column have been sold, or items wanted have been received.
We will repeat the advert in a second issue if we do not receive any notification but obviously it would save us, and our readers, a lot of inconvenience if we are notified of any changes to the advert.

****

STOP PRESS!!!
I announced previously that we would have no SOS for the December magazine. However, Tony Griffin has a number of new unused programmes for sale at very good prices and so I thought it a good idea to put this in this Xmas magazine for those late buyers.
NOTE: A major difference for this SOS is that all orders must be sent direct to Tony.
DO NOT SEND ORDERS, CHEQUES OR MONEY TO COCO-LINK!!!!!!
******

****

Seasons Greetings
Robbie

PUBLIC DOMAIN SOFTWARE

This months Public Domain disk is a double sided floppy just jam packed with Basic Games. This disk originates from the USA and was produced by the Colorado Color Computer Club. The disk has a menu system from which you can see and run the programmes.
We hope you will enjoy this disk as our Xmas 1991 offering. The price remains as always.....$5.00 including postage and packing.

The games on the disk are as follows:
SIDE 1

Menu
Gunner
Life
Biorithm
Busjump
Hangman
Sequence
Flash
Multiply

Beast
How
Max
Blackbox
Chute
Othello
Alphabet
Bagels

Bobo
Lander
Poker
Blockade
Go
Tartus
Geograph
Oregon

SIDE 2

Menu
Kalscope
Lovetrek
Startrek
Reverse
Pizza

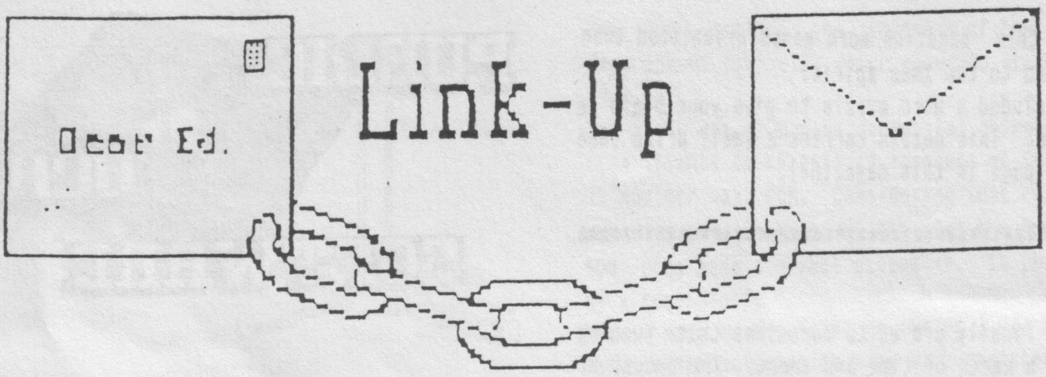
Rubic
Tartus
Nude
Advent
Guessfr
Cinquain

Fractal
World3d
Life
Hurkle
Scramble
Aandan

Please note that the Startrek programme on this disk is not the same one as appears elsewhere in this magazine.

If you wish to receive this disk before Xmas, please order early as COCO-LINK will not be operating over the festive season.
Thank you.

COCO LINK



Dear Ed.
I enjoy getting you magazine in the mail every second month and I hope that it doesn't die out like a lot of the user groups around.
I recently submitted a disk with programs and an article on it. Will I get the disk back when it is no longer needed?
Would it be financially viable to offer, to people who submit material to COCO-LINK, a copy of the magazine in which their article/program appears free of charge? Also the PD DISK on which their program appears?
How about a section for people to suggest a program that could be written by other authors who don't know what type of program to develope and submit.
Do you know of anyone who knows of a Lear-Ziegler dot matrix printer?

Thanks for your time and a great magazine. Keep up the good work.
I'll try and do my best to have some more programs for you in time for the next COCO-LINK.
Raymond Rosch Prestons NSW

Thank you for your encouragement and the suggestions.
Disks sent to COCO-LINK with submissions are returned to sender.......eventually. It takes a while before I get round to it sometimes as I like to do things in batches to save time.
We continually consider various ideas for improving service to readers. That is how SOS came about. However cost is not the only item which has to be considered although it is obviously a major one. Garry and I can only devote so much of our free time to COCO-LINK and each new service we develope increases the time we spend on the magazine.
We are always looking for suggestions on what our readers would like to see in these pages. This can be done quite easily through letters to the editor.
I personally have never heard of a Lear-Ziegler printer but maybe some of our readers can help.

Thank you for the programmes you sent. We look forward to seeing some of your more recent projects.

****

Dear Ed,
Firstly let me say that I am impressed with the magazine, it is good to see that there are still some people out there prepared to give the COCO a go, I for one thought that I would be forced to go to (shock horror) IBM in order to continue my interest in computing.
The COCO community I believe is still out there somewhere waiting for both support and recognition, in order to widen our horizons would it be possible, obviously with the permission of the individual, to print the names of users in the magazine? By users I mean individauals as opposed to user groups as I believe user groups are very few these days, maybe by publishing individuals names some of the past user groups can be reunited and others started.
You can start with my name address and phone numbers, they are:

Fred Remin
14 Wellington Rd
CLAYTON MELB VIC 3168
AH:(03) 5445557
WK:(03) 5436233

It is policy at COCO-LINK to not print lists of subscribers. This is for several reasons.
One. Many people are offended when their name and address is published.
Two. List such as this can be used by other organisations for purposes other than the reason for which the list was published.
As you can see, I have published your name and address as you permitted. I leave it up to the individual readers whether they would like to contact you or be contacted by you.

****

Dear Ed.
I am in the process at the moment of doing a program to show how color graphics can be done on a DMP-107. It should work on a DMP-105 & 106. This is done by using color ribbons & in this case with a lot of programming can produce dot accuracy.
I will forward a copy when completed to see if you can use it.

Thanks for the revised listing of the Investor programme. I did have a typo error, but was in trouble as I was exitting the program without closing one or more files. I then could not rerun the program until I had killed the file and then restarted.
All is well now and am adding info each week.

A Murrells, Corio, NSW

We look forward to seeing your latest programme. I am sure that it will find a place in the magazine.
It is good to see that the programmes we put in COCO-LINK are being used by our readers. Answering questions or solving problems with these programmes is part of the service we like to offer. I am glad that you are now working on your Investor Data base.

****

Dear Ed,
This note is to any reader who has DYNACALC for their CoCo2 and is wanting to buy the $30.00 CoCo3 version for RSDOS.
When I received my upgrade version it had 'Loader' printed on the disk label, and I at first thought it loaded the coCo2 version, but it in fact loads its own CoCo3 version which outwardly looks and runs the same as the old one: but when I tried to access commands that are kept on the disk, it kept telling me that there were no such files.
After wondering for a while if the program was not working properly, I inserted the old CoCo2 version in and the DYNACALC-3 was able to access the necessary commands.
The next problem came when I tried to print data, only to have the printer locking up all the time. Initially I thought it was using the commands for the printer that were in my case set at 600 baud and Pagination OFF, but soon realised that this was not the case. DYNACALC-3 uses its own set of default printer commands.. e.g. baud is 9600 and Pagination is ON.
The only way that I can see around the problem, is to manually set the baud rate and Pagination each time you start a new data filename (Pagination command is saved with data, but not the baud rate).
So, when you receive the CoCo3 version, transfer the programs onto the same disk and same side as your CoCo2 DYNACALC and manually change the baud rate and Pagination etc to suit.
Baud is /SPB and Pagination /APP (see manual).

Send A.P.D. $33.00 for program and certified postage, along with your CoCo2 DYNACALC Master disk.

Garry Holder SA (Asst Editor)

We felt that this information would be of some importance to many of our readers so we decided that Garry should write it as a letter to himself as this way it might be noticed by more people.

(Robbie)

Dear Ed,
Would anyone in COCO-LINK club know how we can obtain a manual or instructions to the ROM cartridge called 'Audio Spectrum Analyzer'; as when we got this ROM it was with no instructions, and have not been able to do anything with it.
We have CoCo3 and Tandy disk drive D502; all we get on screen is the showing, or the scale of music. we would be very grateful if someone could help; name, address and phone number supplied.

Mr & Mrs L.A. Cooper. Leichardt. N.S.W.

Can anyone help here?

****

Dear Ed,
This is to advise you that I will be overseas for much longer than I anticipated; therefore I would like to have Coco Link forwarded to me by airmail to my new overseas address.
Since I arrived here in Holland I have had a chance to look at the computer scene here. Tandy is now reduced to a small shop in the city. They advertise in their catalogue the 1000 TL/2 with Phillips color monitor, 3.5" drive, 20mb hard disk for about the equivalent of $1726.00 but they did not have any computers on display in their shop. Typical?
Otherwise there are lots of IBM compatibles with names I have never heard of. The English photography firm, Dixons, has gone into computers in a big way, and they have shops all over the EEC. The Commodore 64 is still selling strongly, so there seems to be a healthy demand for a simple home/hobby computer; a point that Tandy seems to have missed completely.
I had a letter from George Quellhorst just before I left Australia; the CoCo's been dumped in the U.S.A. too, and Tandy has been selling CoCo leftovers at prices that would bring tears to your eyes:
FD502 disk drives US$49.95; CoCo $49.95; RGB monitors $129.95 and DMP133 printers $89.95
My CoCo and all peripherals are still in Australia, but I am now arranging for them to be shipped to me as soon as possible; I guess it will take another two months before they reach me.

Keiran Kenny. The Hague. Holland.

I am sure we will be able to fix Keiran up to be our first european subscriber. This really makes us international with a magazine already going to Canada. Maybe we will crack the great USA one of these days.
The prices Kieran mentions for the Tandy sell off in the USA are US dollars.

****

END

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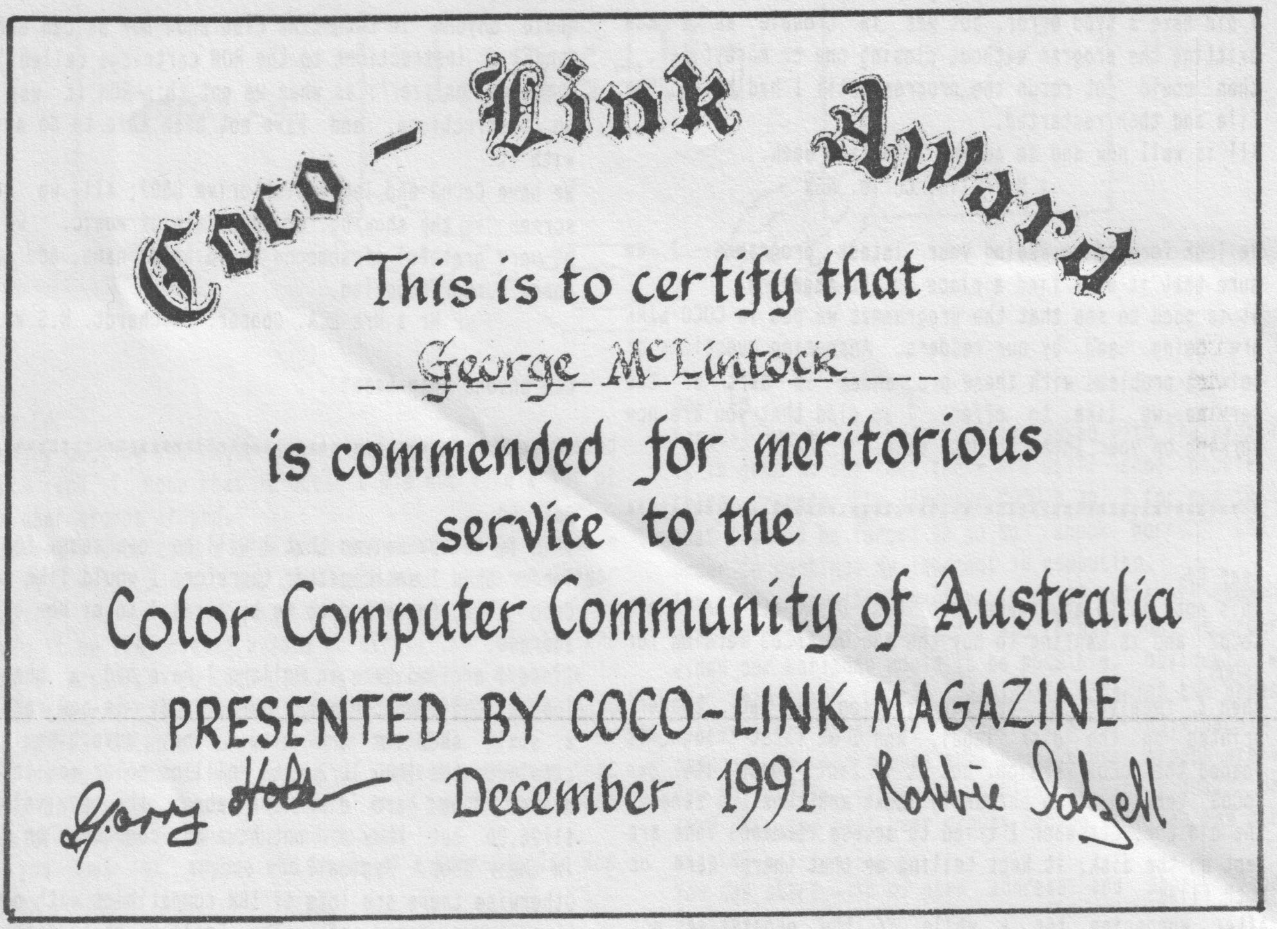


Coco - Link Award

This is to certify that

George McLintock

is commended for meritorious service to the

Color Computer Community of Australia

PRESENTED BY COCO-LINK MAGAZINE

Garry Holt December 1991 Robbie Dalzell

This year's COCO-LINK AWARD for meritorious service to the Coco Community of Australia goes to GEORGE McLINTOCK.

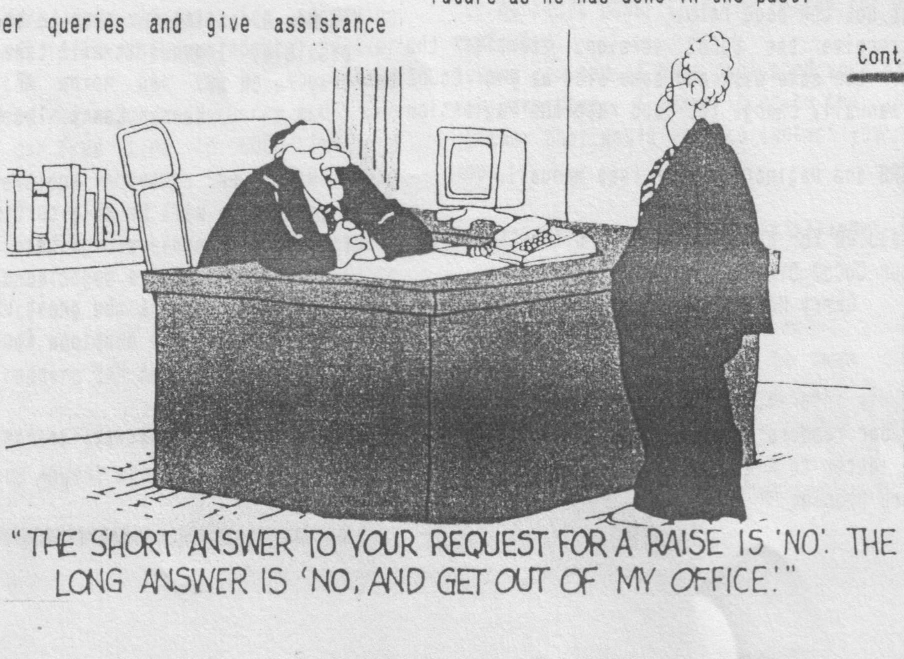
George has long been a supporter of th Color computer since Tandy first issued the machine. He has written countless programmes for the machine. His detailed tutorials on a myriad of subjects connected to the Coco have helped countless users to a better understanding of the machine. George also programmes an MS-DOS machine and writes articles and programmes for an MS-DOS Usert group.

His willingness to answer queries and give assistance where needed to those seeking it makes his contribution to the Coco community invaluable.

I am sure all our readers will endorse our choice for this award and along with Garry and I, offer congratulations

The original of the above scroll plus a cheque for $100.00 have been mailed to George with our best wishes and the hope that he will continue to support us in the future as he has done in the past.

Continued Overleaf



"THE SHORT ANSWER TO YOUR REQUEST FOR A RAISE IS 'NO'. THE LONG ANSWER IS 'NO, AND GET OUT OF MY OFFICE.'"

Competition Winner — Tutorial

Is Your Coco Psychic?

By R.Rosch

This article was an entry in the "Cassette competitionand earns the distinction of being the winner. The subject matter has been covered before but we felt that Mr.Rosch tackled it in a comprehensive and easy to understand manner. The inclusion of the examples shows that things are not always as they seem. In other words, "RNDs ain't random".

It can sure look like it! What I'm talking about is the RND command. Have you ever asked yourself "How random is the RND command?". Keep reading and you'll find out!

*** N.B. IN THIS ARTICLE, RESET THE COCO MEANS TURN THE COMPUTER OFF AND THEN ON AGAIN. ***

Type in the following program and save it.

```
 10 FOR L=1 TO 10
 20 PRINT RND(10)
 30 NEXT L
 40 END
```

Now RESET the coco and run the program, write down the numbers. Then RESET the coco and run it again. Notice something about the second set of numbers? Try it as many times as you want.

More proof? Retype line 30, save the program, RESET the coco and run it again

```
 30 PRINT RND(L)
```

More proof? Enter the following lines and save the program.

```
 11 X=RND(100)
 12 Y=RND(5)
 13 FOR D=1 TO X STEP Y
 14 Z=RND(D)
 15 NEXT D
```

Run the program a few times RESETting the coco each time. Satisfied?

The RND command looks at memory location 280 (&H118) for its starting point. There are two ways to get a more random RND.

```
   POKE 280,PEEK(275)
```

Location 275 (&H113) has a constantly changing value, therefore depending on when you enter the poke decides the starting point for RND. Load up the first program and enter:

```
 10 POKE 280,PEEK(275)
```

Save then run the program a number of times (RESETting the coco each time).

Another way is the RND(-TIMER) command. This command on its own will give you a long unusable decimal. Load the first program and enter:

```
 30 PRINT INT(RND(-TIMER)*10+.5)
```

Save then run the program a number of times (RESETting the coco each time). Notice the difference?

Substitute the 10 in line 30 for the highest number that you need. The +.5 is there to compensate for the rounding down of the INT command.

Well there you have it, a RND that actually looks like a random number.

Just to show you that the RND(-TIMER) isn't perfect. Type in the following program:

```
 10 ON BRK GOTO 80
 20 HSCREEN 2
 30 X=INT(RND(-TIMER)*320+.5)
 40 Y=INT(RND(-TIMER)*192+.5)
 50 X=INT(RND(-TIMER)*15+.5)
 60 HSET(X,Y,C)
 70 GOTO 30
 80 END
```

For coco I and II substitute:

```
 20 PMODE3:SCREEN1,0:PCLC
 30 X=INT(RND(-TIMER)*256+.5)
 60 SET(X,Y,C)
```

And leave out lines 10 and 80. Run the program (No need to reset the coco). Hey presto! Lines. Random? Experiment with the programs and modify them if you wish.

Back to the original question. Reset the coco and run the first program. The numbers I get are:5-4-2-7-5-4-6-3-2-9.

So, can your coco read my coco's CPU?

END

Windows and OS9 By G.McLintock

As a hobby type programmer I often take an interest in current fads and recently got a copy of Windows 3 for a look at. I was rather disappointed with the results

The package itself (for around $175 locally) provides no access to any of its features that you can use from your own programs. If you want to do a simple thing like position a system window on the screen from your own program then you apparently have to spend another 700 odd dollars to get a software developers kit as well. This is not hobby type money so I can't comment on what you might get if you buy that as well.

I have a much older multi tasking/multi windows type operating system that runs on my old computer (OS9 on a Tandy Color computer (CoCo)) and some comparison between it and the 'new generation' windows might be of interest.

A simple direct comparison of the CPU/software overheads associated with multi tasking on the two systems is as follows. The reduction from the native mode value is a measure of these overheads.

	Windows(386)	OS9(CoCo)
Native Mode (DOS on 386)	100	18.77
Multi tasking/windows		
Single task	33	18.77
Two tasks	29	18.69
Three tasks	30	18.58
Four tasks	32	18.40
Five tasks	33	18.27
Six tasks	33	18.10

These relative weights were obtained from a simple compiled Basic program on each machine that counts the number of times a common loop is executed per minute of actual elapsed time. (CPU fully occupied). The same program was then run as multiple tasks to produce a separate count for each task which were then added to obtain a total count for the specified number of tasks. The reduction in total count for multiple tasks is a measure of the cpu/software overheads of multi tasking. I am aware of the problems with this sort of comparison, and will ignore all criticisms of the metholodogy

Windows 3 incurs an enormous penalty for the first task in a multi tasking environment, but after that it gives some erratic results. (5 tasks give the same count as 1, which is significantly higher than 2 or 3 tasks). I have no idea why.
OS9 does its multi tasking with standard time slicing and the results are as you might expect. Native mode with OS9 is a single task, single window environment anyway. The original CoCo mode has interpreted Basic only.

THE SYSTEMS:
Some knowledge of the two systems involved will make the comparison even more interesting. The windows values were obtained from a standard type 386 SX (16 MHz clock, landmark around 21 MHz) with 8 Megs of memory. Multiple tasks were run as DOS programs in their own window, started from the keyboard, with the total count per minute derived from whole minutes with no keyboard or mouse activity. Rather painful but can be done. I assume the general background of the 386 system is known, and apologise to those unfamilar with it.

The original Tandy Color Computer (CoCo) is older than the original IBM PC (by at least a year). The model used here (CoCo 3) was released in 1986. It uses a 1.66 MHz 6809 CPU. (and yes there is a decimal point between the 1 and the 6. The original CoCo is 0.83 MHz). The 6809 is from Motorola, has an 8 bit data path, 16 bit internal registers (Intel's 8088 CPU has a similar system) and 16 address lines. It uses a separate memory management unit to address up to 512K in 8K blocks of actual memory. (64K at any one time). (1 meg upgrade kits from third party suppliers). For comparison, the same program under DOS on a 4.7 MHz 8088 produces a relative count of 13.2.

The OS9 operating system is a real time multi-user multitasking operating system written for the Motorola 68XXÆXA family of processors, and recently available for Intel 80386 processors as well. Multi tasking is standard, all compilers produce re entrant code, modules are linked at run time, all I/O is through standard interfaces by means of device drivers, all graphics modes are supported etc. It provides very efficient use of memory and 512K is a reasonably large system. eg the Basic runB module is 12K and only a single copy is required in memory for any number of different programs. Each source module can be compiled separately and contains direct code for that source only. If it calls another module at run time the system will automatically link to that other module as required. If the other module is not in memory, it is automatically loaded so that the link can be established. A single module can be used by any number of other modules at the same time. The link is established simply by calling the routine.

As another trivial and simplistic comparison, the Quick Basic runB module is approx 77.5K and the count program compiles to approx 6.7K. Apart from its other overheads, Windows 3 loads a total of 84K (77.5 + 6.7) of program code for each task. The OS9 equivalents are 12K for the runB module and 410 bytes (no K's) for the count program. OS9 loads 12K + 410 bytes for the first task and then adds an extra 64 bytes in the system page for each additional time the task is run.

OS9:

OS9 Level 1 (with a 64K memory limit) was released for the CoCo in 1983. Level 2 (any amount of memory) was released with the CoCo 3 in 1986. Around 1987 Tandy released a standard GUI (graphics user interface) (Called Multiview) for OS9 which appears very similar to Windows. For a non technical user they would appear to be much the same. Software packages come with the equivalent of a Window's .PIF file which will automatically set them up to run under Multiview. You drive the system with a mouse, joystick (emulating a mouse) or keyboard. Icons etc follow the same general style as windows.

OS9 windows are proper system type windows with the basic unit being device windows that can be text or graphics. You can have any number of these (within limits), of any size, located anywhere on the physical screen, as well as a number of different physical screens accessible by a screen change 'hotkey'. They are standard OS9 devices and a program can direct its output to any device open to it. Output can be automatically scaled to match the actual window size. Device windows cannot overlap each other on the physical screen and all must be the same type (text or graphics) at any particular time. Graphic device windows can be any resolution and can be mixed, within the limits of the physical display hardware. eg a program using a 4 color screen can have a device window on the same physical screen as a program using a 16 color device window, within the limits of no physical overlap etc. The physical screen is of course set to 16 color mode in these circumstances, with some practical limitations on sequences etc.

Overlay windows sit on top of device windows and can be located anywhere within it. The normal procedure is to start a process in a device window which belongs to it. Different modules within that process can then use overlay windows to locate their output anywhere within it. However, programs can send their output to different device windows and run overlay windows in them. Assuming the owner of that other device window (if it has one) allows it. A process owns a device window if it is running under a separate shell within it, otherwise it is open to all comers. The system provides a standard set of clipboard type buffers to allow for the transfer of data between processes. These can be used without any direct linking between processors at run time.

WINDOWS 3:

These general concepts don't seem to apply too well to Windows 3. In one way it seems to operate as a single full screen device window with each task having its own full screen overlay. A better alternative might be to consider it as allowing device windows to overlap each other, with each task having its own full screen device window overlaying the one below it. This might at least make some sense for the requirement to re-install the whole system to change the graphic display mode. I expect it would be logically very difficult to overlay graphic device windows with different resolutions.

Windows 3 does allow you to change the size and location of the window for a task by using the mouse to drag the edges. However, when you do this you are not actually changing the window itself, position 0,0 remains in the top left corner of the physical screen so it is not even a true overlay window either. All you appear to be doing is to change a Basic type view of the actual window which continues to occupy the full physical screen.

CONCLUSION:

Performance wise, OS9 offers many features not available with Windows. It is a true multitasking, multiuser system which windows is not.

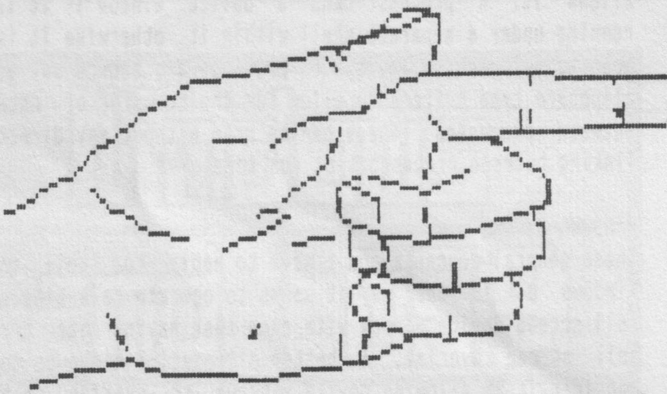
Apart from its age and CPU performance, OS9 on the Coco 3 performs very well. Its main drawback is that the CoCo was discontinued outside the USA a couple of years ago, meaning that there is a vast lack of corporate support for the machine and the system. Cocos can still be acquired in Australia second hand at very good prices.

Windows on the other hand,has vast support and this is growing in leaps and bounds. Windows also requires a system which costs in excess of $2000.

It can therefore be said that the main difference which will affect potential users is price.....as usual.

END

COCO LINK



Better BASIC Part 18

Bu George McLintock & Robert Kenny

more sorting

As an extension of the Better Basic Part 13, (CoCo Link Feb 91) on array sorts, I've included another sorting method which is called the Shell-Metzner sort. In general this is the fastest sort available which is still simple enough to include in a program. I've set it up from line 1000 in the same way as the other methods included in the magazine, but have used only the first two characters in the variable names. For a comparison of speeds. With 200 variables (reverse sequence) the bubble sort requires 19900 comparisons and 19900 exchanges. Shell-Metzner requires 2548 comparisons and 620 exchanges. For larger arrays the difference in execution speeds is substantial.

This sort is based on breaking down the total sorting task into several smaller sorts of sub groups of elements within the total. Each smaller sort is performed by a form of bubble sort, but instead of sorting adjoining elements it sorts elements with a 'gap' between them. The number of groups to be sorted is the same as the gap between elements.(It is variable F in the program). In addition, each sub group of elements to be sorted is selected is such a way that the total number of comparisons (and swaps) between individual elements is substantially reduced. If you work through some examples in detail you can see how this occurs. In all cases the last group to be sorted is a single group with a gap of one, which is the same as a normal bubble sort, but because of the earlier sorts few, if any, swaps are required for this last group.

Sorting data is a common requirement in programs and the nature of the sort can vary a lot. Some years ago I had an article in Australian CoCo which described the more common variations and provided ML routines to do them within a Basic program. The code here for Shell-Metzner is set up to make it easy to include other variations. ie multi level sorts, sorting records on keys, indirect sorts etc. If using the outline code here in a program you can exclude all references to CO, E1 and PA. (and line # 1085). You still need the equivalent to LA (Number of elements)

Line # 1050 provides the comparisons required and can be extended for multi level sorts etc. The essential requirement is to decide if a swap is required or not. If not then jump to line 1070

Line # 1060 sets the switch (SW) non zero and swaps the elements. It can be modified to swap complete records and/or swap a pointer for indirect sorts etc.

The other lines are essentially required in their present form for any sort and normally do not require to be altered

When sorting large string arrays in Basic you can often speed it up significantly by swapping the Varptrs of the strings rather than the strings themselves. eg you might swap the strings with code like T$=A$(X): A$(X)=A$(Y): A$(Y)=T$. You can replace this with code like

```
T1=VARPTR(A$(X)): T2=VARPTR(A$(Y)) 'All variables must be
pre defined
FOR T3=0 TO 3: T=PEEK(T1+T3): POKE T1+T3,PEEK(T2+T3):
POKE T2+T3,T: NEXTT3
```

While this procedure will take longer to do for a single swap, the totalsort time will be less because no garbage collection will be required. It will, of course, be even faster if you include a few ML routines as well, but that is another story.

```
30 DIM AR(200)
40 LA=5
50 FOR EL=1 TO LA
60 AR(EL)=LA-(EL-1)
70 PRINT AR(EL);
80 NEXT EL
90 PRINT "ARRAY IS UNSORTED"
100 GOSUB 1000
120 FOR EL=1 TO LA
130 PRINT AR(EL);
140 NEXT EL
150 PRINT "ARRAY IS SORTED"
160 PRINT "Number comparasions =
";CO
170 PRINT "Number of exchanges =
";E1
180 STOP
1000 'Shell-Metzner Sort
1010 F=LA: CO=0: E1=0: PA=0
1020 F=INT(F/2):IF F=0 THEN RETU
RN
1030 FOR W=0 TO F-1
1040 X=W: Y=W+F: SW=0
1050 CO=CO+1: IF AR(X) <= AR(Y)
THEN 1070
1060 E1=E1+1: SW=1: T=AR(X): AR(
X)=AR(Y): AR(Y)=T 'Swap
1070 X=Y: Y=Y+F: IF Y<= LA THEN
1050
1080 IF SW<>0 THEN 1040
1085 PA=PA+1: PRINT "End of Pass
 # ";PA: FOR X=1 TO LA: PRINT AR
(X);:NEXT X: PRINT
1090 NEXT W: GOTO 1020
```

Variable Pointer

BY ROBERT KENNY

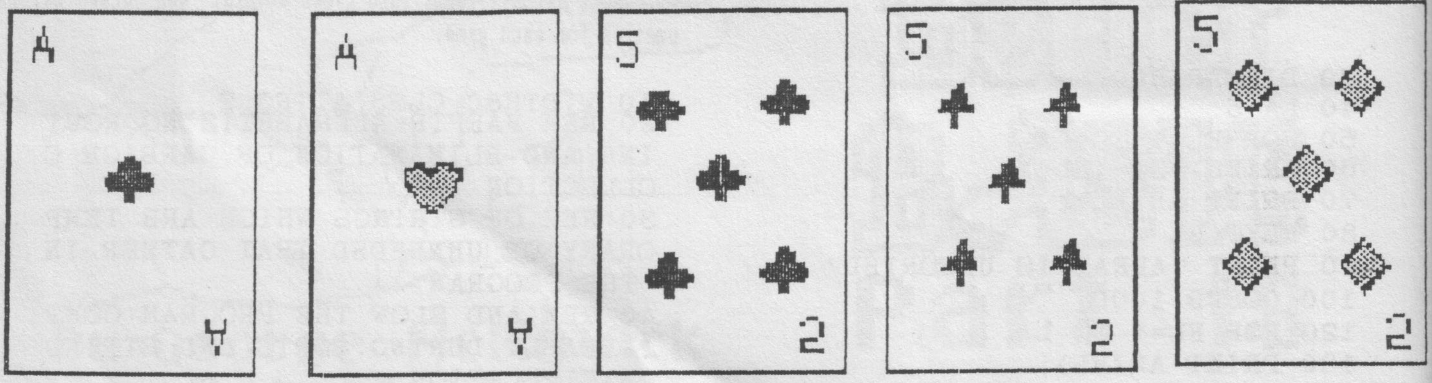
The VAPTR programme I feel should have had more written on it. Indeed it would be a lengthy article on its own but time does not allow me to do this at present, so I have REMed the routine heavily.

There are so many applications that this library funtion is capable of doing. ie Using it to edit lists of names ,sorts, etc. When I get a bit more time I will explore this a bit more.

I have given this routine to a couple of mates of mine to use in there programs and they reckon that it is definitely faster than other sorts that they have used. One uses it for sorting cheque serial numbers in a charitable orginisation, the other uses it to aid his wife sort netball teams into times of play and organize umpires for each game.

```
10 WIDTH80:CLS3:ATTR3,2
20 REM VARPTR ALPHABETIZING ROUT
INE,AND ELIMINATION OF GARBAGE C
OLLECTION
30 REM OF STRINGS WHICH ARE TEMP
ORARY OR UNNEEDED THAT GATHER IN
 THE PROGRAM
40 REM AND SLOW THE PROGRAM CONS
IDERABLY DURING SORTS AND STRING
 MANIPULATION
50 REM SMALL ROUTINE TO SHOW HOW
 VARPTR WORKS IN AN ALPHABETIZIN
G ROUTINE
60 REM  ***LINES 70 TO 190 SETUP
 AND ENTER DATA***
70 CLEAR 2000:  REM CLEAR PLENTY
OF STRING SPACE FOR YOUR LIST
80 CLS::INPUT"HOW MANY ENTRIES";
EN
90 IF EN>100 THEN PRINT"TO MANY
ENTRIES":FORQ=1TO1000:NEXTQ:GOTO
 80
100 DIM A$(EN),B$(EN),C$(EN),D$(
EN)
110 FOR I=1TO EN
120 CLS:LOCATE35,0:PRINT"ENTRY N
o";I
130 LOCATE10,8:LINEINPUT"ENTER N
AME ";A$(I):LOCATE40,8:LINEINPUT
"ADDRESS ";B$(I):LOCATE10,10:LIN
EINPUT"TOWN/CITY ";C$(I):LOCATE4
0,10:LINEINPUT"POST CODE ";D$(I)
140 NEXTI
150 IF INKEY$<>""THEN150
160 LOCATE25,20:PRINT"PRESS ANY
KEY TO CONTINUE"
170 IF INKEY$=""THEN170
180 GOSUB270
190 CLS:FORI=1 TO EN:LOCATE10,8:
PRINTA$(I):LOCATE40,8:PRINTB$(I)
:LOCATE10,10:PRINTC$(I):LOCATE40
,10:PRINTD$(I):FORT=1 TO 1000:NE
XTT,I
200 END
210 REM THE ABOVE LINES ARE FOR
DEMO ONLY ENTER YOUR ROUTINE BEF
ORE VARPTR
220 REM DONE BEFORE A MOVE TO VA
RPTR SUBROUTINE
230 REM LINE 270 SETS UP THE VAR
IABLES. IT IS VERY IMPORTANT THA
```

Continued on Page 30



Draw Poker Revisited

By Richard Schmidt

DRAW POKER appeared in the June/July edition of CoCo-Link.

Kieran Kenny wrote that he couldn't put an in-program scoring routine together. I thought that that was a major defect in an otherwise good program (although I think that maybe it would have been easier for me to understand the program if he had used some more meaningful variable names (bearing in mind the limitations of Microsoft BASIC on this machine)).

I have since added a scoring routine to this program, although it is relatively lengthy (at about 40 lines), and it does take about a second or so to process the hand.

I did this by putting each card displayed in the hand into an array (HD$(), in line 775), replacing it with "XXX" if it is discarded (line 860), and putting a new card into the array if it is drawn (line 975). After this, each card in the array is compared to every other card in the array, and the various statistics gleaned from it.

Any more information should be directed to:

Richard Schmidt
5a Stephens Ave.,
Torrensville, 5031

```
0 'DRAWPOKR' from "COCO - LINK"
 June/July, 1991
5 'Modified & improved by Richar
d Schmidt
10 POKE65497,0
20 CLEAR 2000
30 DIM F$(13),K(4,13),HD$(5)
40 LL=80:ST=100:PRICE=3
50 FOR I=1 TO 13:READ F$(I):NEXT
 I
60 DATA 2,3,4,5,6,7,8,9,10,J,Q,K
,A
70 GOTO 290
80 IF LEN(ZL$)<=LL THEN 120
90 FOR T=LL TO 1 STEP -1:IF MID$
(ZL$,T,1)=" "THEN 110
100 NEXT T:GOTO 120
110 P$=LEFT$(ZL$,T):W$=P$:GOSUB
130:ZL$=RIGHT$(ZL$,(LEN(ZL$))-T)
:C=C+1:GOTO 80
120 W$=ZL$
130 HPRINT(B,C),W$
140 RETURN
150 P=B+LEN(ZL$)
160 PB=P:V$=""
170 K$=INKEY$:IF K$=""THEN 170
```

```
180 IF K$=CHR$(13)THEN 280
190 IF K$=CHR$(8)THEN 200 ELSE 2
40
200 HPUT(P*8-8,C*8)-(P*8,C*8+7),
5,PSET
210 P=P-1:IF P<PB THEN P=PB:GOTO
 170
220 V$=LEFT$(V$,LEN(V$)-1)
230 GOTO 170
240 IF P>78 THEN 170 ELSE HPRINT
(P,C),K$
250 V$=V$+K$
260 P=P+1
270 GOTO 170
280 V=VAL(V$):RETURN
290 PALETTE 0,0:PALETTE 2,63
300 ON BRK GOTO 9999
310 HSCREEN 4
320 FOR BF=1 TO 5:HBUFF BF,1024:
NEXT
330 HGET(0,0)-(63,63),5
339 '***Draw Suits***
340 HCOLOR2:FOR X=0 TO 576 STEP
192:HLINE(X,0)-(X+63,63),PSET,BF
:NEXT
350 HCOLOR 1:HDRAW"BM32,14M+22,+
15M-22,+15M-22,-15M+22,-15"
360 HPAINT(32,40),3,1
370 HGET(0,0)-(63,63),1:'Diamond
380 HDRAW"BM224,24E8R8F8D4M-24,+
15M-24,-15U4E8R8F8"
390 HPAINT(224,30),3,1
400 HGET(192,0)-(255,63),2'Heart
410 HCIRCLE(416,22),14:HCIRCLE(4
30,34),14:HCIRCLE(404,34),14
420 HPAINT(416,22),0,1:HPAINT(43
0,34),0,1:HPAINT(404,34),0,1:HPA
INT(416,30),0,1
430 HDRAW"BM416,34M+12,+12M-24,+
0M+12,-12"
440 HPAINT(416,45),0,1
450 HGET(384,0)-(447,63),3:'Club
460 HDRAW"BM608,16R8M-8,+12E8R8F
8D4M-24,+12M-24,-12U4E8R8F8M-8,-
12R8"
470 HPAINT(608,20),0,1:HPAINT(60
8,40),0,1
480 HGET(576,0)-(639,63),4'Spade
490 HCOLOR 1:HPRINT(36,09),"Draw
 Poker"
500 HPRINT(30,12),"Copyright Kie
ran Kenny"
510 HPRINT(35,14),"Sydney, 1990"
515 HPRINT(40,16),"and":HPRINT(3
4,18),"Richard Schmidt":HPRINT(3
4,20),"Adelaide, 1991"
520 HPRINT(35,23),"Press any key
."
530 EXEC44539:K$=INKEY$:HCLS
```

```
540 HCOLOR 2:HPRINT(34,0),"INSTR
UCTIONS"
550 HCOLOR 1:B=0:C=1:ZL$="Your i
nitial stake is $100. Each hand
costs $"+RIGHT$(STR$(PRICE),LEN(
STR$(PRICE))-1)+". If your stake
 runs out, press any key to play
 again.":GOSUB 80
560 C=C+1:ZL$="Use the left/righ
t arrow keys to move the arrow u
nder your hand. Press the spaceb
ar to discard a card. Press <CLE
AR> to draw cards. Press <ENTER>
 if you are satisfied with your
current hand. Press the <BREAK>
key to quit.":GOSUB 80
570 HCOLOR 2:HPRINT(36,6),"PAYME
NTS."
580 HCOLOR 1:HPRINT(0,7),"ROYAL
FLUSH (AKQJ10 OF A SUIT): $100"
590 HPRINT(40,7),"STRAIGHT FLUSH
 (RUN OF 5 OF A SUIT): $40"
600 HPRINT(0,8),"FOUR OF A KIND:
 $20"
610 HPRINT(40,8),"FULL HOUSE: $1
0"
620 HPRINT(0,9),"FLUSH (ALL SAME
 SUIT): $5"
630 HPRINT(40,9),"STRAIGHT(ANY R
UN OF 5): $4"
640 HPRINT(0,10),"3 OF A KIND: $
3"
650 HPRINT(40,10),"2 PAIR: $2"
660 HPRINT(53,10),"PAIR: $1"
670 FOR S=1 TO 4
680 FOR N=1 TO 13
690 K(S,N)=(S-1)*13+N
700 NEXT N,S
709 '***Deal Cards***
710 X=96:Y=96
720 FOR T=1 TO 5
730 N=INT(RND(-TIMER)*13)+1
740 S=INT(RND(-TIMER)*4)+1
750 IF K(S,N)=0 THEN 730
760 HPUT(X,Y)-(X+63,Y+63),S
770 HCOLOR0:HPRINT(X/8+1,Y/8+1),
F$(N):HPRINT(X/8+6,Y/8+6),F$(N)
775 HD$(T)=RIGHT$(STR$(N),2)+MID
$("DHCS",S,1)
780 K(S,N)=0
790 X=X+96
800 NEXT T
809 '***Discards***
810 X=16:Y=20
820 HCOLOR 1:HPRINT(X,Y),CHR$(94
)
830 K$=INKEY$
840 IF K$=CHR$(8) AND X=16 THEN
830:'Left-hand edge
```

```
850 IF K$=CHR$(9) AND X=64 THEN
830:'Right-hand edge
860 IF K$=CHR$(32) THEN QX=QX+1:
PX(QX)=X*8-32:HPUT(PX(QX),96)-(P
X(QX)+63,159),5:HD$(INT(X/12))="
XXX"
870 IF K$=CHR$(12) AND QX>0 THEN
 920:'Draw new cards
880 IF K$=CHR$(13) THEN 1000
890 IF K$=CHR$(8) THEN HCOLOR 0:
HPRINT(X,Y),"^":X=X-12:HCOLOR 1:
HPRINT(X,Y),"^":'Move pointer le
ft
900 IF K$=CHR$(9) THEN HCOLOR 0:
HPRINT(X,Y),"^":X=X+12:HCOLOR 1:
HPRINT(X,Y),"^":'Move pointer ri
ght
910 GOTO 830
919 '***Draw Cards***
920 FOR TX=1 TO QX
930 N=INT(RND(-TIMER)*13)+1
940 S=INT(RND(-TIMER)*4)+1
950 IF K(S,N)=0 THEN 930
960 HPUT(PX(TX),96)-(PX(TX)+63,1
59),S
970 HCOLOR0:HPRINT(PX(TX)/8+1,13
),F$(N):HPRINT(PX(TX)/8+6,18),F$
(N)
975 HD$(PX(TX)/96)=RIGHT$(STR$(N
),2)+MID$("DHCS",S,1)
980 K(S,N)=0:PX(TX)=0
990 NEXT TX:QX=0
1000 HCOLOR 0:HPRINT(X,Y),"^"
1005 GOSUB 1100
1040 ST=ST-PRICE:HPRINT(46,22),"
CURRENT STAKE = $"+RIGHT$(STR$(S
T),LEN(STR$(ST))-1)
1050 IF ST>0 THEN 1070
1060 FOR X=96 TO 480 STEP 64:HPU
T(X,160)-(X+63,191),5:HPRINT(12,
23),"YOU'RE BROKE! GO HOME, OR P
RESS ANY KEY TO TRY AGAIN.":ST=1
00:GOTO 1080
1070 HCOLOR 1:HPRINT(33,23),"PRE
SS ANY KEY."
1080 EXEC44539:K$=INKEY$:FOR X=9
6 TO 480 STEP 96:HPUT(X,96)-(X+6
3,159),5:NEXT:FOR X=96 TO 480 ST
EP 64:HPUT(X,160)-(X+63,191),5:N
EXT:QX=0:GOTO 670
1099 '***Scoring routine***
1100 MIN=13:MAX=0:ZL$="BETTER LU
CK NEXT TIME!"
1110 FOR N1=1 TO 5
1120 NS$=NS$+LEFT$(HD$(N1),2)
1130 NS=VAL(LEFT$(HD$(N1),2)):SS
$=RIGHT$(HD$(N1),1)
1140 IF NS<MIN THEN MIN=NS
1150 IF NS>MAX THEN MAX=NS
1160 P1=0:P2=0:FOR N2=1 TO 5
```

```
1170 IF NS=VAL(LEFT$(HD$(N2),2))
 THEN P1=P1+1
1180 IF SS$=RIGHT$(HD$(N2),1) TH
EN P2=P2+1
1190 NEXT N2:PAIR(N1)=P1:PBIR(N1
)=P2
1200 NEXT N1
1210 FOR N1=1 TO 5
1220 IF NS$="13121110 9" OR NS$=
" 910111213" AND PBIR(N1)=5 THEN
 ST=ST+100:ZL$="A ROYAL FLUSH! $
100":GOTO 1460
1230 NEXT N1
1240 FOR N1=1 TO 5
1250 IF MAX-MIN=4 AND PBIR(N1)=5
 THEN ST=ST+40:ZL$="A STRAIGHT F
LUSH! $40":GOTO 1460
1260 NEXT N1
1270 FOR N1=1 TO 5
1280 IF PAIR(N1)=4 THEN ST=ST+20
:ZL$="FOUR OF A KIND! $20":GOTO
1460
1290 NEXT N1
1300 FOR N1=1 TO 5
1310 IF PAIR(N1)=3 THEN FOR N2=1
 TO 5:IF PAIR(N2)=2 THEN ST=ST+1
0:ZL$="FULL HOUSE! $10":GOTO 146
0 ELSE NEXT N2
1320 NEXT N1
1330 FOR N1=1 TO 5
1340 IF PBIR(N1)=5 THEN ST=ST+5:
ZL$="A FLUSH! $5":GOTO 1460
1350 NEXT N1
1360 IF MAX-MIN=4 THEN ST=ST+4:Z
L$="A STRAIGHT! $4":GOTO 1460
1370 FOR N1=1 TO 5
1380 IF PAIR(N1)=3 THEN ST=ST+3:
ZL$="THREE OF A KIND! $3":GOTO 1
460
1390 NEXT N1
1400 FOR N1=1 TO 5
1410 IF PAIR(N1)=2 THEN FOR N2=1
 TO 5:IF PAIR(N2)=2 AND F$(VAL(L
EFT$(HD$(N1),2)))<>F$(VAL(LEFT$(
HD$(N2),2))) THEN ST=ST+2:ZL$="T
WO PAIRS! $2":GOTO 1460 ELSE NEX
T N2
1420 NEXT N1
1430 FOR N1=1 TO 5
1440 IF PAIR(N1)=2 THEN ST=ST+1:
ZL$="ONE PAIR! $1":GOTO 1460
1450 NEXT N1
1460 FOR X=96 TO 480 STEP 64:HPU
T(X,160)-(X+63,191),5:NEXT
1470 HCOLOR1:IF LEFT$(ZL$,1)="B"
 THEN HPRINT(14,22),ZL$ ELSE HPR
INT(14,22),"SCORE = "+ZL$
1480 RETURN
1499 '***Data Dictionary***
1500 'VAR-----DESCRIPTION-------
```

```
------------------------------------
1505 'F$     : Name of card.
1510 'HD$    : Hand array - conta
ins all cards of current hand.
1515 'I      : counter variable.
1520 'K$     : Key input variable
.
1525 'K()    : Card array - conta
ins all cards in the pack.
1530 'LL     : Line length contro
l variable.
1535 'MAX    : Highest card in HD
 array.
1540 'MIN    : Lowest card in HD
array.
1545 'N      : Card number - corr
esponds to F$.
1550 'N1     : counter variable.
1555 'N2     : counter variable.
1560 'NS     : Card number in sco
ring routine.
1565 'NS$    : Concatenation of c
ard numbers in current hand.
1570 'P      : Text positioning v
ariable.
1575 'P$     : One line portion o
f text.
1580 'P1     : # of times NS occu
rs in current pass of HD$() arra
y.
1585 'P2     : # of times SS$ occ
urs in current pass of HD$() arr
ay.
1590 'PAIR(): # of times NS occu
rs in entire HD$() array.
1595 'PBIR(): # of times SS$ occ
urs in entire HD$() array.
1600 'PB     : same as P.
1605 'PRICE : Cost of each hand.
1610 'PX()   : Position of discar
ded card.
1615 'QX     : Number of discarde
d cards.
1620 'S      : Suit of card in K(
) array.
1625 'SS$    : Suit portion of ca
rd in HD$() array.
1630 'ST     : Stake variable - a
mount of money in bank.
1635 'T      : counter variable.
1640 'TX     : counter variable.
1645 'V      : unknown
1650 'W$     : unknown
1655 'X      : X co-ordinate of c
ard drawing routine.
1660 'Y      : Y co-ordinate of c
ard drawing routine.
1665 'ZL$    : Message handling s
tring.
1670 '------------------------------
------------------------------------
9999 PPOKE32:RGB:PRINT"YOUR FINA
L BALANCE IS $";RIGHT$(STR$(ST),
LEN(STR$(ST))-1):POKE65496,0:END
```

END

****

HOW TO SUBMIT MATERIAL TO COCO-LINK

****

PROGRAMMES: On tape or disk.
At least two copies should be on the tape/disk one of which should be saved in ASCII format.
Where possible include a description of your prodgramme saved as below for articles.

ML PROGRAMMES:
These require Source code saved on a suitable word processor. Two copies should be made.
A working copy of the programme should be included for checking by COCO-LINK.

ARTICLES:
At least one copy saved in ASCII format plus one copy on à commercial word processor where possible. (VIP Writer etc.)

HINTS AND TIPS:
Hand written or typed is acceptable.

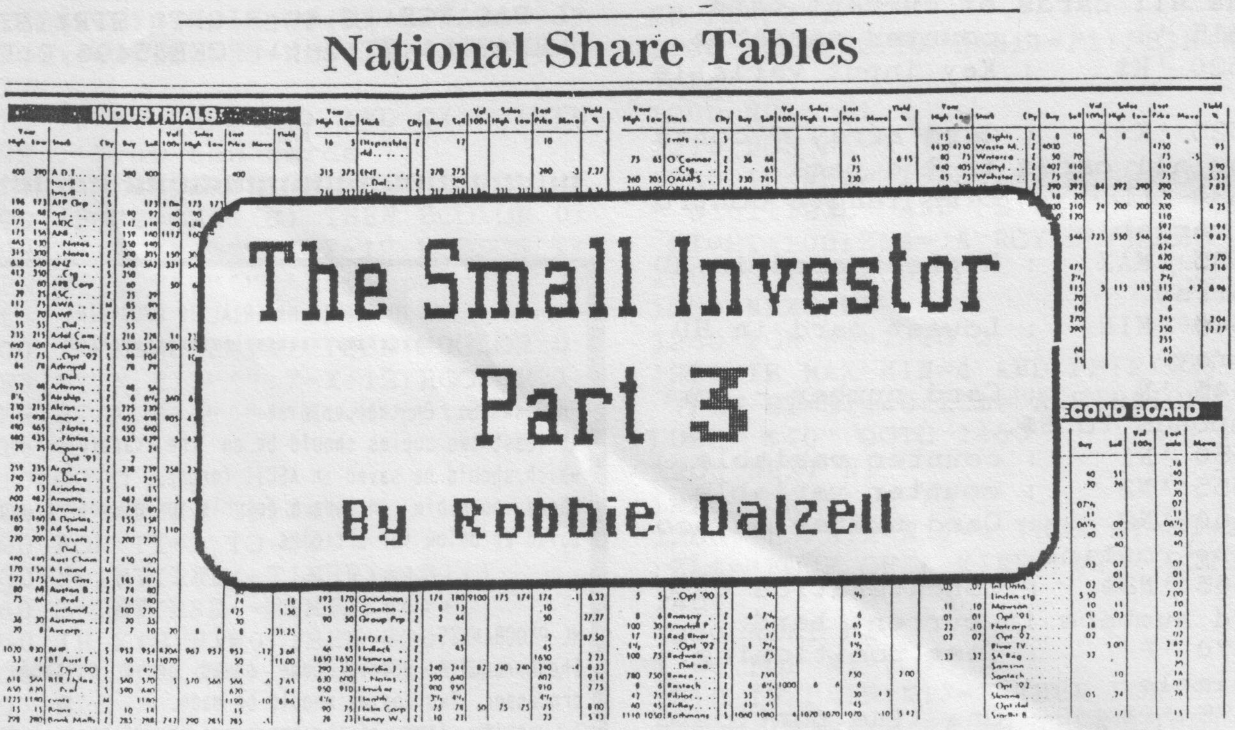
LETTERS TO THE EDITOR:
Hand written letters will be accepted subject to the length. Long letters should be submitted on disk in the manner above for articles.

All disks and cassettes will be returned in due course.

Coco 3/Disk Business Application

The Small Investor Part 3

By Robbie Dalzell


National Share Tables
INDUSTRIALS
SECOND BOARD

As mentioned previously, when writing a programme, as one progresses certain little bugs appear and have to be erased by making alterations to previous code.

While setting up for a trial session with the analysis sections following, I came accross one such bug. This would probably not be found by the normal user, but nevertheless must be taken care of.

In this case the answer was simple. Just add DT$="I" to the end of line 26. This acts as a dummy string for initial setup and keeps the sequential file the correct length.

Also, a small typo was found in line 28. There should be a comma (,) instead of a semicolon (;) in front of LS(52)

Now we can proceed.

In this part of the series we will deal with the methods of analysis that have been incorporated in the programme. Many, many methods could have been used but I have stuck to the tried and true few that most people know of.

Investment analysis is broadly split into two strategies, each with it's own devotees. These two strategies are the FUNDAMENTAL STRATEGY and the TECHNICAL INVESTMENT STRATEGY.

FUNDAMENTAL STRATEGY

The objective of a Fundamental strategy is to ascertain an approximation of a share's intrinsic value. Having done this, the fundamentalist compares this with the market price. If the intrinsic value is sufficiently above the market price, a fundamentalist will buy shares. If the intrinsic value is below the market price he will sell any shares he has.

A fundamentalist arrives at a share's intrinsic value by use of ratios and percentages calculated from the financial information released by companies.

Because of time lags between the end of the financial period and the release of information on company performance over that period, all of the calculations are necessarily based on historical data.

Some of the ratios used in this strategy are:

EARNINGS PER SHARE (EPS).

This is found in the monthly "Glossy" magazines and is recorded in the data collected for this programme.

The formula for calculating EPS is as follows:

```
Net profit available for ordinary shareholders
----------------------------------------------
        Number of ordinary shares issued
```

EPS is well suited to assessing the growth of a company.

PRICE/EARNINGS RATIO (P/E RATIO)

As the name suggests, this ratio is a derivative of the current selling price of a share and the earnings of a share.

The P/E fluctuates with the price of a share, which in turn is influenced by such things as investor confidence, future expectations, the inflation rate, and prevailing interest rates. Generally, investors will pay a high price for shares in companies whose earnings have been growing and are expected to continue in the same way. A comparison of P/E ratios of companies in the same industry will sometimes reveal a share that is underpriced in comparison to shares of other companies in the industry.

Alternatively, It could be said that shares with a high P/E are overpriced, and the selling price of those shares could be more prone to fall in the event of a market downturn.

This ratio is calculated by the programme but can be found in certain Daily Newspapers.

It is sometimes found as the Earnings Yield and is usually expressed as a percentage in this format.

DIVIDEND YIELD

This is calculated as follows:

```
          DIVIDEND PER SHARE         100
     ----------------------   X    ---
          MARKET PRICE OF SHARE        1
```

This can alert the fundamentalist to the possible under-valuation or over-valuation of shares in the market. Depending on anticipated movements in the market, these calculations may also lead to the buying and selling of shares. For example, if the market appears to be in a downward drift, the fundamentalist will be prone to sell shares with the lowest dividend yields, anticipating a downward movement in the market price to result in a more competative dividend yield.

These figures appear in the daily newspapers and the data is recorded in this programme.

These are only a few of the possible statistics to which an investor might turn to attempt to estimate the intrinsic value of a company's shares. The statistics described above deal mainly with the profitability if firms.

TECHNICAL INVESTMENT ANALYSIS

Technicians believe that the past trend of prices falls into an identifiable and recurrent pattern from which predictions about future price movements can be made. The task of the technician therefore is to chart share price movements to identify a pattern of price and/or volume changes. decisions to buy or sell shares will then be made in light of the economic premise that prices rise when demand exceeds supply and vice versa.

The technical analyst makes extensive use of graphs or charts to study the movement of share prices. Charts enable an investor to see readily the way the share price is moving.

I have made use of only two types of charts, Point and Figure and Bar Charting.

POINT AND FIGURE CHARTING

The main features of this type of charting are that:

1) it is frequently compiled with no time dimension,
2) it disregards small changes in share price, and
3) it requires a share price to reverse a predetermined number of points before a directional change is recorded.

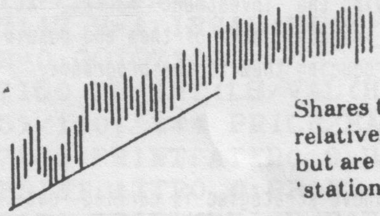
The basic unit change in this graph is calculated by the programme and recorded on the P&F page as STEP: xxx. Unless the price changes by at least this step no movement will be recorded. The crosses indicate upward movements and the circles downward movements in share price.

References are made to congestion areas, that is, areas in which there are a succession of rallies and reverses precluding any lengthy vertical columns. The width of such an area is said to give the technician some insight into the probable size and direction of a movement by a share to some particular price.

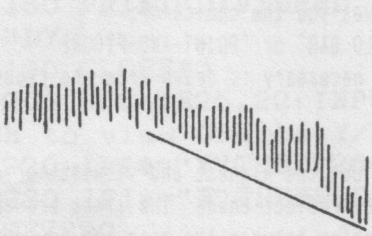
BAR CHARTING

The vertical axis of a bar chart usually reflects the share price while the horizontal axis is made up of various time periods. On a bar chart the analyst makes use of the vertical line, the high and low points of which represent the high and low prices of a share over a determined period.

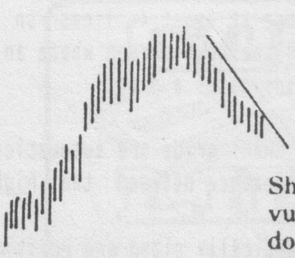
Bar chartists, like point-and-figure chartists, have developed patterns to look for when trying to determine the most probable price action of a stock. Listed below are five patterns that seem to fit most shares despite the the kind of market one is in.



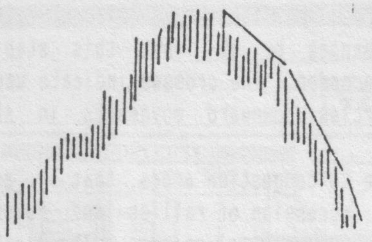
Shares that have performed relatively well in the past, but are currently in a 'stationary' position.



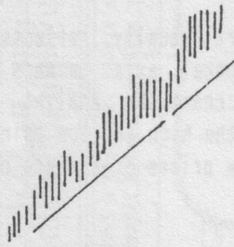
Shares that have declined, but which have subsequently consolidated and offer promise in a favourable market.



Shares that are in a vulnerable position with downward tendencies.



Shares that appear to have reached their lows, but still somewhat vulnerable given the lack of consolidation.



Shares with established upward trends that show few signs of abating.

The above should give the beginner an insight into the workings of the main purpose of this programme but it must be taken into consideration that there are many more methods used for studying the investment market. At a later date we will discuss some of them and possibly consider means of introducing them to the programme.

THE LISTING

The mechanics of the above strategies is carried out in the listing from line 4999 - 7280
The type of analysis is chosen from the menu. The technical analysis gives you the choice of:
"FUNDAMENTAL","HI-LO BAR" or "POINT-AND-FIGURE".
In each case the data necessary is drawn from the records stored on disk.

The "HI-LO BAR" works out the highest and lowest prices and makes up a chart to reflect these. The lines are then drawn to show the relation between the high and low share prices. The chart is split up into 52 weeks (this is in accordance with my decision to make the programme operate on a weekly basis. This can be altered if it is found preferable to work on a more regular basis).

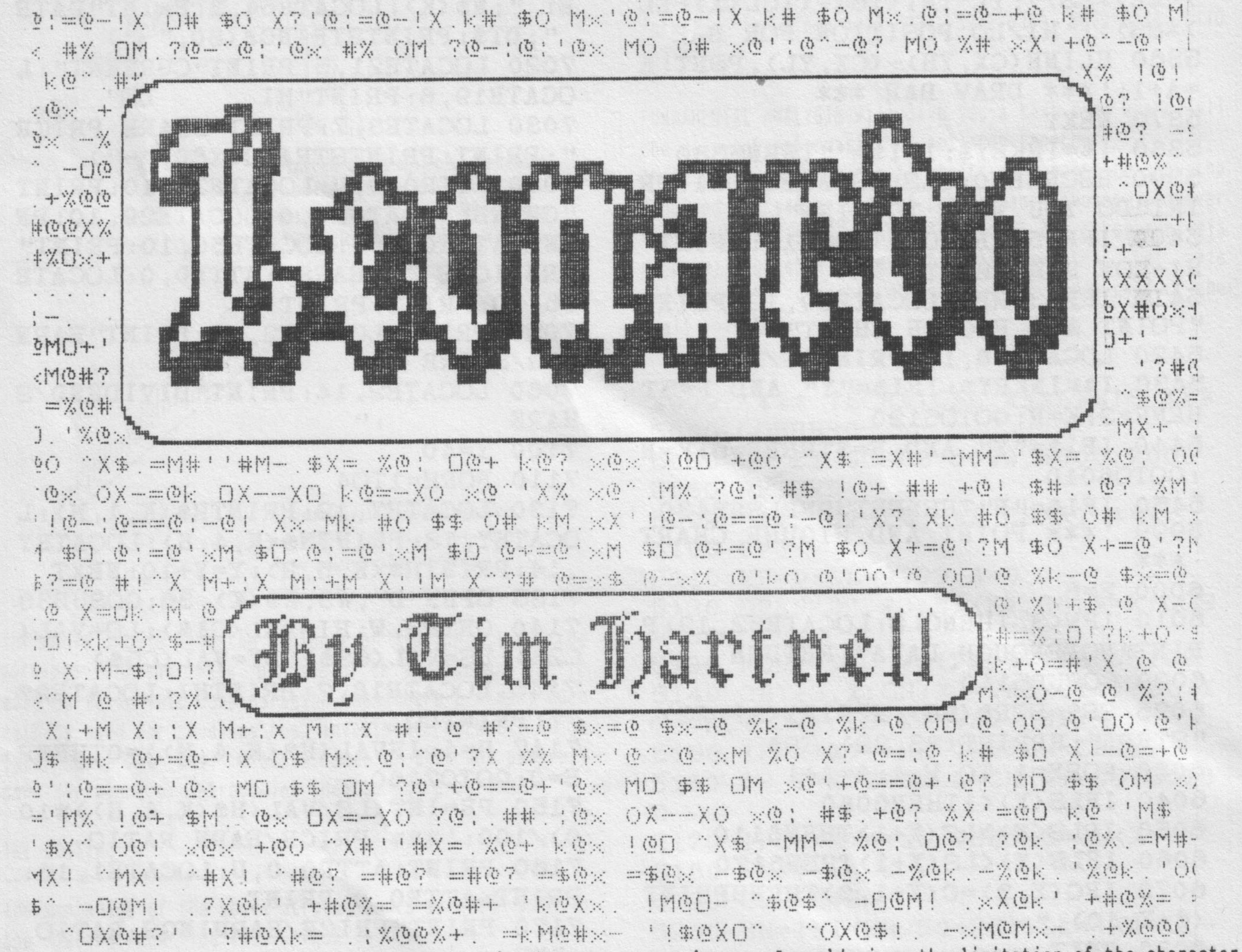
The POINT-AND-FIGURE will give a "Not enough data" message if it is unable to use at least 4 lines on the chart. This is charted on the text screen where an "X" indicates a rise and a "O" indicates a drop.

The HI-LO CHART and the P&F CHART grids are automatically sized to accommodate the difference between the highest and lowest points charted
The HI-LO bars are automatically sized and positioned while the "plusses and minusses" for the P&F chart are calculated to the dimensions appropriate to the chart requirements
These figures are calculated using the rather involved formulae in lines 5200-5230, 5350-5360, 6050-6070, 6110 and 6170.

FUNDAMENTAL ANALYSIS will give you a text page where all the relevant information is collated together.
This page uses saved data as its main point to show the required characteristics of the company chosen, however the P/E RATIO is calculated in situ. The three analysis pages will be able to be sent to the printer, but this will be the subject of the next and final part of the Small Investor.

```
4999 '*** TECHNICAL ANALYSIS ***
5000 GOSUB80
5050 ON ZI GOSUB 5099,6000,7000
5060 RETURN
5099 '*** HI-LO BAR CHART ***
5100 F=3
5110 HH=0:LL=9999:A=0
5120 OPEN"D",#3,N$(K),36:N=K:GOS
UB30
5130 FORX=1TO W:IFX=W+1THEN5190
5140 GET#3,X:CH(X)=VAL(C1$):CL(X
)=VAL(C2$):LS(X)=VAL(C3$)
5150 IFCH(X)=>HH THENHH=CH(X)
5160 IF W=1 THENLL=CL(X):GOTO518
0
5170 IFCL(X)<=LL THENLL=CL(X)
5180 NEXT
5190 CLOSE#3
5200 HH=INT(HH/50+HH):LL=INT(LL-
LL/50):'HIGHEST &LOWEST POINT ON
 GRID FOR BAR
5210 IFF=5THEN5230:'F5IS FOR P&F
5220 HL=HH-LL:SS=((160/HL)*100)/
100:GOTO5240:'DIFFERENCE & STEP
FOR BAR CHART
5230 HL=HH-LL:SS=(HL/20):H=INT((
SS*4)+.5):H1=HH:'DIFFERENCE AND
STEP FOR P&F
5240 WIDTH80:HSCREEN1:HCLS0
5250 HPRINT(5,22),"NAME: ":HPRIN
T(11,22),N$(K)
5260 IFF=5THEN5270ELSEH1=HH:H=IN
T(((HH-LL)/5)+.5)
5270 FORX=0TO20STEP4
5280 HPRINT(0,X),H1
5290 H1=H1-H:NEXT
5299 '*** DRAW GRID ***
5300 HLINE(44,0)-(309,168),PSET,
B:'CHART BOX
5310 IFF=5THENRETURN
5320 Y=36:FORZ=1TO4:HLINE(44,Y)-
(309,Y),PSET:Y=Y+32:NEXT:'HORIZO
NTAL LINES
```

```
5330 A=1
5340 FORX=1 TO W
5350 CX=44+A*5:YH=INT(164-((CH(X
)-LL)*SS)):YL=INT(164-((CL(X)-LL
)*SS)):'HI/LO POSITION FOR BAR
5360 HLINE(CX,YH)-(CX,YL),PSET:A
=A+1:'*** DRAW BAR ***
5370 NEXT
5380 I$=INKEY$:IFI$=""THEN5380
5390 HSCREEN0:CLS:LOCATE30,11:PR
INT"DO YOU WISH TO VIEW"
5400 IFF=5THENLOCATE32,12:PRINT"
HI-LOW BAR CHART"
5410 IFF=3THEN LOCATE29,12:PRINT
"POINT AND FIGURE CHART"
5420 LOCATE38,13:PRINT"Y/N"
5430 I$=INKEY$:IFI$="Y" AND F=5T
HENF=3:K=N:GOTO5120
5440 IFI$="Y" AND F=3THENF=5:K=N
:GOTO6010
5450 IFI$="N"THENRETURNELSE5430
5999 '*** POINT AND FIGURE CHART
 ***
6000 F=5
6010 IFW<3 THENCLS:LOCATE32,12:P
RINT"NOTENOUGH DATA":RETURN
6020 GOSUB5110
6025 SS$=STR$(SS):HPRINT(29,22),
"STEP:":HPRINT(33,22),SS$
6030 FORX=1 TO W-1:A=A+1
6040 IFLS(X)<1THEN6080
6050 IFLS(X)>LS(X+1)THEN6110
6060 IFLS(X)<LS(X+1)THEN6170
6070 IFC(X,3)=C(X+1,3)THENHPRINT
(6+X,10),"-"
6080 NEXT
6090 I$=INKEY$:IFI$=""THEN6090EL
SE5380
6100 RETURN
6110 LS=LS(X)-LS(X+1):L=INT((LS/
SS)+.5):L1=INT((HH-LS(X))/SS)+L
6120 IFL<1THENHPRINT(4+A,10),"-"
:GOTO6080
6130 FORK=1 TO L
6140 HPRINT(5+A,L1-K),"O"
6150 NEXT
6160 GOTO6080
6170 LS=LS(X+1)-LS(X):L=INT((LS/
SS)+.5):L1=INT((HH-LS(X))/SS)-L
6180 IFL<1THENHPRINT(4+A,10),"-"
:GOTO6080
6190 FORK=1TO L
6200 HPRINT(5+A,L1+K),"X"
6210 NEXT
6220 GOTO6080
6999 '*** FUNDAMENTAL ANALYSIS *
**
7000 WIDTH80:CLS:ATTR0,0,U:LOCAT
E30,1:PRINT"FUNDAMENTAL ANALYSIS
":ATTR0,0:LOCATE50,1:PRINT
7010 LOCATE3,3:PRINT"COMPANY NAM
E: ";N$(K):LOCATE64,3:PRINT"DATE
 ";DT$:PRINTSTRING$(80,"-")
7020 LOCATE21,5:PRINT"CURRENT":L
OCATE19,6:PRINT"HI       LO"
7030 LOCATE3,7:PRINT"SHARE PRICE
":PRINT:PRINTSTRING$(80,"-")
7040 ATTR0,0,U:LOCATE22,10:PRINT
"CURRENT":ATTR0,0:LOCATE29,10:PR
INT:ATTR0,0,U:LOCATE50,10:PRINT"
PREVIOUS 4 YEARS":ATTR0,0:LOCATE
66,10:PRINT:PRINT
7050 PRINT:LOCATE2,13:PRINT"EARN
ING/SHARE         :"
7060 LOCATE2,14:PRINT"DIVIDEND/S
HARE          :"
7100 Y=40
7110 FORH=1TO4
7130 LOCATEY,12:PRINTH$(K,1,H):L
OCATEY,13:PRINTH$(K,4,H):LOCATEY
,14:PRINTH$(K,5,H):Y=Y+10:NEXT
7135 OPEN"D",#3,N$(K),36:GOSUB30
7140 GET#3,W:HI=VAL(C1$):LO=VAL(
C2$):LS=VAL(C3$):DY=VAL(C5$)
7145 LOCATE18,7:PRINTHI:LOCATE27
,7:PRINTLO
7147 H=4:IFVAL(H$(K,4,H))=0THENP
E=0:GOTO7160
7150 PE=INT(LS/VAL(H$(K,4,H))*10
0)/100:'*** PRICE/EARN RATIO
7160 PRINT:ATTR0,0,U:LOCATE1,16:
PRINT:ATTR0,0:PRINT
7170 PRINT"PRICE/EARNINGS RATIO
:"PE
7180 PRINT"DIVIDEND YIELD
:"DY
7190 CLOSE#3
7200 LOCATE25,22:INPUT"Do you wi
sh to view Graphs Y/N";I$
7220 IFI$="Y"THEN7260
7230 IFI$="N"THENWIDTH40:RETURNE
LSE7220
7260 LOCATE23,23:INPUT"HI-LO BAR
 OR POINT AND FIGURE H/P";I$
7270 IFI$="H"THEN HSCREEN1:GOTO5
300
7280 IFI$="P"THEN6000ELSE7270
```



This programme draws designs using the normal character set of the computer. It will draw these designs to printer on a Coco 2 and to printer or screen on a Coco 3. The programme listed is set up for Coco 2 or 3 use to printer.

These graphs are the result of entering certain mathematical functions into line 160 of the programme listed here. They do not demand any special graphics board on your computer nor a particular type of printer.

As you can see from looking at line 160, you enter the mathematical function as "K equals something", such as K=SIN(X)+Y/X or K=COS(X*Y).

The programme works by going through the X and Y loops and working out the function for each pair of values. Then it scales it up (or down) to end up with a number between 1 and 20. It then uses that number to select the same numbered element from the A$ string variable.

If you examine the contents of A$ in the listing you will see that it starts with a space and then works up - as evenly as I could given the limitation of the character set - to darker characters which use up more space. This means that when the programme is printing out, higher values will be printed darker than the lighter items, leading to the results you see.

Despite the crudeness of the elements which make up the design, you can see a definite pattern on the page.

Note that you can go through printer paper at an alarming rate when running this programme, so you may want to convert the programme slightly (and save it under another name) so that it prints out only on the screen rather than the printer. This can only be done on the Coco 3 in 80 column mode as the graph needs this width to function.

The changes needed to accomplish this are minimal:

```
Add     19 WIDTH80
```

Then change all the PRINT#-2's in lines 70,110,120 and 190 to PRINT. That is all that is required.

When you have found a function which looks interesting you can enter it into the printer version of the programme.

```
10 ' LEONARDO
11 ' BY TIM HARTNELL
20 CLS
30 A$=" .'-=^:+!?xkOO%$#MX@"
40 FOR X=-18 TO 18 STEP .5
50 FOR Y=-18 TO 18 STEP .5
60 GOSUB 160
70 NEXT Y:PRINT:NEXT X
80 FOR X=18 TO -18 STEP -.5
90 FOR Y=18 TO -18 STEP -.5
100 GOSUB 160
110 NEXT Y:PRINT:NEXT X:PRINT
120 LIST 160:PRINT
130 END
140 ' **************************
150 ' PUT FUNCTION IN NEXT LINE
160 K=SIN(X*Y)
170 K=10+INT(10*K):IF K<0 THEN K
=0
180 IF K>20 THEN K=K-20:GOTO180
190 PRINT MID$(A$,K+1,1);
200 RETURN
```

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****

END

****

I saw the STAR TREK game in the book "Basic Computer Games - Microcomputer edition" (1978). Apparently, the game was first written for a HP2000C in October, 1972, and "converted to BASIC-PLUS fo DEC's RSTS-11 compiler" in 1973. (obviously not a microcomputer we would recognize today!) It would seem that all computers then worked through a keyboard and printer combination, as the sample run showed several inputs followed by several outputs, all following one another.

I converted it to run on my CoCo's PMODE 4 screen, instead of the printer (this was before I got a printer). Later, when I got my CoCo3, I converted all the graphics to the HSCREEN 2 screen, and changed the high-speed poke for the new machine.

This game has a rather interesting twist in that while you are out there in the galaxy, looking for Klingons to destroy, various things go wrong on your ship. This may not be serious, eg. Damage-control facilities damaged, or it may be, eg. Photon Torpedo tubes damaged. In the latter case, you will have to either use your Phasers to destroy the Klingons, or else find a Starbase and wait for repairs.

Due to the second problem outlined here, it is wise to use your Long Range Sensors every time you come to a new Quadrant, in order to build up a map of the Galaxy, detailing where the Starbases are.

Happy Trekking!

STARTREK

```
2 REM "Super Startrek" - ORIGINA
L GAME BY ROBERT LEEDHAM & DAVID
 AHL
4 REM CONVERTED FOR THE COCO3 BY
 RICHARD SCHMIDT
5 POKE&H143,0:POKE&H13E,0' CoCo3
 / B-DOS Pokes
6 RGB:WIDTH80:GOTO 10
7 SAVE"STARTREK:"+RIGHT$(STR$(PE
EK(&HEB)),1):END
9 FOR WA=1 TO 1900:NEXT:RETURN
10 CLEAR 1500:PALETTE 0,0:PALETT
E 8,63:FC=0:BC=0:ATTR FC,BC
20 POKE 65497,0
25 ON BRKGOTO9999
30 S$(1)="L255;01;12;11;10;9;8;7
;6;5;4;3;2;1;":S$(2)="L155;01;1:
3;1;3;":S$(3)="XS$(1);":FOR SO=1
 TO 3:SO$(1)=SO$(1)+S$(1):SO$(3)
=SO$(3)+S$(3):NEXT:FOR SO=1 TO 1
0:SO$(2)=SO$(2)+S$(2):NEXT:SO$(1
)="03;"+SO$(1):SO$(3)="04;"+SO$(
3)
35 S$(4)="L255;04;1;2;1;2;1;2;1;
3;1;4;1;5;1;6;1;7;1;8;1;9;1;10;1
;11;1;12":FOR SO=1 TO 3:SO$(4)=S
O$(4)+";P4;"+S$(4):NEXT
40 CLS:PRINT"  * * *   * *   * *
 *   * *   * * * STAR TREK * * *
   * *   * * *   * *   * * *"
50 FORX=1 TO 5:O$="O"+STR$(X):PL
AY"L200;XO$;12;11;10;9;8;7;6;5;4
;3;2;1":NEXT
270 Z$="
 "

290 ' SH$(1) is Starship, SH$(2)
 is Klingon, and SH$(3) is Starb
ase
300 SH$(1)="O-E":SH$(2)="<K>":SH
$(3)=">B<"
330 DIM G(8,8),C(9,2),K(3,3),N(3
),Z(8,8),D(8)
370 T=INT(RND(0)*20+20)*100:T0=T
:T9=25+INT(RND(0)*10):D0=0:E=300
0:E0=E
440 P=10:P0=P:S9=200:S=0:B9=0:K9
=0:X$="":X0$=" is "
470 DEF FND(D)=SQR((K(I,1)-S1)^2
+(K(I,2)-S2)^2)
475 DEF FNR(R)=INT(RND(0)*7.98+1
.01)
480 ' Initialize ENTERPRISE's po
sition
490 Q1=FNR(1):Q2=FNR(1):S1=FNR(1
):S2=FNR(1)
530 FORI=1TO9:C(I,1)=0:C(I,2)=0:
NEXTI
540 C(3,1)=-1:C(2,1)=-1:C(4,1)=-
1:C(4,2)=-1:C(5,2)=-1:C(6,2)=-1
600 C(1,2)=1:C(2,2)=1:C(6,1)=1:C
(7,1)=1:C(8,1)=1:C(8,2)=1:C(9,2)
=1
670 FORI=1TO8:D(I)=0:NEXT I
710 A1$="NAVSRSLRSPHATORSHEDAMCO
MXXX"
739 ' Setup to change cumulative
 galactic record to galaxy map
810 ' Set up wht exists in the g
alaxy
815 ' K3= No. of Klingons  B3=No
. of Starbases  S3 = No. of star
s
820 FORI=1TO8:FOR J=1 TO 8:K3=0:
Z(I,J)=0:R1=RND(0)
850 IF R1>.98 THEN K3=3:K9=K9+3:
GOTO 980
860 IF R1>.95 THEN K3=2:K9=K9+2:
GOTO 980
870 IF R1>.8 THEN K3=1:K9=K9+1
980 B3=0:IF RND(0) >.96 THEN B3=
1:B9=B9+1
1040 G(I,J)=K3*100+B3*10+FNR(1):
NEXTJ,I:IF K9>T9 THEN T9=K9+1
1100 IF B9<>0 THEN 1200
1150 IFG(Q1,Q2)<200THENG(Q1,Q2)=
G(Q1,Q2)+100:K9=K9+1
1160 B9=1:G(Q1,Q2)=G(Q1,Q2)+10:Q
1=FNR(1):Q2=FNR(1)
1200 K7=K9:IF B9<>1 THEN X$="s":
X0$=" are"
1230 PRINT"Your orders are as fo
llows:"
1240 PRINT"Destroy the"K9"Klingo
n warships which have invaded th
e galaxy"
1250 PRINT"before they destroy t
he Enterprise and conquer the Fe
deration."
1260 PRINT:PRINT"This will happe
n on stardate "STR$(T0+T9)".   T
his gives you"T9"days."
1270 PRINT"There"X0$;B9"Starbase
"X$" in the galaxy for resupplyi
ng your ship."
1280 PRINT:PRINT"Press any key w
hen you are ready to accept comm
and"
1300 EXEC44539 ' wait for key pr
essed
1310 'Here any time new quadrant
 entered
1320 Z4=Q1:Z5=Q2:K3=0:B3=0:S3=0:
G5=0:D4=.5*RND(0):Z(Q1,Q2)=G(Q1,
Q2)
1390 IF Q1<1 OR Q1>8 OR Q2<1 OR
Q2>8 THEN 1600
1430 GOSUB 9030:CLS:IF T0<>T THE
N 1490
1460 PRINT"Your mission begins:"
:PRINT"Your starship is located
in the"
1470 PRINT""G2$"' Quadrant.":GO
TO 1500
1490 PRINT"Now entering the quad
rant known as ":PRINT""G2$"'. .
 ."
1500 PRINT:K3=INT(G(Q1,Q2)*.01):
B3=INT(G(Q1,Q2)*.1)-10*K3
1540 S3=G(Q1,Q2)-100*K3-10*B3:IF
K3=0THEN1590
1560 ATTR FC,BC,B:PRINT"COMBAT A
REA      CONDITION RED":ATTR FC,
BC:POKE65496,0:PLAY SO$(4):POKE6
5497,0:IFS>200THEN1590
1580 ATTR FC,BC,B:PRINT"   SHIEL
DS DANGEROUSLY LOW":ATTR FC,BC:P
OKE65496,0:PLAY SO$(4):POKE65497
,0
1590 FORI=1TO3:K(I,1)=0:K(I,2)=0
:NEXTI
1600 FORI=1TO3:K(I,3)=0:NEXTI:Q$
=Z$+Z$+Z$+Z$+Z$+Z$+Z$+LEFT$(Z$,1
7)
1660 ' Position ENTERPRISE in qu
adrant, then place
1670 ' "K3" klingons, "B3" starb
ases, & "S3" stars elsewhere
1680 A$=SH$(1):Z1=S1:Z2=S2:GOSUB
8670:IFK3<1 THEN 1820
1720 FOR I=1 TO K3:GOSUB 8590:A$
=SH$(2):Z1=R1:Z2=R2
1780 GOSUB 8670:K(I,1)=R1:K(I,2)
=R2:K(I,3)=S9*(.5+RND(0)):NEXTI
1820 IFB3<1THEN1910
1880 GOSUB 8590:A$=SH$(3):Z1=R1:
B4=R1:Z2=R2:B5=R2:GOSUB 8670
1910 FOR I=1 TO S3:GOSUB 8590:A$
=" * ":Z1=R1:Z2=R2:GOSUB 8670:NE
XT I
1980 GOSUB 6430
1990 IF S+E>10 THEN IF E>10 OR D
(7)=0 THEN 2060
2020 ATTR FC,BC,B:PRINT:PRINT"
        ** FATAL ERROR ** ":ATTR
 FC,BC:PRINT" You've just strand
ed your ship in space."
2030 PRINT"You have insufficient
 manuevering energy,"
2040 PRINT"and shield control is
 presently incapable of"
2050 PRINT"Cross-circuiting to e
ngine room!!":GOTO 6220
2060 INPUT"COMMAND";A$
2080 FOR I=1 TO 9:IF LEFT$(A$,3)
```

```
<>MID$(A1$,3*I-2,3)THEN 2160
2100 IF I=2 OR I=3 OR I=7 OR I=8
 THEN CLS
2140 ON I GOTO 2300,1980,4000,42
60,4700,5530,5690,7290,6270
2160 NEXTI:PRINT"ENTER ONE OF TH
E FOLLOWING:"
2180 PRINT"  NAV (TO SET COURSE)
"

2190 PRINT"  SRS (FOR SHORT RANG
E SENSOR SCAN)"
2200 PRINT"  LRS (FOR LONG RANGE
 SENSOR SCAN)"
2210 PRINT"  PHA (TO FIRE PHASER
S)"
2220 PRINT"  TOR (TO FIRE PHOTON
 TORPEDOES)"
2230 PRINT"  SHE (TO RAISE OR LO
WER SHEILDS)"
2240 PRINT"  DAM (FOR DAMAGE CON
TROL REPORTS)"
2250 PRINT"  COM (TO CALL ON LIB
RARY COMPUTER)"
2260 PRINT"  XXX (TO RESIGN YOUR
 COMMAND)":PRINT:GOTO 1990
2290 ' Course control begins her
e
2300 INPUT"COURSE(1-9)";C1:IFC1=
9THENC1=1
2310 IF C1>=1 AND C1<9 THEN 2350

2330 ATTR FC,BC,B:PRINT"   LT. S
ULU REPORTS, 'INCORRECT COUSE DA
TA, SIR!'":ATTR FC,BC:GOTO1990
2350 X$="8":IFD(1)<0THENX$="0.2"

2360 PRINT"WARP FACTOR (0-"X$")"
;:INPUT W1:IFD(1)<0ANDW1>.2THEN2
470
2380 IF W1>0 AND W1<=8THEN2490
2385 IF W1>0 AND W1<1 THEN CLS
2390 IFW1=0THEN1990
2420 ATTR FC,BC,B:PRINT"   CHIEF
 ENGINEER SCOTT REPORTS 'THE ENG
INES WON'T"
2430 PRINT" TAKE WARP "W1"!'":AT
TR FC,BC:GOSUB9:GOTO 1990
2470 ATTR FC,BC,B:PRINT"WARP ENG
INES ARE DAMAGED. MAXIMUM SPEED
= WARP 0.2":ATTR FC,BC:GOSUB9:GO
TO 1990
2490 N=INT(W1*8+.5):IF E-N>=0 TH
EN 2590
2500 ATTR FC,BC,B:PRINT"ENGINEER
ING REPORTS  'INSUFFICIENT ENERG
Y AVAILIBLE":
2510 PRINT" FOR MANUEVERING AT W
ARP"W1"!'":ATTR FC,BC
2530 IF S<N-E OR D(7)<0 THENGOSU
B9:GOTO1990
2550 PRINT"DEFLECTER CONTROL ROO
M ACKNOWLEDGES:":PRINTTAB(0); S"
UNITS OF ";
2560 PRINT"ENERGY PRESENTLY DEPL
OYED":PRINT" TO SHIELDS."
2570 GOTO1990
2580 ' Klingons move/fire on mov
ing Starship . . .
2590 FORI=1TOK3:IFK(I,3)=0THEN27
00
2610 A$="   ":Z1=K(I,1):Z2=K(I,2
):GOSUB 8670:GOSUB 8590
2660 K(I,1)=Z1:K(I,2)=Z2:A$=SH$(
2):GOSUB 8670
2700 NEXT I:GOSUB 6000:D1=0:D6=W
1:IF W1>=1 THEN D6=1
2770 FOR I=1 TO 8:IF D(I)>=0 THE
N 2880
2790 D(I)=D(I)+D6:IF D(I) >=-.1
AND D(I) <0 THEN D(I)=-.1:GOTO 2
880
2800 IFD(I)<0THEN2880
2810 IFD(I)<>1THEND(I)=1:ATTR FC
,BC,B:PRINT"DAMAGE CONTROL REPOR
T:  "
2840 PRINTTAB(6);:R1=I:GOSUB8790
:PRINTG2$;" REPAIR COMPLETED.":A
TTR FC,BC
2880 NEXTI:GOSUB9:IFRND(0)>.2THE
N3070
2910 R1=FNR(1):IFRND(0)>=.6THEN3
000
2930 D(R1)=D(R1)-(RND(0)*5+1):AT
TR FC,BC,B:PRINT"DAMAGE CONTROL
REPORT: "
2960 GOSUB8790:PRINTG2$;" DAMAGE
D":ATTR FC,BC:PRINT:GOTO3040
3000 D(R1)=D(R1)+RND(0)*3+1:PRIN
T"DAMAGE CONTROL REPORT: "
3030 GOSUB8790:PRINTG2$;" STATE
OF REPAIR IMPROVED ":PRINT
3040 GOSUB9
3060 ' Begin moving Starship
3070 A$="   ":Z1=INT(S1):Z2=INT(
S2):GOSUB8670
3110 X1=C(C1,1)+(C(C1+1,1)-C(C1,
1))*(C1-INT(C1)):X=S1:Y=S2
3140 X2=C(C1,2)+(C(C1+1,2)-C(C1,
2))*(C1-INT(C1)):Q4=Q1:Q5=Q2
3170 FOR I=1 TO N:S1=S1+X1:S2=S2
+X2:IF S1<1 OR S1>=9 OR S2<1 OR
S2>=9 THEN 3500
3240 S8=INT(S1)*24+INT(S2)*3-26:
IF MID$(Q$,S8,2)="  "THEN 3360
3320 S1=INT(S1-X1):S2=INT(S2-X2)
:CLS:PRINT"WARP ENGINES SHUT DOW
N AT ":
3350 PRINT"SECTOR";S1;",";S2:PRI
NT"DUE TO BAD NAVIGATION.":GOTO
3370
3360 NEXTI:S1=INT(S1):S2=INT(S2)

3370 A$=SH$(1):Z1=INT(S1):Z2=INT
(S2):GOSUB 8670:GOSUB3910:T8=1
3430 IF W1<1THEN T8=.1*INT(10*W1
)
3450 T=T+T8:IF T>T0+T9 THEN 6220

3470 ' See if docked, then get c
ommand
3480 GOSUB9:GOTO1980
3490 ' Exceed quadrant limits
3500 X=8*Q1+X+N*X1:Y=8*Q2+Y+N*X2
:Q1=INT(X/8):Q2=INT(Y/8):S1=INT(
X-Q1*8)
3550 S2=INT(Y-Q2*8):IF S1=0THENQ
1=Q1-1:S1=8
3590 IF S2=0THENQ2=Q2-1:S2=8
3620 X5=0:IFQ1<1THENX5=1:Q1=1:S1
=1
3670 IFQ1>8THEN X5=1:Q1=8:S1=8
3710 IF Q2<1THENX5=1:Q2=1:S2=1
3750 IFQ2>8THEN X5=1:Q2=8:S2=8
3790 IFX5=0THEN3860
3800 CLS:PRINT"LT. UHURA REPORTS
":PRINT"' MESSAGE FROM STARFLEET
 COMMAND:"
3810 PRINT CHR$(34)+"PERMISSION
TO ATTEMPT CROSSING GALACTIC PER
IMETER IS HEREBY ";:ATTR FC,BC,B
:PRINT"*DENIED*.":ATTR FC,BC
3820 PRINT" SHUT DOWN YOUR ENGIN
ES."+CHR$(34)+"'"
3830 PRINT"CHIEF ENGINEER SCOTT
REPORTS:-":PRINT"'   WARP ENGINE
S SHUT DOWN AT SECTOR"S1","S2"OF
 QUADRANT"Q1","Q2".'"
3840 GOSUB9
3850 IF T>T0+T9 THEN 6220
3860 IF 8*Q1+Q2=8*Q4+Q5 THEN 337
0
3870 T=T+1:GOSUB3910:GOTO1320
3900 ' Manouver energy S.R.
3910 E=E-N-10:IFE>=0THENRETURN
3930 ATTR FC,BC,B:PRINT"SHEILD C
ONTROL SUPPLIES ENERGY TO COMPLE
TE THE MANEUVER.":ATTR FC,BC:GOS
UB9
3940 S=S+E:E=0:IFS<=0THENS=0
3980 RETURN
3990 ' Long range sensor scan co
de
4000 IF D(3)<0THENPRINT"LONG RAN
GE SENSORS INOPERABLE.":GOTO1990
```

```
4030 PRINT"LONG RANGF SCAN FOR Q
 UADRANT"Q1","Q2"."

4040 O1$=STRING$(31,"-"):PRINTTA
B(8);O1$
4060 FORI=Q1-1 TO Q1+1:N(1)=-1:N
(2)=-2:N(3)=-3:FORJ=Q2-1 TO Q2+1

4120 IF I>0 AND I<9 AND J>0 AND
J<9 THEN N(J-Q2+2)=G(I,J):Z(I,J)
=G(I,J)
4180 NEXT J:FOR L=1 TO 3:PRINTTA
B(7);": ";:IF N(L)<0 THEN PRINT"
*** ";:GOTO 4230
4210 PRINT RIGHT$(STR$(N(L)+1000
),3);" ";
4230 NEXTL:PRINT":":PRINTTAB(8);
O1$:NEXTI:GOTO1990
4250 ' Phaser control starts her
e
4260 IF D(4)<0THENPRINT"PHASERS
INOPERATIVE.":GOTO1990
4265 IFK3>0THEN4330
4270 PRINT"SCIENCE OFFICER SPOCK
 REPORTS 'SENSORS SHOW NO ENEMY
SHIPS IN THIS QUADRANT.'":GOTO 1
990
4330 IFD(8)<0THENPRINT"COMPUTER
FAILURE HAMPERS ACCURACY."
4350 PRINT"PHASERS LOCKED ON TAR
GET."
4360 PRINT"ENERGY AVAILABLE="E"U
NITS."
4370 INPUT"NUMBER OF UNITS TO FI
RE";X:IF X<=0THEN1990
4400 IF E-X<0 THEN 4360
4410 E=E-X:IFD(7)<0THENX=X*RND(0
)
4450 H1=INT(X/K3):FORI=1TO3:IFK(
I,3)<=0THEN4670
4480 H=INT((H1/FND(0))*(RND(0)+2
)):IF H>.15*K(I,3)THEN4530
4500 ATTR FC,BC,B:PRINT"SENSORS
SHOW NO DAMAGE TO ENEMY AT";K(1,
1);",","K(1,2):ATTR FC,BC:PLAY SO$
(1):GOTO4670
4530 K(I,3)=K(I,3)-H:ATTR FC,BC,
B:PRINT H;"UNIT HIT ON KLINGON A
T SECTOR"K(I,1)",";K(I,2):ATTR F
C,BC:PLAY SO$(1)
4550 IF K(I,3)<=0 THEN PRINT"***
 KLINGON DESTROYED ***":PLAY SO$
(2):GOTO 4580
4560 ATTR FC,BC,B:PRINT"(SENSORS
 SHOW";K(I,3);"UNITS REMAINING)"
:ATTR FC,BC:GOTO4670
4580 K3=K3-1:K9=K9-1:Z1=K(I,1):Z
2=K(I,2):A$="   ":GOSUB 8670
```

```
 4650 K(I,3)=0:G(Q1,Q2)=G(Q1,Q2)-
100:Z(Q1,Q2)=G(Q1,Q2):IF K9<=0 T
HEN 6370
4670 NEXTI:GOSUB6000:GOTO1990
4700 IFP<=0THENPRINT"ALL PHOTON
TORPEDOES EXPENDED":GOTO 1990
4730 IF D(5)<0 THEN PRINT"PHOTON
 TUBES ARE NOT OPERATIONAL":GOTO
 1990
4760 INPUT"PHOTON TORPEDO COURSE
 (1-9)";C1:IFC1=9THENC1=1
4780 IF C1>=1 AND C1<9 THEN 4850

4790 ATTR FC,BC,B:PRINT"ENSIGN C
HEKOV REPORTS, 'INCORRECT COURSE
 DATA, SIR!'":ATTR FC,BC
4800 GOTO 1990
4850 X1=C(C1,1)+(C(C1+1,1)-C(C1,
1))*(C1-INT(C1)):E=E-2:P=P-1
4860 X2=C(C1,2)+(C(C1+1,2)-C(C1,
2))*(C1-INT(C1)):X=S1:Y=S2
4910 PRINT"TORPEDO TRACK:"
4920 X=X+X1:Y=Y+X2:X3=INT(X+.5):
Y3=INT(Y+.5)
4960 IFX3<1ORX3>8ORY3<1ORY3>8THE
N5490
5000 PLAY"L255;O1;1;2;1;2;1;2;1;
2;1;2;1;2;1":PRINTSTRING$(5," ")
;X3",","Y3:A$="   ":Z1=X:Z2=Y:GOSU
B 8830
5050 IF Z3<>0 THEN 4920
5060 A$=SH$(2):Z1=X:Z2=Y:GOSUB88
30:IFZ3=0THEN5210
5110 ATTR FC,BC,B:PRINT"*** KLIN
GON DESTROYED ***":ATTR FC,BC:K3
=K3-1:K9=K9-1:PLAY SO$(2):IFK9<=
0THEN6370
5150 FORI=1TO3:IFX3=K(I,1)ANDY3=
K(I,2)THEN5190
5180 NEXTI:I=3
5190 K(I,3)=0:GOTO5430
5210 A$=" * ":Z1=X:Z2=Y:GOSUB 88
30:IFZ3=0 THEN 5280
5260 ATTR FC,BC,U:PRINT"STAR AT"
;X3",","Y3"ABSORBED TORPEDO ENERGY
.";:ATTR FC,BC:PRINT:GOSUB6000:G
OTO1990
5280 A$=SH$(3):Z1=X:Z2=Y:GOSUB 8
830:IF Z3=0 THEN  4760
5330 ATTR FC,BC,B,U:PRINT"*** ST
ARBASE DESTROYED ***":ATTR FC,BC
:PLAY SO$(3):B3=B3-1:B9=B9-1
5360 IF B9>0 OR K9>T-T0-T9 THEN
5400
5370 ATTR FC,BC,B:PRINT"THAT DOE
S IT, CAPTAIN!!":ATTR FC,BC:PRIN
T" YOU ARE HEREBY RELIEVED OF CO
MMAND AND SENTENCED"
```

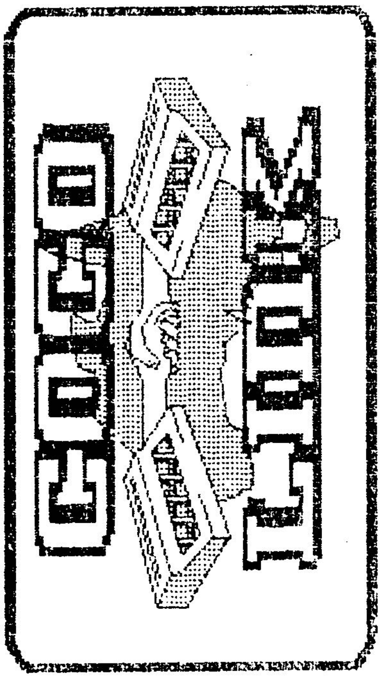
```
5380 PRINT"TO 99 STARDATES AT HA
RD LABOR ON";:ATTR FC,BC,B:PRINT
" CYGNUS 12!!":ATTR FC,BC
5390 GOTO6270
5400 PRINT"STARFLEET COMMAND REV
IEWING YOUR RECORD"
5410 PRINT"TO CONSIDER COURT MAR
TIAL!":D0=0
5430 Z1=X:Z2=Y:A$="   ":GOSUB 86
70
5470 G(Q1,Q2)=K3*100+B3*10+S3:Z(
Q1,Q2)=G(Q1,Q2):GOSUB6000:GOTO19
90
5490 PRINT"TORPEDO MISSED":GOSUB
6000:GOTO1990
5520 ' Sheild control starts her
e
5530 IFD(7)<0THENPRINT"SHIELD CO
NTROL INOPERABLE":GOTO1990
5560 PRINT"ENERGY AVAILABLE =";E
+S:INPUT"NUMBER OF UNITS AVAILAB
LE TO SHIELDS";X
5580 IF X<0 OR S=X THEN PRINT"<S
HIELDS UNCHANGED>":GOTO1990
5590 IF X<=E+S THEN 5630
5600 PRINT"SHIELD CONTROL REPORT
S:-":ATTR FC,BC,B:PRINT"'THIS IS
 NOT THE FEDERATION TREASUARY!'"
:ATTR FC,BC
5610 PRINT"<SHIELDS UNCHANGED>":
GOTO1990
5630 E=E+S-X:S=X:PRINT"DEFLECTOR
 CONTROL ROOM REPORT:"
5660 PRINT"'SHIELDS NOW REGISTER
";INT(S);"UNITS":PRINT"AS PER YO
UR COMMAND.'":GOTO1990
5680 ' Damage control
5690 IF D(6) >=0  THEN 5910
5700 PRINT"DAMAGE CONTROL REPORT
 NOT AVAILBLE":IFD0=0 THEN 1990
5720 D3=0:FOR I=1 TO 8:IF D(I)<0
 THEN D3=D3+.1
5760 NEXT I:IF D3=0 THEN 1990
5780 PRINT:D3=D3+D4:IFD3>=1THEND
3=.9
5810 PRINT"TECHNICIANS STANDING
BY TO EFFECT REPAIRS TO SHIP;"
5820 PRINT"ESTIMATED TIME TO REP
AIR";.01*INT(100*D3);"STARDATES"

5840 INPUT"WILL YOU AUTHORIZE TH
E RE!PAIR ORDER (Y/N)";A$
5860 IF A$<>"Y" THEN 1990
5870 FOR I=1 TO 8:IF D(I)<0 THEN
 D(I)=0
5890 NEXT I:T=T+D3+.1
5900 CLS
5910 PRINT"DEVICE                ST
```

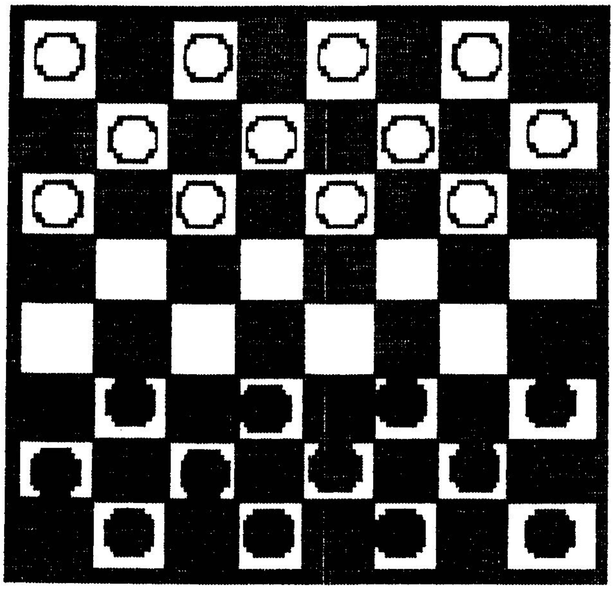
```
ATE OF REPAIR":FOR R1=1 TO 8
5920 GOSUB8790:PRINTG2$;LEFT$(Z$
,25-LEN(G2$));INT(D(R1)*100)*.01

5950 NEXT R1:PRINT:IF D0<>0 THEN
 5720
5980 GOTO1990
6000 IFK3<=0THENRETURN
6010 IF D0<>0 THEN PRINT"STARBAS
E SHIELDS PROTECT THE ENTERPRISE
":RETURN
6040 FORI=1TO3:IFK(I,3)<=0THEN62
00
6060 H=INT((K(I,3)/FND(1))*(2+RN
D(0))):S=S-H:K(I,3)=K(I,3)/(3+RN
D(0))
6070 PLAY SO$(3)
6080 PRINTH;"UNIT HIT ON ENTERPR
ISE FROM SECTOR";K(I,1);",",K(I,2
)
6090 IFS<=0THEN6240
6100 PRINT"   <SHIELDS DOWN TO "
S"UNITS>":IFH<20THEN6200
6120 IF RND(0)>.6 OR H/S<=.02 TH
EN 6200
6140 R1=FNR(1):D(R1)=D(R1)-H/S-.
5*RND(0):GOSUB8790
6170 PRINT"DAMAGE CONTROL REPORT
S '":PRINT G2$;" DAMAGED BY THE
HIT'":GOSUB 9
6200 NEXTI:RETURN
6210 ' End of game
6220 PRINT"IT IS STARDATE";T:GOT
06270
6240 PRINT:PRINT"THE ENTERPRISE
HAS BEEN DESTROYED.  THE FEDERAT
ION WILL BE CONQUERED":GOTO 6220

6270 PRINT"THERE WERE"K9"KLINGON
 BATTLE CRUISERS LEFT AT THE END
 OF YOUR MISSION."
6280 PRINT"THE END OF YOUR MISSI
ON."
6290 PRINT:PRINT:IFB9=0THEN9999
6310 PRINT"THE FEDERATION NEEDS
A NEW STARSHIP COMMANDER"
6320 PRINT"FOR A SIMILAR MISSION
 -- IF THERE IS A VOLUNTEEER"
6330 INPUT"LET HIM STEP FORWARD
AND ENTER 'AYE'";A$:IF A$="AYE"T
HEN10
6340 GOTO 9999
6370 FOR RN=1TO10:PLAY S$(RND(4)
):NEXT:PRINT"CONGRATULATIONS, CA
PTAIN!":PRINT"THE LAST KLINGON B
ATTLE";
6380 PRINT"CRUISER MENACING THE
FEDERATION HAS BEEN DESTROYED"
```

```
6400 PRINT"YOUR EFFICIENCY RATIN
G IS";1000*(K7/(T-T0))^2:GOTO629
0
6420 'short range sensor scan &
startup subroutine
6430 FORI=S1-1TOS1+1:FORJ=S2-1TO
S2+1
6450 IFINT(I+.5)<1ORINT(I+.5)>8O
RINT(I+.5)>8ORINT(J+.5)<1ORINT(J
+.5)>8THEN6540
6490 A$=SH$(3):Z1=I:Z2=J:GOSUB 8
830:IF Z3=1 THEN 6580
6540 NEXTJ,I:D0=0:GOTO6650
6580 D0=1:C$="DOCKED":E=E0:P=P0
6620 PRINT"SHIELDS DROPPED FOR D
OCKING PURPOSES":S=0:GOTO6720
6650 IF K3>0 THEN C$="*RED*":GOT
O 6720
6670 C$="GREEN":IFE<E0*.1THENC$=
"YELLOW"
6720 IF D(2) >=0 THEN 6770
6730 PRINT:PRINT"*** SHORT RANGE
 SENSORS ARE OUT ***":PRINT:RETU
RN
6770 O1$="----+---+---+---+---+-
--+---+---":PRINT"+"O1$"+":FOR I
=1 TO 8:PRINT"+";
6820 FOR J=(I-1)*24+1 TO (I-1)*2
4+22 STEP3:PRINT" ";MID$(Q$,J,3)
;:NEXTJ
6825 PRINT"+":NEXT I:PRINT"+"O1$
"+":FOR I=1 TO 8
6830 ON I GOTO 6850,6900,6960,70
20,7070,7120,7180,7240
6850 PRINT"NAVIGATION STARDATE
        ";INT(T*10)*.1:GOTO7260
6900 PRINT"  CHART    CONDITION
         ";C$:GOTO7260
6960 PRINT"              QUADRANT
        ";Q1",";Q2:GOTO7260
7020 PRINT"4   3   2  SECTOR
        "S1",";S2:GOTO7260
7070 PRINT"  \ ! /    PHOTON TOR
PEDOES  ";INT(P):GOTO7260
7120 PRINT"5 - 0 - 1  TOTAL ENER
GY       ";INT(E+S):GOTO7260
7180 PRINT"  / ! \    SHIELDS
        ";INT(S):GOTO7260
7240 PRINT"6   7   8  KLINGONS R
EMAINING";INT(K9)
7260 NEXTI:PRINT"      ----------
-------------     ":RETURN
7280 'library computer code
7290 IFD(8)<0THENPRINT"COMPUTER
DISABLED":GOTO1990
7320 INPUT"COMPUTER ACTIVE AND A
WAITING COMMAND(? = HELP)";A$:IF
 A$="?" THEN 7360 ELSE A=VAL(A$)
```

```
7350 H8=1:ONA+1GOTO7540,7900,807
0,8500,8150,7400
7360 PRINT"FUNCTIONS AVAILABLE F
ROM LIBRARY-COMPUTER:"
7370 PRINT"   0 = CUMULATIVE GAL
ACTIC RECORD"
7372 PRINT"   1 = STATUS REPORT
(GO HERE WHEN AT STARBASE)"
7374 PRINT"   2 = PHOTON TORPEDO
 DATA"
7376 PRINT"   3 = STARBASE NAV D
ATA"
7378 PRINT"   4 = DIRECTION/DIST
ANCE CALCULATOR"
7380 PRINT"   5 = GALAXY 'REGION
 NAME' MAP":PRINT:GOTO7320
7400 H8=0:G5=1:PRINT"
        THE GALAXY":GOTO7550
7530 'CUM GALACTIC RECORD
7540 '
7543 PRINT
7544 PRINT"COMPUTER RECORD OF GA
LAXY":PRINT"FROM QUADRANT"Q1","Q
2
7546 PRINT
7550 PRINT"      1   2   3   4
5   6   7   8"
7560 O1$= "    --- --- --- --- -
-- --- --- ---"
7570 PRINTO1$:FORI=1TO8:PRINTI;:
IFH8=0THEN7740
7630 FORJ=1TO8:PRINT" ";:IFZ(I,J
)=0THENPRINT"***";:GOTO7720
7700 PRINTRIGHT$(STR$(Z(I,J)+100
0),3);
7720 NEXTJ:GOTO7850
7740 Z4=I:Z5=1:GOSUB9030:J0=INT(
8-0.5*LEN(G2$)):PRINTTAB(J0);G2$
;
7800 Z5=5:GOSUB 9030:J0=INT(15-0
.5*LEN(G2$)):PRINT TAB(J0);G2$;
7850 PRINT:PRINTO1$:NEXTI:PRINT:
:GOTO1990
7890 'STATUS REPORT
7900 PRINT"   STATUS REPORT:":X$
="":IFK9>1THENX$="S"
7940 PRINT"KLINGON"X$;" LEFT: ";
K9
7960 PRINT"MISSION MUST BE COMPL
ETED IN";.1*INT((T0+T9-T)*10);"S
TARDATES"
7970 X$="S":IFB9<1THEN8010
7980 PRINT"THE FEDERATION IS MAI
NTAINING"B9"STARBASE"X$" IN THE
GALAXY."
7990 GOTO5690
8010 PRINT"YOUR STUPIDITY HAS LE
```

```
FT YOU ON YOUR OWN IN "
8020 PRINT"THE GALAXY -- YOU HAV
E NO STARBASES LEFT!":GOTO5690
8060 'TORPEDO, BASE NAV, D/D CAL
CULATOR
8070 IFK3<=0THEN4270
8080 X$="":IF K3>1 THEN X$="S"
8090 PRINT"FROM ENTERPRISE TO KL
INGON BATTLE CRUISER";X$
8095 PRINT"(DISTANCE SHOULD BE /
 10)"
8100 H8=0:FOR I=1 TO 3:IF K(I,3)
<=0 THEN 8480
8110 W1=K(I,1):X=K(I,2)
8120 C1=S1::A=S2:GOTO8220
8150 PRINT"DIRECTION/DISTANCE CL
CULATOR:"
8160 PRINT"YOU ARE AT QUADRANT "
Q1","Q2" SECTOR "S1","S2
8170 PRINT"PLEASE ENTER":INPUT"
 INITIAL COORDINATES (Y,X)";C1,A

8200 INPUT"  FINAL COORDINATES (
Y,X)";W1,X
8220 X=X-A:A=C1-W1:IFX<0THEN8350

8250 IF A<0 THEN 8410
8260 IF X>0 THEN 8280
8270 IF A=0 THEN C1=5:GOTO 8290
8280 C1=1
8290 IF ABS(A)<=ABS(X)THEN 8330
8310 PRINT"DIRECTION =";:PRINTUS
ING "$.##";C1+(((ABS(A)-ABS(X))+
ABS(A))/ABS(A)):GOTO 8460
8330 PRINT"DIRECTION =";:PRINT U
SING "$.##";C1+(ABS(A)/ABS(X)):G
OTO8460
8350 IFA>0THENC1=3:GOTO8420
8360 IFX<>0THENC1=5:GOTO8290
8410 C1=7
8420 IFABS(A)>=ABS(X)THEN8450
8430 PRINT"DIRECTION =";:PRINT U
SING "$.##";C1+(((ABS(X)-ABS(A))
+ABS(X))/ABS(X)):GOTO8460
8450 PRINT"DIRECTION =";:PRINT U
SING "$.##";C1+(ABS(X)/ABS(A))
8460 PRINT"DISTANCE =";:PRINT US
ING "$.##";SQR(X^2+A^2):IFH8=1TH
EN1990
8480 NEXTI:GOTO1990
8500 IFB3<>0THENPRINT"FROM ENTER
PRISE TO STARBASE:":PRINT"DISTAN
CE MUST BE /10":W1=B4:X=B5:GOTO8
120
8510 PRINT"Mr. Spock reports, '
SENSORS SHOW NO STARBASES IN QUA
DRANT'":GOTO1990
8580 'Find empty place in quadra
nt (for things)
8590 R1=FNR(1):R2=FNR(1):A$="
":Z1=R1:Z2=R2:GOSUB8830:IFZ3=0TH
EN8590
8600 RETURN
8660 'insert in string array for
 quadrant
8670 S8=INT(Z2-.5)*3+INT(Z1-.5)*
24+1
8675 IFLEN(A$)<>3THEN PRINT"ERRO
R":STOP
8680 IF S8=1 THEN Q$=A$+RIGHT$(Q
$,189):RETURN
8690 IF S8=190 THEN Q$=LEFT$(Q$,
189)+A$:RETURN
8700 Q$=LEFT$(Q$,S8-1)+A$+RIGHT$
(Q$,190-S8):RETURN
8780 'prints device name
8790 ON R1 GOTO 8792,8794,8796,8
798,8800,8802,8804,8806
8792 G2$="WARP ENGINES":RETURN
8794 G2$="SHORT RANGE SENSORS":R
ETURN
8796 G2$="LONG RANGE SENSORS":RE
TURN
8798 G2$="PHASER CONTROL":RETURN

8800 G2$="PHOTON TUBES":RETURN
8802 G2$="DAMAGE CONTROL":RETURN

8804 G2$="SHEILD CONTROL":RETURN

8806 G2$="LIBRARY-COMPUTER":RETU
RN
8820 'STRING COMPARISON IN QUADR
ANT ARRAY
8830 Z1=INT(Z1+.5):Z2=INT(Z2+.5)
:S8=(Z2-1)*3+(Z1-1)*24+1:Z3=0
8890 IF MID$(Q$,S8,3) <> A$ THEN
 RETURN
8900 Z3=1:RETURN
9010 'quadrant name in G2$ from
Z4,Z5 ( = Q1,Q2 )
9020 'call with G5=1 to get regi
on name only
9030 IF Z5<=4 THEN ON Z4 GOTO 90
40,9050,9060,9070,9080,9090,9100
,9110
9035 GOTO 9120
9040 G2$="ANTARES":GOTO 9210
9050 G2$="RIGEL":GOTO9210
9060 G2$="PROCYON":GOTO9210
9070 G2$="VEGA":GOTO9210
9080 G2$="CANOPUS":GOTO9210
9090 G2$="ALTAIR":GOTO9210
9100 G2$="SAGGITARIUS":GOTO9210
9110 G2$="POLLUX":GOTO9210
9120 ON Z4 GOTO 9130,9140,9150,9
160,9170,9180,9190,9200
9130 G2$="SIRIUS":GOTO9210
9140 G2$="DENEB":GOTO9210
9150 G2$="CAPELLA":GOTO9210
9160 G2$="BETELGEUSE":GOTO9210
9170 G2$="ALDEBARAN":GOTO9210
9180 G2$="REGELUS":GOTO9210
9190 G2$="ARCTURUS":GOTO9210
9200 G2$="SPICA"
9210 IF G5<>1 THEN ON Z5 GOTO 92
30,9240,9250,9260,9230,9240,9250
,9260
9220 RETURN
9230 G2$=G2$+" I":RETURN
9240 G2$=G2$+" II":RETURN
9250 G2$=G2$+" III":RETURN
9260 G2$=G2$+" IV":RETURN
9999 RGB:POKE 65496,0:PRINT"  Go
odbye, and thanks for playing  '
STARTREK'":END
```





Checkers

By

Tim Hartnell

Checkers, or Draughts as it is more commonly called in the UK, is a simple text screen version of the game.

The programme is interesting in that it gives beginner to intermediate programmers an insight into how to go about playing the computer on board games.
This version of Checkers is not imbued with any great intelligence but at the same time it must be able to know what move to make next and also know that the move is legal. It therefore must know the position of all the men on the board at all times. This means that it must check every square before each move.

There are several omissions in this programme and it is possible to cheat the machine (I know you would never do that!). They allow you to make illegal moves. If you "accidentally" find them see if you can fix them and send the revamped programme back to COCO-LINK.

NOTE: One main difference in the rules in this version is that only one man at a time can be taken.

```
10 '***CHECKERS***
20 '***DRAUGHTS***
30 HC=0:CC=0
40 GOSUB 1580
50 GOTO1300
60 CLS
70 PRINTTAB(12);"CHECKERS"
80 PRINT
90 PRINTTAB(4);"ABCDEFGH"
100 GOSUB430
110 PRINT"YOUR SCORE";SM;"MACHIN
E SCORE";SI;
120 PLAY"O3L24CDEFEDC"
130 PRINT
140 IF U$="N" THEN GOTO670
150 IF SI=12 THEN PRINT"I WIN":S
TOP
160 IF SM=12 THENPRINT"YOU WIN":
STOP
170 IF Q=2 THEN GOTO390
180 PRINT"LAST TO ";F$;
190 INPUT"        FROM..";C$
200 INPUT"                    TO..
";B$
210 F$=B$
220 D$=C$
230 GOSUB 1510
240 C=M(I)
250 IF I=0 THEN GOTO190
260 D$=B$
270 GOSUB1510
280 B=M(I)
290 IF I=0 THEN GOTO 190
300 U$="N"
310 IF B-C=10 THEN A(B-5)=0
320 IF B-C=8 THEN A(B-4)=0
330 IF C-B=10 THEN A(C-5)=0
340 IF C-B=8 THEN A(C-4)=0
350 A(B)=A(C)
360 A(C)=0
370 Q=2
380 GOTO 60
390 U$="":Q=0
400 IF ABS(C-B)=10 OR ABS(C-B)=8
 THEN PRINT:PRINT:INPUT U$
410 IF U$<> "Y" THEN GOTO 670
420 GOTO 60
430 REM
440 MI=0:K=1
```

```
450 J=-1
460 HC=0:CC=0
470 FOR I=40TO6 STEP-1
480 IF A(I)=1 AND I>37 THEN A(I)
=2
490 IF A(I)=-1 AND I<10 THEN A(I
)=-2
500 IF I=14 OR I=32 OR I=23 THEN
 GOTO560
510 IF MI=0 THEN PRINT K;" ";:MI
=0:K=K+1:J=-1*J:IF J=1 THEN PRIN
T CHR$(128);
520 A=A(I)
530 GOSUB600
540 IF MI<>3 OR J=-1 THEN PRINT
CHR$(128);
550 MI=MI+1:IFMI>3THENMI=0:PRINT
560 NEXT I
570 SI=12-HC:SM=12-CC
580 PRINT
590 RETURN
600 ' ***PRINT PIECES***
610 IF A=0 THEN PRINT" ";
620 IF A=1 THEN PRINT"X";:HC=HC+
1
630 IF A=-1 THEN PRINT"O";:CC=CC
+1
640 IF A=-2 THEN PRINT"o";:CC=CC
+1
650 IF A=2 THEN PRINT"x";:HC=HC+
1
660 RETURN
670 U$="  ":Q=0
680 Z=6
690 IF Z<9 THEN GOTO730
700 IF A(Z)<0 AND (A(Z-4)=1 OR A
(Z-4)=2) AND A(Z-8)=0 THEN GOTO9
20
710 IF Z<11 THEN GOTO730
720 IF A(Z)<0 AND (A(Z-5)=1 OR A
(Z-5)=2) AND A(Z-10)=0 THEN GOTO
 1010
730 IF Z>25 THEN GOTO 760
740 IF A(Z)=-2 AND (A(Z+4)=1 OR
A(Z+4)=2) AND A(Z+8)=0 THEN GOTO
 1110
750 IF A(Z)=-2 AND(A(Z+5)=1 OR A
(Z+5)=2) AND A(Z+10)=0 THEN GOTO
 1210
760 Z=Z+1: IF Z<=40 THEN GOTO 69
0
770 ' *** RANDOM ***
780 U=0
790 Z=RND(34)+6
800 K=0
810 U=U+1
820 IF A(Z)<0 AND A(Z-4)=0 THEN
K=1
830 IF A(Z)<0 AND A(Z-5)=0 AND K
=0 THEN K=2
840 IF K=0 AND Z<26 AND A(Z)=-2
AND A(Z+4)=0 THEN K=-7
850 IF Z<10 THEN GOTO 870
860 IF (K=1 OR K=2) AND U<200 AN
D (A(Z-(10 AND Z>10))=1 OR A(Z-8
)=1) THEN GOTO 790
870 IF K=0 AND U<400 THEN GOTO 7
90
880 IF K=0 THEN SM=12:GOTO 60
890 A(Z-(3+K))=A(Z)
900 A(Z)=0
910 GOTO 60
920 A(Z-8)=A(Z)
930 A(Z)=0
940 A(Z-4)=0
950 IF Z<24 THEN GOTO 60
960 IF (A(Z-13)=1 OR A(Z-13)=2)
AND A(Z-18)=0 THEN P=2
970 IF P=1 THEN A(Z-18)=A(Z-8):A
(Z-13)=00
980 IF P=2 THEN A(Z-12)=0:A(Z-12
)=0
990 IF P>0 THEN A(Z-8)=0
1000 GOTO60
1010 A(Z-10)=A(Z)
1020 A(Z)=0
1030 A(Z-5)=0
1040 IF Z<25 THEN GOTO 60
1050 IF (A(Z-15)=1 OR A(Z-15)=2)
 AND A(Z-20)=0 THEN P=1
1060 IF (A(Z-14)=1 OR A(Z-14)=2)
 AND A(Z-18)=0 THEN P=2
1070 IF P=1 THEN A(Z-15)=0:A(Z-2
0)=A(Z-10)
1080 IF P=2 THEN A(Z-14)=0:A(Z-1
8)=A(Z-10)
1090 IF P>0 THEN A(Z-10)=0
1100 GOTO60
1110 A(Z+8)=-2
1120 A(Z+4)=0
1130 A(Z)=0
1140 IF Z<32 AND (A(Z+3)=1 OR A(
Z+3)=2) AND A(Z-2)=0 THEN P=1
1150 IF Z<23 AND (A(Z+14)=1 OR A
(Z+14)=2) AND A(Z+16)=2 THEN P=2
1160 IF Z<23 AND (A(Z+13)=1 OR A
(Z+13)=2) AND A(Z+18)=0 THEN P=3
1170 IF P=1 THEN A(Z+3)=0:A(Z-2)
=-2
1180 IF P=2 THEN A(Z+14)=0:A(Z+1
6)=0
1190 IF P=3 THEN A(Z+13)=0:A(Z+1
8)=-2
1200 IF P>0 THEN A(Z+8)=0
1210 A(Z+10)=-2
1220 A(Z+5)=0
1230 A(Z)=0
1240 SI=SI+1
1250 GOTO60
1260 PRINT:PRINT
```

```
1270 PRINT:PRINT
1280 RETURN
1290 ' *** INITIALIZE ***
1300 DIM A(45)
1310 PRINT
1320 FOR Z=1TO45
1330 IF Z<6 THEN A(Z)=9
1340 IF Z>5 AND Z<19 THEN A(Z)=1
1350 IF Z>18 AND Z<28 THEN A(Z)=
0
1360 IF Z>27 AND Z<41 THEN A(Z)=
-1
1370 IF Z>40 THEN A(Z)=9
1380 NEXT Z
1390 A(14)=9:A(23)=9:A(32)=9
1400 F$=" --"
1410 P=0:Q=0
1420 SI=0:SM=0
1430 CLS:PRINT:PRINT
1440 INPUT"FIRST MOVE? (Y/N)";Q$
1450 U$=""
1460 PRINT
1470 IF Q$<> "Y" THEN GOTO 670
1480 U$=""
1490 PRINT
1500 GOTO 60
1510 ' *** DECODE MOVE ***
1520 I=1
1530 IF M$(I)=D$ THEN GOTO 1570
1540 I=I+1
1550 IF I=33 THEN I=0:GOTO1570
1560 GOTO 1530
1570 RETURN
1580 DIM M$(32):DIM M(32)
1590 FOR I=1TO32
1600 READ M$(I)
1610 NEXT
1620 DATA "B1","D1","F1","H1","A
2","C2","E2","G2","B3","D3","F3"
,"H3","A4","C4","E4","G4","B5","
D5","F5","H5","A6","C6","E6"
1630 DATA "G6","B7","D7","F7","H
7","A8","C8","E8","G8"
1640 FOR I=1TO32
1650 READ M(I)
1660 NEXT I
1670 DATA 40,39,38,37,36,35,34,3
3,31,30
1680 DATA 29,28,27,26,25,24,22,2
1,20,19
1690 DATA 18,17,16,15,13,12,11,1
0,9,8,7,6
1700 RETURN
```

END END

```
T THIS IS
240 REM DONE BEFORE USING VARPTR
, BECAUSE USING NEW VARIABLES WO
ULD CAUSE A
250 REM CHANGE IN THE POSITION O
F THE VARIABLES MAKING THE VARPT
R VALUE WRONG
260 REM PLACE THIS SUBROUTINE AT
 THE END OF THE PROGRAMME
270 V1=0:V2=0:A1=0:A2=0:A3=0
280 REM SET UP ARRAYS FOR COMPAR
ISON
290 FORJ=1 TO EN:FORK=J TO EN
300 REM COMPARE FIRST ARRAY TO S
ECOND. IF FIRST IS ALREADY LESS
THAN SECOND
310 REM THEN THE SECOND ARRAY PO
INTER IS INCREASED
320 IF A$(J)<A$(K)THEN420
330 REM POINT TO THE DESCRIPTORS
 OF BOTH ARRAYS IN FIRST FIELD C
ALL THE SWAP   ROUTINE
340 V1=VARPTR(A$(J)):V2=VARPTR(A
$(K)):GOSUB470
350 REM SAME FOR SECOND FIELD
360 V1=VARPTR(B$(J)):V2=VARPTR(B
$(K)):GOSUB470
370 REM SAME FOR THIRD FIELD
380 V1=VARPTR(C$(J)):V2=VARPTR(C
$(K)):GOSUB470
390 REM SAME FOR FOURTH FIELD
400 V1=VARPTR(D$(J)):V2=VARPTR(D
$(K)):GOSUB470
410 REM INCREASE SECOND ARRAY PO
INTER
420 NEXTK
430 REM INCREASE FIRST ARRAY POI
NTER EXIT IF FINISHED
440 LOCATE 20,2:PRINT"NOW ALPHAB
ETIZING ENTRY ";J:NEXT:RETURN
450 REM THE FOLLOWING LINES DO T
HE SWAPS ON THE VARIABLE DATA .
EACH STRING   VARIABLE IS FIVE B
YTES LONG. FIRST BYTE CONTAINS T
HE LENGTH OF THE STRING,SECOND B
YTE NOT USED THIRD AND FOURTH BY
TES CONTAIN THE STRING ADDRESS I
N MEMORY
460 REM THE FIFTH BYTE IS'NT USE
D. THE FIVE BYTES ARE USED TO MA
KE ALL THE    VARIBLE DESCRIPTOR
S EQUAL IN LENGTH SPEEDING THE S
ORT
470 A3=0
480 A1=PEEK(V1+A3):A2=PEEK(V2+A3
)
490 POKEV1+A3,A2:POKEV2+A3,A1
500 A3=A3+1:IF A3=4THEN RETURN E
LSE 480
```

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Mr A. Griffin
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SUTHERLAND NSW 2232

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