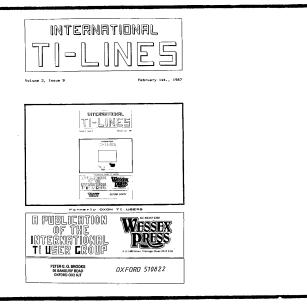
# INTERNATIONAL TI-LINES

Volume 3, Issue 9

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Formerly OXON TI USERS





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Apologies all round for the delay in getting January's IT out to you; I hope that it is worth the wait. PB.

HAPPY VALENTINE'S DAY !!! TO ALL TI'ERS !!!

#### BALDIE'S BURBLE

Well, as predicted I did experience problems in producing the January issue of IT, so it has run into the production period for this, the February issue. I vaguely remember that this happened once before, a long time ago (well, anything over seven days is a long time ago to me, these days!).

Now, I am about to don my miller's apron. This is because I am about to operate the Rumour Mill, and fittingly it concerns Miller's Graphics and their IBM PC on-a-card, a piece of equipment about which even MicroNet have seen fit to publish details (many thanks to DAVE HEWITT for the printout, and see later for more about DAVE).

Here's how it goes: CRAIG MILLER has been strongly rumoured to be ready to put out an IBM PC on a card, fitting the TI PEB, for a little while now. He wisely made sure he actually had a working product before he released any information, unlike the parent of a certain young lady called Geneve (or 9640 as her birth certificate now shows). That rumour has substance, and the card is ready.

Now, Cheap Throats 3 and 4 (you may remember 1 and 2 a long time back) tell me that TI are in the process of altering stocks of their 99/4A consoles to "expand the memory". This applies solely to the USA, not as far as I know to the UK.

I have been told that the 4A console and the PEB hosepipe as they stand are not suitable for connecting to an IBM PC on-a-card.

So, click, click, whirr, whirr, the old brain does a bit of creaky Maths and finds that Two plus Two just might equal Four. I have yet to find out if the memory upgrade being undertaken includes a keyboard reshuffle (to create a true IBM keyboard) with perhaps a new hosepipe, but Cheap Throat 3 is going to ask Cheap Throat 4 next time they write to each other. Cheap Throat 5 is rumoured to work at TI and to be the source of all these rumours, but that's just a rumour...

DAVE HEWITT sends his sincere apologies to any ITUGer who has been trying to contact him by phone or post. BT cleverly reconnected his old number to the new occupant of his old abode (I was told once that they wait 6 months before re-assigning any phone number), and she in turn has now stopped forwarding his mail, sending it back to the GPO marked NOT KNOWN AT THIS ADDRESS.

Dave says he's sorry for any inconvenience that this may have caused, and he now has a new address (as from 12th February):

53, Kennet Close, BERINSFIELD. Oxon.

He may get back on the phone later in the year.

Here's a thought for some of you: Have you ever told a group of people a joke and had them just sit there, not laughing, not booing, just sitting there? It makes you wonder why you bother, perhaps? So maybe you tell another and they still just sit there, expressionless?

Perhaps this has never happened to you. Something just like it though happens to every author who writes a column in a newsletter and asks for readers to provide feedback (did you like it, if not why not, and what would you like covered ?) and gets absolutely zilch.

Everybody at some time or other must have read an article in IT (or any other publication) and thought of replying, and then forgotten about it.

This is therefore a plea on behalf of all IT authors who ask for replies from possible readers; I speak from experience when I say that it does get extremely depressing and disheartening when you spend hours on an article, ask for comments/opinions/any kind of response, and get bugger all.

How about replying once in a while when an author says "Please write with your questions/comments to  $\dots$ "? There is a good chance that YOUR opinion could change the course of a series. The individual does matter, and authors do take note of what readers say — when they bother to say anything.

Of course, the respondent who says "what a bunch of crap, why do you bother?" is not being constructive, and no author in his/her right mind would give up on the strength of just one opinion like that.

But someone who writes to let an author know of grey areas which have been missed, or possible major errors in a piece, is doing everyone a service, not just the author. Even just letting the author know that you liked the piece, a sort of "keep up the good work", is a really good tonic.

So think about it. But don't let me know what you think.

Write to the author instead...

It has just dawned on me that I have overlooked something important. You may remember many moons ago, when we were young, that I launched a competition to find out what daft things Users could fit to the initials OTIU. STEPHEN SHAW came up with the most obscure entries, and won by a head. However, shame on me, I have failed to award him the fabulous prize of a jelly (flavour of his choice).

In the meantime he has beaten me to the start of the next competition, one to find the most obscure thing that fits the letters ITUG...

It's INTERJACENT TRIVIUM of USUFRUCTUARY GRAVAMEN in case you hadn't guessed...

Apologies to Stephen, and what flavour did you prefer again ?

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One of the topics which was to have been aired in this issue, and now probably won't because of space (or lack of it) was covered in some part by Stephen in the current issue of TI\*MES.

It concerns the ALGERIA\_F font file on one of the RLE disks, although Stephen was covering the use of an INSTANCE and how it can be converted to a FONT. I hadn't pursued the font/instance/slide format far enough to realise that they were related. Interestingly, ALGERIA\_F defines a space not as 1,1,23 and then 0,0,0,0,0,0,0 but as 3,4, and then a whole block of 0s!

Anyway, I will try and get something slotted in to the March issue, which should have a hardware single-stepper feature in it, to whet your appetites. Further articles (from the list of outstanding items) will follow in due course.

A long time ago I mentioned the use of INT(.5+...) as a method for rounding up or down when dealing with non-integer values. However, what I forgot was the effect that .5+... has when dealing with NEGATIVE values. In that case you need to use INT(-.5+...). Confusing, innit?

I have been dipping my fingers into all sorts of projects over the last year, most of which have not seen the light of day. At some stage I will try my hand at explaining FRACTAL GRAPHICS, GRAFTALS, PSEUDO-RANDOM NUMBER GENERATION (which is linked to an article in this issue) and part of which looks at other ways of creating random numbers - have you tried dividing 1 by 1.997 lately ? - CORE WAR, BASES AND OFFSETS, DATA PACKING, more on SORTING & SEARCHING, GRAPH SCALING, THE GAME OF LIFE (did you know that some clever clogs implemented it on dear old Multiplan ?), TILE GRAPHICS (some examples of which were printed in last month's issue - what am I saying, the January issue is coming out THIS month!), CASSETTE FILE HANDLING IN TI BASIC, EMULATING RECURSION (and TURTLE GRAPHICS) IN BASIC, more on ENHANCED BASIC, and much more.

TONY BOWDEN needs help with screen dumping to his printer. He would like to dump RLE images to his Tandy printer, and he has a suitable machine code patch already written, but does anyone have the source code to MAX/RLE or know how he might insert a detour into his screen dump patch? Contact me in the first instance and I will put you in touch.

The news on the BULLETIN BOARD front (i.e., the modem-based system, not the page of Sales in each issue) is looking up. GORDON PITT has been working on the software, and from what he has seen the program suite looks very good indeed. I am indebted to STEPHEN SHAW for the details in the first place. Some further work needs to be done on the hardware side before the WEST MIDLANDS TIBBS goes on the air, but it looks as though the effort will have been worth it.

The ITUG TIBBS will come into operation once trials of the system have

been completed.

In the meantime we await TECHIE by MONTY SCHMIDT, which seems to have been subjected to delay also.

THE BLOXWICH WORKSHOP IS ON! Gordon has a date for the next Workshop: SATURDAY, MARCH 28TH. FOR FULL DETAILS CONTACT GORDON ON 0922 476373. Or, if the phones are out, write to him at 259 SNEYD LANE, BLOXWICH, WALSALL, WEST MIDLANDS, WS3 2LS. Please include an SAE for reply.

I said that I'd look at the prospect of publishing a bumper annual of TI-LINES, and so I have. So far, without detailed cross-referenced indexes, volume 1 would be about 360 pages, and volume 2 about 340.

As there are so many pages, the format would have to be A4 rather than A5, which doubles the cost of reproduction (I can get the equivalent of 4 A4 pages in an A5 format, but only 2 in an A4 format). This still puts the cost at around £20 for the volume including post and packing, and would entail a large amount of work in preparation — I can't just bang the whole lot into the photocopier.

As the reduction copied volume works out at around £16 (depending on volume) this doesn't seem much of a good idea.

Printing selected articles is even more difficult: I would have to cut and paste rather than just copy; many articles have errata mentioned in other, unrelated articles; and how do I decide which articles should be included? They all have value to one reader or another, which puts me back in the "can't please 'em all" rut again.

I did consider possibly reprinting selected articles on request, but ran into a brick wall: without a detailed cross-reference how do potential readers decide which article to ask for, and without doing a massive amount of work cross-referencing all errata I can't hope to provide a useful fault-free service. If you've never tried writing a detailed index, you can have no idea of the enormity of the task - especially as we are now into the tail-end of volume 3, so you can add another 360 pages to the 700 already available, all of which make some mention of each other from time to time.

I could publish the titles of all the articles which have ever appeared, but I have looked at them and many do not indicate their content (which may be varied).

The end result is the coward's way out (and also the way out for the Editor with no time to do the work!): I have decided to preserve the status quo, so each volume will continue to be available on its own, or as individual issues. The cost will be £16 for the 14 issues of volume 1, £14 for volume 2, and when it finishes, volume 3 will also be £14.

Individual issues will be  $\pounds 2$  each, regardless of size (which ranges from 16 pages to 60).

All prices are inclusive of post and packing, and because of the cost

involved, will only be produced to order.

I am still trying to find time to put together a comprehensive list of all my holdings - both software and literature as well as minor items of hardware (like the RS232/PID modification to "true" Centronics). I have already promised to provide at least two ITUGers with a full data sheet, and to them my sincere apologies. For once, time seems to be, catching up with me (or maybe it's old age) - either way, it's in the pipeline and will appear as soon as humanly possible.

I have been sent a copy of a Swedish newsletter by ITUGer PETER ODELRYD (see also LETTERS) which looks very impressive. As Peter says, he works in the typesetting industry so he can make use of the equipment for his newsletter, which would otherwise be too expensive to produce.

I have noticed, though, that quite a few of the European newsletters are of very high presentation quality, and number of the other overseas periodicals appear to be produced by people with access to the better equipment. Certainly in some cases the size of the groups means that they can afford the benefits of bulk printing, but alas until ITUG can get over the 2000 mark it will not see typeset output in the same way that the others do (I can get the original masters typeset if I have more than 500 subscribers, and then photocopy at the normal rates, but even that is a long way off yet).

If I can get a decent enough copy from the originals, there should be a page of photographs taken at the first Bloxwich Workshop by BRENDA NOELL and passed to me by SCOTT and JO ANN COPELAND. If the photocopies don't come out too well, don't blame me.

I should also be able to feature a better set of photos of the Cologne-based group with whom we now have links. I would hope that the next Bloxwich Workshop would provide an opportunity for almost everyone to get their mugs in shot somewhere...

Coming up: in the next issue, space permitting, you should find a crossword for Adventure buffs, and a Word Search, both provided by SCOTT and JO ANN COPELAND. COLIN HINSON promises a short piece on how to build a hardware single-stepper, and all being well I should be able to feature one of several other hardware articles which have been in proofing for a while now.

Thanks to GORDON PITT and TREVOR DAVIES, ITUG and WMTI should now be found on the pages of CEEFAX and ORACLE, and possibly also PRESTEL and MICRONET. The Bloxwich Workshop should also appear there, and we hope to see it presented in MICROMART and PERSONAL COMPUTER WORLD. If all goes well, 1987 should see continued growth of ITUG and associated groups.

#### LETTERS

I received a letter from Swedish ITUGer PETER ODELRYD which might be of interest:

"I work in the typesetting industry. Much of the text we set comes in from word processors and personal computers of different kinds. For it to be possible for us to read disks produced by a wide range of machines we bought a special computer from a British company, Intermedia, which can convert between different formats. About 400 different formats are available, and the number increases with every program released.

Among the formats which are not present (and which probably never will be) is of course the 99/4A. But that poses no great problem. The machine can dump text from any soft-sectored disk (which is what the TI produces), although the file must be contiguous for a sector dump to be successful. This means that I can take a disk from my 99/4A, transfer it to the Intermedia machine, enter the number of tracks, sides used, single or double density, and then dump the text onto a Winchester disk. After that I can write a translation table and convert the text for sending over a link to the phototypesetting system.

From there it is easy to continue to work with the text, putting in the codes for the desired fonts and so on. But, I never need to retype the text! Of course, it is possible to send the text over a telephone link using a modem instead, but the advantage of dumping the disk is that I can use all the codes from the word processing program — such as underlined text (which I convert to italics), paragraph indents, tabs, superscripts, and so on. Most of these codes would be lost over the modem if you tried sending it to another system.

I remember Peter Brooks mentioning that he hired a dedicated word processor for writing his book a few years ago. I think that the TI could have been used to write that book, or at least that it should be possible to do so today.

Of the word processing programs available, I think that Companion is by far the best and easiest to use. It doesn't allow right margin justification, or running heads, but for writing something that is to be typeset, it must be near perfect. It uses INT/VAR 254 files, which means that it fills the sectors almost entirely (perfect for dumping sectors to another system). Companion needs an article all to itself, so I will not write further about it here. Of course, TI-Writer could be used in almost the same way, but if anyone plans to write a book which is going to be printed, I think that using Companion and sending the disks to a typesetter via Intermedia is a very good alternative."

Comment: my initial manuscript for MTT covered 5 disks of DSDD 80T format on the system hired for me by the publisher. At that time, it would have required at least 20 TI disks, and possibly 40 if I'd used a standalone drive controller (which is only single-sided unless you use the modification about to be published), so it wasn't a viable choice.

## ADVENTURE HELP

by SCOTT and JO ANN COPELAND

Most of us are fortunate enough to have disk capability and fully enjoy the advantage of playing INFOCOM Adventures. Now, we all know there's nothing better; however, some only have the capability of enjoying the Scott Adams series due to system set-ups. That's why I try to treat both types of Adventures in the Hints columns. An Adventurer is an Adventurer, no matter what kind they are playing, and even the best of us get stuck somewhere once in a while! And PLEASE - you CAN write in with questions, or if you are at the stage of a complete mental collapse - call in to the Adventurer's Hot Line (the number was included in a previous column if you caught it). Careful thought will be given to misleading you completely! So, without sufficient questions. WYSIWYG - hope it helps!

ZORK I- Gaining entrance to the kitchen from behind the house starts off an Adventure of a lifetime where you can either go up to the attic or down through the living room. Beware the Troll! I killed him right off although my counterparts say they weren't as lucky! The cellar entrance starts off your Underground experience - one you won't forget for a long time to come!

The Loud Room is loud for a reason - water is rushing overhead. Working with the Dam Lobby Maintenance Room bubble helps, or typing the word for what happens in the Loud Room is as easy.

Your rope helps you gain entrance to the Temple - not only does the Altar give you some important items, saying a prayer might help too!

The Black Book solves your problems entering the Land of the Dead. Read all the accessible pages to see the answer (and there is more than one page to read).

The Basket in the shaft room helps you along the way - use it to hold your items when going into the mine area. Also, try working with the coal in the machine room.

By the way, do Bats like garlic? // Have you tried 'waving' any of your treasures? One should remind you of something else!!

The Cyclops just might be hungry - no less thirsty if you feed him the wrong thing! Saying the right word might get him to make a way through the Strange Passage area.

Meanwhile, Ulysses and I are going out for a cup of coffee! Maybe we'll take a ride in our boat and check out a buoy.

ZORK II- It took me a while to get my 200 Zorkmid bills in this one - no less getting out with the portrait of J. Pierbont Flathead. The Bank and the Safety Depository lead your way to these! Try entering the curtain or walking through the walls - yes - it works. You'll sooner or later find the vault.

Collect all three spheres to make the black one - that old Wizard won't bother you for the rest of your tour while holding it. Saves time and points. Find the red, blue and crystal one and unite them through the Pentagram Room.

The Carousel Room provides eight different exits — and until you turn it off you'll have a time getting where you're going! Work with the robot in the Machine Room up from the Circular Room. He'll help you on your way. Remember the "Frobozz Magic Well Company" gives you transport.

The oddly angled room is a pip! Think of a baseball field and try some different directions. You should go from a dimly glowing field to a brightly glowing one. The dog kennel will help you get by the Cerberus.

{Er, what's a baseball field look like ? Baffled Baldie}

When you're going up in your balloon there's more than one pit-stop. Treasure will be found at each. It's as easy to come down as it is to go up! You might try checking some books out at the library - they hold more than words!

Let the dragon help you get past the ice room - he'll reveal an exit west to the lava room. The dragon also gives you passage to find the "lady" who helps the unicorn deliver its appropriate item to you.

ZORK III- And a big "Frotz Ozmoo" to you too! This Adventure has a maze that will take you at least 53 moves to get through (Don't waste the book where you think it goes - 'cause it doesn't go there!). Have fun in the Royal Puzzle - it's a royal pain in the \*\*\*!

7 points in this game - (1) Taking the Amulet; (1) Taking the key; (1) Getting the sword; (1) Going down the rope; (1) Taking the ring; (1) Taking the book; (1) Stabbing the 'figure' for the first time. After these points, you have at least another hour's play to end the Adventure.

Use the chest in the Beam Room - Push the button in the Button Room. Inside the Mirror Room - work with the Grip and the panels to get you on your way. Eventually you will need to use the Vial you got from the Sailor at Flathead Ocean. Look for the ship and say the appropriate words. Zork I had them! (Although you never used them.)

The Scenic Vista is more scenic than it seems. Try working with the table - it holds the secret. Four places to see - one to die! Each has something you'll need but one!

The Gold Machine can transport you where no man has gone before. (Sorry Captain Kirk). Your documents hold the year you have to visit.

The temporary Dungeon Master helps you on the Parapet. Have him do your button-pushing while you investigate other areas there. Visit the Prison Cell while you're there. Soon you'll find your way to the "Treasury of Zork" containing precious jewels, mountains of zorkmids, rare paintings, ancient statuary, and beguiling curios.

Remember, in this Adventure - COLLECT everything you see that the "starting figure" has, which will include the book, staff, key, ring, cloak, etc.

Scott Adams Series - Adventure No. 13 - SORCERER OF CLAYMORGUE CASTLE

I feel very odd! // Great! I'm dragon fodder! // I'm de-moated in the field! // Blub! // @ ! @ % \* (expletive deleted) lava! // ARGH! I drown! Asthma you know.

Number of Verbs: 106
Number of Nouns: 108
Number of Treasures: 13 Stars
Length of Nouns/Verbs: 5

Getting into the Castle is not as hard as it seems — Ali Baba had it figured out — you can either cast a spell or do it an easier way to save a spell for later (you'll need it). Try the moat!

The Plain room is not as plain as it seems. Work with the walls and the floors to see where you can go. Adventure tactics help if you 'examine' them, 'feel' them, etc.

An entrance lies from the Ballroom - try looking up! A spell and the chandelier help here.

Savage Island I fans know that swimming helped - holding your breath helped even more. Swim up, swim down, and maybe down again?

I bet none of you knew you could go through a kitchen drain, did you?

Get that blissful feeling to cross an otherwise hot area. You'll feel better for it!

Meet the dragon for an otherwise uneventful day. He's hiding something you need. Something in the Dusty Room takes care of him real quick like!

Spells: Seed, Permeability, Bliss, Methuselah, Firefly, Dizzy Dean, Lycanthrope, Wicked Queen's, Yoho, (YOHO?). Am I in Pirates Island again??!!!

For Adventure Help - write in or call: Scott or Jo Ann Copeland

P. O. Box 5927 RAFL Lakenheath Brandon, Suffolk IP27 9PN

#### BULLETIN BOARD

WANTED / 4 SALE / WANTED / 4 SALE / WANTED / 4 SALE / WANTED / 4 SALE /

SCOTT and JO ANN COPELAND still have two Adventures up for sale:

ZORK II and ZORK III, both at \$20 each.

Drop a line to the Copelands at PO BOX 5927, RAF LAKENHEATH, BRANDON, SUFFOLK, IP 27 9PN  $\,$ 

Non-ITUGER TOM HENSON, of 31A ALBERT AVENUE, CARLTON, NOTTINGHAM, on 0602 873805, has a system for sale. It comprises a console, PEB with 32K card only, Extended BASIC, MiniMemory, Household Budget, Personal Record Keeping, and about two dozen Adventure and Games modules and tapes plus the TI cassette recorder.

It's all in mint condition, and he is asking around £250 for the lot.

JIM BALLINGER is selling a standalone 32K ( $\rlap/$ 45) and an ALPHACOM 42 printer with TI interface, RS232-compatible interface, and five rolls of paper (£65).

Prices are inclusive of post, packing, and insurance, or alternatively the buyer may collect.

Contact me on Oxford 0865 510822 in the first instance.

#### POETRY AND PROSE

A preliminary excursion into computer-generated poetry and prose

PETER BROOKS

Good reading: PERSONAL COMPUTER WORLD, December 1986. Pp 182 - 184
ARTIFICIAL INTELLIGENCE: LITERARY CHOICE by DAVID LEVY

This article is intended to stimulate a little thought, and hopefully a lot of activity, among those who like to investigate some of the more esoteric aspects of Computing.

The equipment needed consists of a minimal set-up, i.e. console only. If you have TEII and Speech Synthesiser (or Synthesiser, Extended BASIC, a disk system, and TEII-on-disk), then you might consider amending the examples so that the 4A speaks aloud the "words" it generates.

This article is one that I had intended to write ages ago but never found time for one reason or another. It's really just a taste — or a teaser — designed (hopefully) to spur some of you on to greater things. Ideally you should be able to follow, and build on, the principles shown here, even if you have only a few months computing behind you.

We'll begin by examining exactly how the computer might be programmed to generate letters of the alphabet.

To simplify matters, we'll exclude punctuation, and, for this first example, even the "space". All characters will be in upper case ("true" capitals) to make the presentation consistent.

What we need are the letters A to Z, to be selected at random and printed on the screen, one after another. (You may modify the output to be sent to a cassette or disk file or perhaps a printer if you want the results to be preserved...). This first example is too long to be sent to the TEII as a "single" word!

There are a couple of obvious routes, both of which involve the use of the RND function. Either: we could set the 26 letters of the alphabet up in a single string variable, and then use RND to generate a whole number (integer) between 1 and 26, and then use that with SEG\$() to extract a single letter, which could then be printed on the screen using a "pending PRINT" (achieved by using a trailing semi-colon after the expression in the PRINT statement); or: we could make use of the fact that the letters A to Z have a "contiguous" ASCII range of 65 to 90 inclusive, and thus generate an integer (using RND) between 0 and 25 (the "offset") and add it to 65 (the "base"), converting the result to an alphabetic character (by using CHR\$()), and PRINTing to the screen as outlined earlier.

The second technique is easier, so we'll use that for now, but later the first technique will come into play for non-contiguous ranges (contiguous meaning, essentially, adjacent).

```
100 CALL CLEAR
110 PRINT CHR$(65+INT(RND*26));
120 GOTO 110
```

Once you RUN this, you will need to BREAK with FCTN 4 in order to stop the process.

Depending on your native language, you may recognise occasional words (or near words) but it's a fair bet that largely you'll see garbage, and few "words" will be over four letters in length.

We could insert spaces at random or at regualr intervals in this stream, and see what effect they have. More often than not, a recognisable word will be split by such a space into two unrecognisable words, but that's the luck of the draw!

Inserting a space at regular intervals is easy. Using the example above, it becomes:

```
100 CALL CLEAR
110 FOR LOOP=1 TO 5
120 PRINT CHR$(65+INT(RND*26));
130 NEXT LOOP
140 PRINT " "; (or PRINT CHR$(32); if you like!)
150 GOTO 110
```

This example breaks up the garbage into fixed 5 letter words. You might like to try other lengths, by simply altering line 110. The variable LOOP is called an INDEX or counter — it doesn't actively participate in the process of selecting a number/letter.

This example CAN be modified to send the words via TEII to the Speech Synthesiser. There are a number of different ways of doing it, and I could easily get bogged down in explaining them, so I will leave it up to you to decide on a method for yourselves. Of course, if someone does want that side of it explaining as well, please make your voice heard.

You might like to explore the effect of varying the maximum size for the loop and to observe the resulting frequency of "recognisable" words.

It would be helpful if the computer generated exactly the same series of numbers with RND each time — and up to now, it would do. Later, if you get more deeply involved, you might want to compare the effect of varying the spacing and the resulting frequencies all in one program, without having to restart the program every time in order to get the same series of numbers. This is a job for RANDOMIZE with a "seed", but I won't cover its use here unless someone specifically requests the information.

This again is fairly easy - but it will have an effect on the numbers being generated. The reason for this is that RND will be used once at the start of each loop, and will thus remove one letter every so often from the list you have seen previously. It should not prove to be an important factor in the long run, though.

Instead of using a "constant" - 5 - as a loop maximum, we'll use an "expression". If we set a maximum word length of 6 letters and a minimum of 1, we can use the expression INT(RND\*6)+1 to generate integers  $\dot{}$  to 6 (you may have used this to simulate the throw of a single dice).

The program therefore changes to:

```
100 CALL CLEAR

110 FOR LOOP=1 TO INT(RND*6)+1

120 PRINT CHR$(65+INT(RND*26));

130 NEXT LOOP

140 PRINT " ";

150 GOTO 110
```

Again, this can be modified appropriately for spoken output (or printed, for that matter).

So far, the "text" we have been generating is mindless, without rules governing its production. You will have come across words of the form PGGXR which, while they might mean something in an obscure Aztec dialect or slang Martian, don't have much relevance for English. Bear in mind also that any attempt at pronunciation by TEII and Speech Synthesiser will be governed by rules for pronunciation of American English, which differs in many respects from British English.

What we need to do now is to apply some constraints to the random production - a set of primitive rules.

An elementary rule might consist of dividing the alphabet into two groups: Vowels and Consonants (where Y can be considered only as a vowel for the moment), and selecting one from each to make up words with even lengths, up to a maximum of, say, ten letters.

As the two groups, vowels and consonants, do not consist of simple ranges of ASCII codes, the first technique mentioned at the beginning of this article can now be brought into play.

We could also employ yet another method — assigning the respective vowels and consonants to two string arrays, when the RND function can be used to point to the element number of each array.

For simplicity's sake I will stick to the use of string variables with SEG\$().

We can assign the vowels to, say, V\$ thus:

```
V$="AEIOUY"
```

and the consonants to C\$ thus:

C\$="BCDFGHJKLMNPQRSTVWXZ"

Once more, a choice is available: do we begin each "word" with a vowel, or with a consonant? We can try both, by simply swapping the V\$ and C\$ used in the example below:

```
100 CALL CLEAR
110 V$="AEIDUY"
120 C$="BCDFGHJKLMNPQRSTVWXZ"
130 V=LEN(V$)
140 C=LEN(C$)
150 FDR LODP=1 TO INT(RND*5)+1
160 PRINT SEG$(V$, INT(RND*V+1),1);
170 PRINT SEG$(C$, INT(RND*C+1),1);
180 NEXT LOOP
190 PRINT " ";
200 GOTO 150
```

A couple of points to note here: I have used the variables V and C to denote the lengths, in characters, of V\$ and C\$ respectively so that V\$ and C\$ can be altered without requiring further changes to the listing.

To alter the type of generation - making it consonant first instead of, as it is here, vowel first, you simply alter V\$, V, C\$, and C in 160 and 170. Again, this program can be modified to allow output to TEII.

Depending upon the arrangement of lines 160, 170, this program produces words of the form SOBADOGA or OCACIXEX. The smallest word will be two letters long - perhaps IN, IN, AT, DD, SD, HI - while the longest will be ten letters and probably totally unrecognisable - BUT ... you (and the TEII) will be able to pronounce them.

You might choose to restrict still further the choice of letters involved in the process of generation, by removing some of the least-commonly used letters, like Q, X, Z, and possibly Y. This will remove some of the more extreme examples from the Aztec Thesaurus, and may improve the noises coming from the Speech Synthesiser if you are using it.

Alternatively (or additionally) you might choose to ADD to the lists in  $\mathbb{C}^{\$}$  and  $\mathbb{V}^{\$}$ . How, you might ask, can you add to lists which already contain all of the available alphabet ?

You simply add more of the same. For example, the letter E is supposed to be the most commonly-occurring in "average" English (as opposed to specialised text/speech, where words not normally in everyday use may be involved), so you could alter V\$ to become "AEEEEIOU" and thus increase the chances of E being selected by RND.

Equally, you could use "AEIEOEUE", which has the same number of Es, but with a different distribution. I leave you to debate the pros and cons

of methods of adding to the list. You might also consider peppering the consonant list with one or two selected vowels, to get EE, IE, or OO cropping up as well (but not II or UU or AA - I know that words like vacUUm and others do exist, but you'll more likely see ESIIOX than VACUUM!).

It is worth pointing out that all of these methods here have a weak point (well, one among many): they all rely on the assumption that the RND function is unbiassed - that is, it generates all numbers equally.

However, this is not the case, as you will see (I hope) when I finally get round to publishing an article on PSEUDO-RANDOM NUMBERS later this year, if I can find the time to write it.

At this point I will stop. I have, I hope, given you something to think about. If no-one comes forward with a follow-up article (or articles), I will chip in with a couple exploring the production of even more recognisable words and perhaps sentences, and even perhaps a program to generate "haiku" verse (three line verse in which the lines are five, seven, and five syllables long).

I haven't mentioned how you might apply these techniques to the production of computer-generated music using CALL SOUND()...

100 DEM - 200050 TOP		500 BBBUB 7550
100 REM GA0060 TSC		520 GDSUB 3580
110 CALL CLEAR		530 CALL CHAR(107, "181818FFF
120 DIM S\$(20,20)		F181818")
130 FOR A=0 TO 16 STEP 8 140 CALL CHAR(112+A,"7EFFFFF		540 CALL CHAR(108, "181818181 8181918")
FFFFFFFE")		550 CALL CHAR(109, "000000FFF
150 CALL CHAR(113+A, "807F07F		F")
FF8E0CO")		560 CALL CHAR(99, "0000001F1F
160 CALL CHAR(114+A, "01FE98E		181818")
0")		570 CALL CHAR(100, "1818181F1
170 NEXT A		F")
180 S(1)=20		580 CALL CHAR(101, "1818181F1
190 GOSUB 3530	i	, F181818")
200 PRINT TAB(14); "BY": TAB(1	ם	590 CALL CHAR(102, "181818F8F
0);"ALAN GEDRGE"::TAB(10);"U		8181818")
PDATED BY":TAB(9);"JOHN LARR	-	600 CALL CHAR(103, "000000F8F
ISON"::::	IJ	8181818")
210 PRINT " SPACE-IF NO MOV	_	610 CALL CHAR(104, "181818F8F
E":" REDO-NEW GAME"	0	8")
220 PRINT TAB(3); "ENTER COLO		620 CALL CHAR(105, "181818FFF
R TO START:":	0	j F")
230 PRINT TAB(3); "A-M/GREEN"	-	630 CALL CHAR(106, "000000FFF
, "B-L/GREEN": TAB(3); "C-D/BLU	IJ	F181818")
E", "D-L/BLUE": TAB(3); "E-D/RE		640 CALL HCHAR(11,6,121)
D", "F-CYAN"	•	650 CALL HCHAR(11,7,122)
240 PRINT TAB(3);"G-M/RED"," H-L/RED":TAB(3);"I-D/YELLOW"	D	660 CALL HCHAR(11,30,113)
,"J-L/YELLOW":TAB(3);"K-D/GR		670 CALL HCHAR(11,31,114) 680 FOR A=11 TO 23 STEP 2
EEN", "L-MAGENTA":::	3	690 CALL HCHAR(5, A, 106)
250 FOR A=2 TO 28 STEP 3		700 CALL HCHAR(21, A, 105)
260 CALL HCHAR(1, A, 112)		710 CALL HCHAR(5, A-1, 109)
270 CALL HCHAR(1, A+1, 120)		720 CALL HCHAR(21, A-1, 109)
280 CALL HCHAR(1, A+2, 128)	_	730 NEXT A
290 CALL HCHAR (23, A+2, 112)	Γ	740 FOR A=7 TO 19 STEP 2
300 CALL HCHAR(23, A+1, 120)		750 CALL HCHAR(A, 9, 101)
310 CALL HCHAR(23, A, 128)	H	760 CALL HCHAR(A, 25, 102)
320 NEXT A		770 CALL HCHAR(A-1,9,108)
330 FOR A=2 TO 21 STEP 3	Ø	780 CALL HCHAR(A-1,25,108)
340 CALL HCHAR(A, 2, 128)	•	790 NEXT A
350 CALL HCHAR (A, 29, 112)	4	800 FOR A=7 TO 19 STEP 2
360 CALL HCHAR(A+1,2,120)	'	810 FOR B=11 TO 23 STEP 2
370 CALL HCHAR(A+1,29,120)		820 CALL HCHAR(A, B, 107)
380 CALL HCHAR(A+2,2,112)	н	830 CALL HCHAR(A-1, B, 108)
390 CALL HCHAR(A+2,29,128)		840 CALL HCHAR(A,B-1,109) 850 NEXT B
400 NEXT A 410 FOR A=1 TO 3	Z	860 NEXT A
420 CALL KEY(0, COL, B)	į	870 FOR A=5 TO 21 STEP 2
430 IF (COL (78) - (COL) 64) THEN	0	880 CALL HCHAR(A, 24, 109)
440 ELSE 470		890 NEXT A
440 ON A GOSUB 3740, 3780, 382		900 FOR A=9 TO 25 STEP 2
0		910 CALL HCHAR(20, A, 108)
450 NEXT A		920 NEXT A
460 GDTD 410		930 CALL HCHAR(5,9,99)
470 Q2=10		940 CALL HCHAR(5,25,103)
480 CALL CLEAR		950 CALL HCHAR(21,9,100)
490 W2=6		960 CALL HCHAR(21,25,104)
500 GOSUB 3140		970 S\$(4,5)=CHR\$(36)
510 S(1)=0		980 S\$(5,4)=CHR\$(36)
·>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	>>>>>	>>>>>>> MORE>

```
1550 IF W2>19 THEN 1330
990 S$(4,4)=CHR$(35)
                                              1560 W2=W2+2
1000 S$ (5,5) =CHR$ (35)
1010 CALL HCHAR (12, 18, 112)
                                             1570 W=W+1
                                             1580 CALL HCHAR (W2-2, 8, 32)
1020 CALL HCHAR (14, 16, 112)
                                             1590 GOTO 1240
1030 CALL HCHAR (14, 18, 120)
                                             1600 IF Q2>23 THEN 1330
1040 CALL HCHAR(12, 16, 120)
1050 CALL SCREEN(COL-62)
                                             1610 Q2=Q2+2
                                             1620 Q=Q+1
1060 CALL COLOR(11,2,1)
                                              1630 CALL HCHAR(4, Q2-2, 32)
1070 FOR A=13 TO 16
                                              1640 GOTO 1240
1080 CALL COLOR(A, 2, 10)
                                              1650 IF Q2(11 THEN 1330
1090 NEXT A
                                              1660 02=02-2
1100 CALL COLOR(12,16,1)
1110 CALL COLOR(9,2,1)
                                              1670 Q=Q-1
                                             1680 CALL HCHAR(4, Q2+2, 32)
1120 CALL COLOR(10,2,1)
                                              1690 GOTO 1240
1130 CALL COLOR(1,16,1)
                                              1700 IF S$(W.Q)=CHR$(35)THEN
1140 CALL CHAR (33, "183C7EBDF
F247EA5")
                                              1710 IF S$(W,Q)=CHR$(36)THEN
1150 Q=Q2/2-4
1160 W=W2/2-2
                                              1720 FOR Z=1 TO 8
1170 S(1)=2
                                              1730 IF S$(W-Z,Q)=CHR$(D)THE
1180 5(2)=2
                                              N 1740 ELSE 1760
1190 D=36
                                              1740 NEXT Z
1200 F=35
                                              1750 GOTO 1850
1210 09=0
                                              1760 IF Z=1 THEN 1850
1770 IF S$(W-Z,Q)=CHR$(F)THE
1220 6=120
1230 FOR A=1 TO 2
                                              N 1780 ELSE 1850
1240 CALL HCHAR (4, Q2, 33)
                                             1780 FOR Z=1 TO 8
1250 CALL HCHAR (W2, 8, 33)
                                              1790 IF S$(W-Z,Q)=CHR$(F)THE
1260 GOTO 1330
                                              N 1850
1270 FOR X=1 TO 10
1280 IF X/2=INT(X/2)THEN 131
                                              1800 S$(W-Z,Q)=CHR$(F)
                                             1810 CALL HCHAR(W2-Z*2, Q2, G)
                                              1820 GDSUB 3660
1290 CALL SDUND(10,220,0)
1300 GOTO 1320
                                              1830 L9=L9+1
                                              1840 NEXT Z
1310 CALL SOUND (10, 110, 0)
                                             1850 FOR Z=1 TO 8
1320 NEXT X
                                              1860 IF S$(W+Z,Q)=CHR$(D)THE
1330 CALL KEY (O, KEY, STATUS)
                                             N 1870 ELSE 1890
1340 IF STATUS=0 THEN 1420
1350 IF KEY=69 THEN 1500
1360 IF KEY=88 THEN 1550
                                              1870 NEXT Z
                                              1880 GOTO 1980
                                              1890 IF Z=1 THEN 1980
1900 IF S$(W+Z,Q)=CHR$(F)THE
1370 IF KEY=68 THEN 1600
1380 IF KEY=83 THEN 1650
                                              N 1910 ELSE 1980
1390 IF KEY=32 THEN 2800
                                              1910 FOR Z=1 TO 8
1400 IF KEY=13 THEN 1700
                                              1920 IF S$(W+Z,Q)=CHR$(F)THE
1410 IF KEY=6 THEN 3360
                                             N 1980
1420 CALL JOYST (A, Y, X)
                                              1930 S$(W+Z,Q)=CHR$(F)
1430 IF X=4 THEN 1500
                                              1940 CALL HCHAR (W2+Z*2, Q2, G)
1440 IF X=-4 THEN 1550
                                              1950 GDSUB 3660
 1450 IF Y=4 THEN 1600
                                              1960 L9=L9+1
1460 IF Y=-4 THEN 1650
1470 CALL KEY (A, KEY, STATUS)
                                              1970 NEXT Z
                                              1980 FOR Z=1 TO 8
 1480 IF KEY=18 THEN 1700
                                              1990 IF S$(W,Q+Z)=CHR$(D)THE
 1490 GOTO 1330
                                              N 2000 ELSE 2020
 1500 IF W2 (7 THEN 1330
                                              2000 NEXT Z
 1510 W2=W2-2
                                              2010 GOTO 2110
 1520 W=W-1
                                              2020 IF Z=1 THEN 2110
 1530 CALL HCHAR(W2+2,8,32)
                                              2030 IF S$(W,Q+Z)=CHR$(F)THE
 1540 GOTO 1240
```

N 2040 ELSE 2110	2490 NEXT Z
2040 FOR Z=1 TO 8	2500 FOR Z=1 TO 8
2050 IF S\$(W,Q+Z)=CHR\$(F)THE	2510 IF S\$(W-Z,Q-Z)=CHR\$(D)T
N 2110	HEN 2520 ELSE 2540
2060 S\$(W,Q+Z)=CHR\$(F)	2520 NEXT Z
2070 CALL HCHAR (W2, Q2+Z*2, G)	2530 GOTO 2630
	2540 IF Z=1 THEN 2630
2080 GDSUB 3660	2550 IF S\$(W-Z,Q-Z)=CHR\$(F)T
2090 L9=L9+1	
2100 NEXT Z	HEN 2560 ELSE 2630
2110 FOR Z=1 TO 8	2560 FOR Z=1 TO 8
2120 IF S\$(W,Q-Z)=CHR\$(D)THE	2570 IF S\$(W-Z,Q-Z)=CHR\$(F)T
N 2130 ELSE 2150	HEN 2630
2130 NEXT Z	2580 S\$(W-Z,Q-Z)=CHR\$(F)
2140 GOTO 2240	2590 CALL HCHAR (W2-Z*2, Q2-Z*
2150 IF Z=1 THEN 2240	2,6)
2160 IF S\$(W,Q-Z)=CHR\$(F)THE	2600 GOSUB 3660
N 2170 ELSE 2240	2610 L9=L9+1
2170 FOR Z=1 TO 8	2620 NEXT Z
2180 IF S\$(W,Q-Z)=CHR\$(F)THE	2630 FOR Z=1 TO 8
N 2240	2640 IF S\$(W+Z,Q+Z)=CHR\$(D)T
	HEN 2650 ELSE 2670
2190 S\$(W,Q-Z)=CHR\$(F)	2650 NEXT Z
2200 CALL HCHAR (W2, Q2-Z*2, G)	2660 GOTO 2760
2210 GOSUB 3660	
2220 L9=L9+1	2670 IF Z=1 THEN 2760
2230 NEXT Z	2680 IF S\$(W+Z,Q+Z)=CHR\$(F)T
2240 FOR Z=1 TO 8	HEN 2690 ELSE 2760
2250 IF S\$(W-Z,Q+Z)=CHR\$(D)T	2690 FOR Z=1 TO 8
HEN 2260 ELSE 2280	2700 IF S\$(W+Z,Q+Z)=CHR\$(F)T
2260 NEXT Z	HEN 2760
2270 GOTO 2370	2710 S\$(W+Z,Q+Z)=CHR\$(F)
2280 IF Z=1 THEN 2370	2720 CALL HCHAR(W2+Z*2, Q2+Z*
2290 IF S\$(W-Z,Q+Z)=CHR\$(F)T	2,6)
HEN 2300 ELSE 2370	2730 GDSUB 3660
2300 FOR Z=1 TO 8	2740 L9=L9+1
2310 IF S\$(W-Z,Q+Z)=CHR\$(F)T	2750 NEXT Z
HEN 2370	2760 IF L9=0 THEN 1270
2320 S\$(W-Z,Q+Z)=CHR\$(F)	2770 GOTO 2920
	2780 L9=0
2330 CALL HCHAR(W2-Z*2, Q2+Z*	2790 09=09+1
2, G)	2800 IF A=1 THEN 2960 ELSE 3
2340 GOSUB 3660	010
2350 L9=L9+1	
2360 NEXT Z	2810 CALL HCHAR(10,6,32,2)
2370 FDR Z=1 TD 8	2820 CALL HCHAR(10, 6, ASC(SEG
2380 IF S\$(W+Z,Q-Z)=CHR\$(D)T	\$(STR\$(S(1)),1,1))
HEN 2390 ELSE 2410	2830 IF S(1)(10 THEN 2850
2390 NEXT Z	2840 CALL HCHAR (10, 7, ASC (SEG
2400 GOTO 2500	\$(STR\$(S(1)),2,1)))
2410 IF Z=1 THEN 2500	2850 CALL HCHAR(10,30,32,2)
2420 IF S\$(W+Z,Q-Z)=CHR\$(F)T	2860 CALL HCHAR(10,30,ASC(SE
HEN 2430 ELSE 2500	G\$(STR\$(S(2)),1,1)))
2430 FOR Z=1 TO 8	2870 IF S(2)(10 THEN 2900
2440 IF S\$(W+Z,Q-Z)=CHR\$(F)T	2880 CALL HCHAR (10, 31, ASC (SE
HEN 2500	G\$(STR\$(S(2)),2,1)))
2450 S\$(W+Z,Q-Z)=CHR\$(F)	2890 IF 09)59 THEN 3280
2460 CALL HCHAR(W2+Z*2,Q2-Z*	2900 NEXT A
	2910 GOTO 1230
2,G)	2920 S\$(W,Q)=CHR\$(F)
2470 GDSUB 3660	2930 CALL HCHAR(W2, Q2, G)
2480 L9=L9+1	2300 CALL HUMAN WE, WE, UT
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	>>>>>> MORE>

2940 S(A)=S(A)+1	3350 IF B()1 THEN 3340
2950 GOTO 2780	3360 FOR A=10 TO 24 STEP 2
2960 D=35	3370 FOR B=6 TO 20 STEP 2
2970 F=36	3380 CALL HCHAR(B, A, 32)
2980 G=112	3390 NEXT B
2990 CALL COLOR(1,2,1)	3400 NEXT A
3000 GOTO 2810	3410 FOR A=1 TO 8
	3420 FOR B=1 TO 8
3010 D=36	
3020 F=35	3430 S\$(A, B)=" "
3030 G=120	3440 NEXT B
3040 CALL COLOR(1,16,1)	3450 NEXT A
3050 GOTO 2810	3460 GOTO 970
3060 DATA 0,0000000000000000000000000000000000	3470 REM "OTHELLD" CHAR'S
,010101,00030F1F1F3F3F3F,3F3	3480 DATA 0,0000000000000000
F3F3F3F3B39, 39393 <b>939393B3F</b>	3490 DATA 0100030303030303,F
3F, 3F3F7F7F7F7F7F	FOOFEFE06464646, 9F80BFBF8383
3070 DATA 3F3F1F1F0F0F0707,0	8383, FC04F5F101414141, E120A3
707070707070707, 070707070707	A3A3BB83FF, CF405F5F585B585F
0703, 030303030202, 00007EFFFF	3500 DATA FC04F5F101F909D1, E
FFFFFF, FF4D018182B24438	020A0A0A0A0A0A0, 1C0434343434
3080 DATA 0C86C3E0F0F8FCFE,F	3434,0300070706060606,FF01FD
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	FDODADADAD, 030303030303
FFFF, FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	3510 DATA 46467606FEFE, 83838
· · · · · · · · · · · · · · · · · · ·	3838303, 414141414101, FF83A3A
E3E1E0E0E0, E0E0C0C0C0C0C0C	
3090 DATA COCOCOCOCOCO, 80C	3A383,5F585B585F1F,C101FD05F
OFOF8FCFC, 000000000004080, 0	5F1, AOAOBF80FEFE
, OOOOOOBOCOCOGOFB, FCFCFCF8FB	3520 DATA 3434B7B0BF3F,0606F
FOEOEO, 80C0F0FFFF3F07	616D7C7, 8D8DEDODFDF
3100 REM CHAR 84	3530 RESTORE 3480
3110 DATA 80808080C0E0F0F8,F	3540 FOR A=136 TO 159
CFEFFFFFFFF7F3F, 1F0F07070707	3550 READ A\$
0707,07070707070F1F	3560 CALL CHAR(A,A\$)
3120 DATA 1F2F070301,0,0,0,0	3570 NEXT A
0000000000000F, FEFCC, 0, 0000	3580 N=137
0080C0E0E0E0, E0E0C0C0C0C0CCC	3590 FOR B=2 TO 3
0,000000000000000	3600 FOR A=12 TO 22
3130 DATA 000080C0E0F0	3610 N=N+1
3140 RESTORE	3620 CALL HCHAR(B+S(1), A, N)
3150 FOR A=58 TO 98	3630 NEXT A
3160 READ A\$	3640 NEXT B
3170 CALL CHAR(A, A\$)	3650 RETURN
3180 NEXT A	3660 CALL SOUND (-100, 200, 30,
3190 N=58	200, 30, RND*1500+110, 15, -4, 0)
3200 FOR V=3 TO 6	3670 IF A=2 THEN 3710
3210 FOR B=7 TO 16	3680 S(2)=S(2)-1
3220 N=N+1	3690 S(1)=S(1)+1
	3700 RETURN
3230 CALL HCHAR(B, V, N)	
3240 CALL HCHAR (B, V+24, N)	3710 S(1)=S(1)-1
3250 NEXT B	3720 S(2)=S(2)+1
3260 NEXT V	3730 RETURN
3270 RETURN	3740 CALL COLOR(11,6,1)
3280 FOR A=1 TO 30	3750 CALL COLOR(12,10,1)
3290 CALL COLOR(11, 16, 1)	3760 CALL COLOR(13, 11, 1)
3300 CALL COLOR(12, 2, 1)	3770 RETURN
3310 CALL COLOR(11,2,1)	3780 CALL COLOR(11,10,1)
3320 CALL COLOR(12,16,1)	3790 CALL COLOR(12,11,1)
3330 NEXT A	3800 CALL COLOR(13,6,1)
3340 CALL KEY(0, A, B)	3810 RETURN
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	>>>>>>> AND MORE

3820 CALL COLOR(11,11,1) 3830 CALL COLOR(12,6,1) 3840 CALL COLOR(13, 10, 1) 3850 RETURN

Formatted listing produced partly by a program kindly provided by JIM PETERSON of TIGERCUB SOFTWARE.

#### MULTIPLAN TUTORIAL

MULTIPLAN MANIA by BRENDA J. NOELL

CHAPTER 3: ENTERING FORMULAS

Reload your SPENCER file by Pressing T (Transfer), and selecting L (Load), type in SPENCER and press  $\operatorname{ENTER}$ .

You will need to expand your worksheet to include the following:

Material \$ 4000.00 Labour \$ 7000.00 Overhead \$ 4000.00

Total Costs \$15000.00

It is logical to place Material, Labour and Overhead between Cost and Gross Profits. Place your cell pointer at R6C2. To insert empty rows or columns use INSERT. Press I. Press ENTER since it is Row that you want. Multiplan assumes you want to insert 1 row of space before row 6 through all columns. We need to add at least 5 rows to allow enough space, so let's add 7. Press 7. Press ENTER. Type Material in R6C1, Labour in R7C1, Overhead in R8C1 and Total Costs in R1OC1. Place 4000 in R6C2, type 7000 in R7C2, and 4000 in R8C2.

You now have 2 rows showing Total Costs so you will need to Blank the number in R5C2. The worksheet will be clearer if Cost is left as a major title in column 1, but you want the number to appear next to Total Costs. Go to R5C2. Press B. Press ENTER.

BUILDING A FORMULA-place the cell pointer at R10C2. You could just type in \$15000.00 since you know that is the answer, but you need a formula to work for other months, too, so that you don't have to calculate them yourself. We know that Total Costs is equal to Material (four rows above Total Costs) + Labour (3 rows above Total Costs) + Dverhead (two rows above Total Costs). To execute this we Press = or V. Move the cell pointer up 4 rows to R6. (Watch the formula on the command line. RC-4JC tells Multiplan to go up 4 rows to find a value.) Press +. (Cell pointer moves back to original position). Move cell pointer to R7. Press +. Move cell pointer up to Overhead. Your formula should look like this: VALUE:RC-4JC+RC-3JC+RC-2JC. Press ENTER. You should see \$15000.00 appear in R10C2.

When a formula does not give a row or column number it means "this" row or column. The dollar format selected in Chapter 2 automatically gives you 2 decimal points. You have to change the format to alter this.

STATUS LINE: CELL CONTENTS-If a formula is too long to be shown on the status line, use Edit to place the formula in the command line.

The status line shows what is contained in the active cell. While the active cell may display \$15000.00, the status line will tell you that a formula governs that cell. The value may change, but the formula will remain constant. Try changing the value of Materials. Move cell pointer to R6C2. Type 6000. Press ENTER and watch the value change. Change it back to 4000.

DRAWING LINES-to make the worksheet easier to read we can add a line, using dashes to separate the subcategories from Total Costs. Move the cell pointer to R9C2. Press A (Alpha). If you tried to enter the dashes with the Value command press CTRL C to cancel. Type 9 dashes. Press ENTER.

Transfer Save your worksheet until you are ready for Chapter 4: Naming Cells and Copying.

CHAPTER 4: NAMING CELLS AND COPYING

Reload your file. Press T. Press L or ENTER. Type SPENCER. Press ENTER.

TITLES-You need to identify the columns by months, so let's put the names of the months across the top of the worksheet. Place the cell pointer at R1C2. Press A. Type January. Press the right direction key to move the cell pointer to R1C2, and Type February. Continue in this manner until December. Remember that moving the cell pointer automatically enters the word and places you in the ALPHA/VALUE: command each time you press a direction key to enter data. There is no meed to press ENTER each time. Press ENTER after the last title and return to the main command menu.

FORMAT: ALIGN CENTRE-Because they are text, the months are aligned to the left in the "General" format. Let's centre the names of the months over the columns. Place the cell pointer at R1C2. Press F. Press C. Since it would be easier to format the whole row instead of each cell individually, let's do so. Press CHARACTER FORWARD (CTRL 4) to move the cursor to R1C2. Delete the C2 from the cell reference, using BACKSPACE (FCTN 9). The R1 stays. (The same with C1 would mean to format all of column 1.) Press TAB (CTRL A). Type C (Centre). Press ENTER. The names are now all centred over the columns.

COPY RIGHT COMMAND-The figures entered are only for January. Copy the January figures into the rest of the months. To copy SALES into the next 11 months, move the cell pointer to R3C2. Press C. Choose R. Type 11, for the number of times you want R3C2 copied. Press ENTER. Press PAGE RIGHT (CTRL D) to look at the next months. To copy a group of cells such as R6 through R1O in column 2, place the cell pointer at R6C2. Press C. Press R. Leave the 11 that was placed there the last time. Press TAB (CTRL A). Press: Press DOWN until the cell pointer is at R1OC2. Press ENTER and then PAGE RIGHT.

NAMING CELLS-Multiplan has a way to name groups of cells so that you can refer to them easily. You can name a whole row such as Row 3; you can name it SALES, meaning the whole line of numbers showing sales. When naming a group of cells, make the name continuous; do not use spaces or hyphens.

To build a formula for GROSS PROFITS, you must first name the groups of cells that contain sales and total cost figures. These names will then be used to make your formula. We'll start by naming row 3 SALES. Move the cell pointer to R3C1. Press N (Name). Press TAB (CTRL A). Press the RIGHT direction key (now you should be at R3C2.) Press :. Press the RIGHT direction key until you are at R3C13 (DECEMBER). You should see-----to refer to:R3C2:R3C13. Press ENTER. You could have typed 13 after the colon instead of moving the cell pointer if you knew which cells you needed to compose into a group. Now Name the group of cells that defines TOTAL COSTS. Move the cell pointer to R10C1. Press N. The range is the same as in SALES so just Press ENTER. Multiplan changes any spaces in titles to underlines and deletes any illegal characters in titles when they are being defined as names. The titles are not affected. Do the same for MATERIAL, LABOUR and OVERHEAD. Move the cell pointer to the title. Press N. Press ENTER. If you forget which cells a name refers to Press N, then RIGHT direction key and step forward through the list of names. Press CANCEL (CTRL C) to return to the regular command line.

BUILDING A FORMULA USING NAMES-Consider that GROSS PROFITS is SALES minus TOTAL COSTS. Now build the formula. Place the cell pointer at R15C2, next to GROSS PROFITS. Press =. Type SALES. Press -. Type TOTAL\_COSTS. Press ENTER and your formula is complete. Look at R15C2. Multiplan calculated the formula and placed the results in the cell. Copy this formula to the right 11 times. Press C, R, 11, ENTER.

GOTO NAME COMMAND-Named cells are easy to locate with GOTO. Press G. Choose Name by pressing N or ENTER. Type SALES (you can use the direction keys to "step through" the list of names. When you come across the name you want, press ENTER). Press ENTER. Your cell opinter has moved to the first cell in the SALES area. The cell pointer always goes to the first cell in the named area. The only way to remove a name is to define it as blank. So, to remove Sales, press N, then the RIGHT direction key until SALES appears, then TAB (CTRL A). Press the DELETE key (FCTN O) to erase the row and column numbers to which SALES refers. You should press the CANCEL (CTRL C) key now because you do not want to remove the SALES, you'll need to redefine SALES as referring to R3C2:13 before continuing.

NUMBER SIGNS (#)-When numbers are too large to be shown #'s will appear. So, let's widen the column. Use the FORMAT WIDTH command. Press F, W, 15. ENTER. You should now see \$24000.00 in R3C14.

ERROR VALUES-Let's undefine SALES. Press N, RIGHT direction key until SALES appears, TAB (CTRL A), DELETE key (FCTN O). Press ENTER and the

name SALES no longer exists. Notice that R3C14 changes to #NAME?. This means that Multiplan came across a name that is not defined. Now redefine SALES to refer to R3C2:13. Press N. Type SALES, then press ENTER. The value \$24000.00 reappears. Other error values are #DIV/O!, #N/A, #NULL!, #NUM!, #REF!, and #VALUE!.

RELATIVE REFERENCES AND ABSOLUTE REFERENCES—When you refer to cells by row and column (R3C2, R2C14:12) numbers, you are using absolute references. When using + or - a number of rows (RI-4JC) you are using relative references. First we need to edit the formula in R3C14. Right now it contains SUM (Sales). Because names are defined by absolute references, SALES is handled the same as an absolute reference. You need to change SALES to relative references. Move the cell pointer to R3C14. Press E (Edit). BACKSPACE (FCTN 9) TO ERASE THE "SALES)" leaving Sum. You should see SUM(. Press LEFT direction key until you get to R3C2. You will notice Multiplan added the reference to the formula. Press: Press the LEFT direction key until you reach R3C13. Press). Press ENTER. The total of R3 appears under SUM. Now you can use the same formula to calculate the sums for TOTAL COSTS and GROSS PROFITS by copying the formula.

COPYING A FORMULA: THE COPY COMMAND-Press C, F (From). Multiplan will propose that you copy from the active cell, which is what you plan to do. Press TAB (CTRL A). The response in "to cells" isn't correct. Press the DOWN direction key until the cell pointer reaches R10. R10C14 is one of the cells to receive the formula. The other is R15. Since they are not next to each other you can't use a range. Instead, you need to make a list of cells. To make a list, use the comma. Press, (Comma). Press DOWN direction key until you get to R15. Press ENTER and watch the numbers appear in rows 10 and 15.

Save your work. Goto R3C2. Place storage disk in drive 1 and Press T, S, ENTER.

See you next time for CHAPTER 5: WINDOWS, COPYING FORMULAS, and OPTIONS and CHAPTER 6: PRINTING A WORKSHEET.



by JO ANN COPELAND

Graphics by SCOTT COPELAND and (who else?)

Well, I think I put my foot in my mouth last article and advised that artwork could be accomplished with the Control U Special Character Mode in TI-Writer/Funlwriter files. I think I also advised I would give an example of this (next time I watch what I write!). With apologies beforehand to all the experts out there, I'm going to give some short examples of less-than-expert graphics, etc. Cringe!

TT

TI

TI

TI

TI

Now, on to graphics - since we're talking about the Texas Instruments Computer, let's attempt to make something look like the Texas Instruments Symbol.







Now, the way we do this is something else. It involves (in my case, anyway) working with a grid and drawing in what I would hopefully like to get to print out! Using my Gemini 10X book and the Special Character Mode Commands, I set out to go crazy for about an hour. What I first have in hand is my Firing Code Pin Chart Graph, as shown.

Firing Codes	Rough Sketch	THIS IS A 7-bit INTERFACE EXAMPLE
	1 2 3 4 5 6 7 8	
		On an 8 X 8 grid, shade in the
64	1,	areas which will make your design.
32		•
16	3000	An 8-bit Interface will be shown
8	4 0 0 0 <b>2 2</b> 0 0 0	later (I use either but 7-bit can
4	5000	be easier).
2	6000	
1	7 0 0 0 2 0 0 0 0	
not used	8 0 0 0	NOT USED on a 7-bit Interface

The first sketch, when printed out, should be a Capital "T". Column 1 shows blocks 64 and 32 used. 64 plus 32 equals 96. That means we want the printer head to hit 96 — or character code 96 will be used. Column Two (starting at top and counting downwards) shows 64 and 32 — again 64 plus 32 = 96. Column Three the same. Column Four, however, shows us using 64 + 32 + 16 + 8 + 4 + 2 + 1 which should equal 127 - or character code 127. Same for Column Five. Columns 6, 7, and 8 again show 96.

In the graph we found Column 1 added up to 96 - character code 96 is the 'grave' or ('). Columns 2 and 3 also added up to 96. Columns 4 and 5 added up to 127 - my character 127 is the DEL which has no visible character, so I will Transliterate 126 ( $^{\sim}$ ) to equal 127 to make it so.

If we were to go into a TI-Writer/Funlwriter file, we would do this: FIRST — set up our Transliteration commands. First line, .TL 126:127 as discussed above. Then we will have another — .TL 42:17 (read on). At the beginning of another new line we go into Control U Special Character Mode. Press keys Control and U. See your blinking, underlined cursor? Okay, then press keys Function R — Escape. You should see on screen a "small b" with a little line in front of it —

#### For Example: 'b

Exit Control U mode by pressing CTRL U again. Type in a Capital K which tells the printer to open GRAPHICS mode. Type in Shift 8- and then return to Control U Mode to press the Shift 2 keys.

Shift 2 should look like:  $^{\circ}$  The asterisk will be transliterated to equal 17 (thus our second transliteration command) because we will have 17 characters across. Shift 2 ( $^{\circ}$ ) means we have less than 256 characters to print (null over 256). That sets us up to start typing in the graph characters we did above. You should have a new line with four characters on screen — now press the following keys: grave, ('), grave, grave, tilde, ( $^{\sim}$ ), tilde, grave, grave, grave, (hold this spot for later as we will be adding some more characters).

Now, our next graph shows our Capital "I" to end our little "T I" we're making. Let's see it on our graph:

1 2 3 4 5 6 7 8  64 1 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Firing Codes				ou Ska	-	ch					
32			1	2	3	4	5	6	7	8		
	64	1								•		
8	32	2								=		
4 5 0 0 0 <b>0 0</b> 0 0 0 0 0 0 0 0 0 0 0 0 0 0	16	- 3										
2 6	8	4										
	4	5			0							
	2	6										
	1	7								-		

not used 8000000000 NOT USED on a 7-bit Interface

We see here we have in Column 1 the addition of 64 + 32 + 2 + 1 = a total of 99. Column 2 and 3 are also 99. Columns 4 and 5 equal 127 (64+32+16+8+4+2+1). So character code 99 is my lower case 'c' and my character code 127 is still the DEL so we still Transliterate 126:127 to show the tilde ( $^{\sim}$ ) to equal code 127. So, go back to where you had your 4 characters, the (3) graves, (2) tildes, (3) graves, and add the following:

Enter Control U Mode
Shift 2 ( ) (means "nothing" - leaves a space)
Exit Control U Mode
three 'lower-case' c's
two tilde (~)
three 'lower-case' c's
Press Enter

What you should see, if you print this out, is the following:

#### TI

Type it again on the next line, indenting your typing — and get it again (only moved over) (or use CTRL 5 to duplicate your line and then reformat it):

TI

#### TI

Well, whether or not it was worth the effort is up to the individual! This was a short example, and just the start of what you can accomplish when you really get into it! And to confuse everyone, I'll show an example of an 8-bit Interface grid.

Firing Codes	Rough Sketch Th	HIS IS AN 8-bit INTERFACE EXAMPLE
	12345678 Dr	n this 8 X 8 grid you will add ALL
128	1	
64		ne numbers going down in a column.
32	3 0 0 0	
16		28+64+32+16+8+4+2+1 = 255
8	5 0 0 0 <b>2 2</b> 0 0 0	
4	6 0 0 0 11 11 0 0 0	(character code 255)
2	7	
1	8	
not used	9 0 0 0 0 0 0 0 0 \\\\\(\)	OT USED on an 8-bit Interface

In this case, using an 8-bit Interface, Column 1 would equal character code 195 (128+64+2+1). Column 2 and 3 the same. Column 4 and 5 would equal 255. So, instead of using the character codes as shown on the 7-bit Interface grid, you would instead use these character codes.

An 8-bit Interface grid is best used when writing programs in Basic. You will find, using this grid, that you may have more Transliterations than you can handle - and it can be more annoying than useful!

Now, there are easier ways of just emphasizing letters — CTRL U is most helpful in graphics mode. So, why not wrestle with this for a while and I'll sign off with a migraine headache and the following:

### EMPHASIZED PRINT MODE HAPPY VALENTINE'S DAY

## HAPPY VALENTINE'S DAY PETER !!!

AND TO ALL OF MY FELLOW TI'ERS !!!!!

"BYE FOR NOW.. HAVE FUN!

#### GOLLY I'M GLAD THIS IS OVER!

AAGH!!
TECHNICAZ PROBLEMS
PREVENT PUBLICATION
OF THOSE PHOTOGRAPHS!!

#### THE TIHOME SOFTWARE COLLECTION

Pricing for TSC disks has been reorganised, although the full Collection is still offered at £35 inclusive.

Check the TSC Catalogue (available free to ITUG subscribers on request) to find out what the TSC entries stand for. Make sure that you indicate clearly what your choice is, specifying the name of the disk/s you want.

GAMES:	TSC ENTRIES:	PRICING
TSC_DSK_A TSC_DSK_B TSC_DSK_C TSC_DSK_D TSC_DSK_E TSC_DSK_E TSC_DSK_F	GA0001 - GA0011   GA0012 - GA0022   GA0023 - GA0032   GA0033 - GA0043   GA0044 - GA0055   GA0056 - GA0066   GA0056 - GA0066	The number of programs on a disk can vary between about 7 and 11, dependent upon the sizes of the programs in terms of sectors used.  The exception is the DEMONSTRATION disk, which alone is offered at £2.95 inclusive of post and packing
TSC_DSK_G TSC_DSK_H	ED0001 - ED0009   ED0010 - ED0017	The rest are priced as follows:
DEMONSTRATION:		2 3.95 for ANY 1 DISK 2 6.90 for ANY 2 DISKS (SAVE £ 1) 2 9.85 for ANY 3 DISKS (SAVE £ 2)
TSC_DSK_I	DE0001 - DE0006	£12.80 for ANY 4 DISKS (SAVE £ 2) £14.75 for ANY 5 DISKS (SAVE £ 5) £16.70 for ANY 6 DISKS (SAVE £ 7) £18.65 for ANY 7 DISKS (SAVE £ 9)
TSC_DSK_J TSC_DSK_K TSC_DSK_L	MU0001 - MU0009   MU0010 - MU0017   MU0018 - MU0026	£20.60 for ANY 8 DISKS (SAVE £11) £22.55 for ANY 9 DISKS (SAVE £13) £24.50 for ANY 10 DISKS (SAVE £15) £26.45 for ANY 11 DISKS (SAVE £17)
UTILITIES:	1	£28.40 for ANY 12 DISKS (SAVE £19) £30.35 for ANY 13 DISKS (SAVE £21)
TSC_DSK_M TSC_DSK_N TSC_DSK_D TSC_DSK_P	UT0001 - UT0011   UT0012 - UT0022   UT0023 - UT0033   UT0034 - UT0044	£32.30 for ANY 14 DISKS (SAVE £23) £34.25 for ANY 15 DISKS (SAVE £25) £35.00 ENTIRE (SAVE £27.20)

All programs are recorded on Single-sided disks.

You may elect to be supplied with software on Double-sided disks, when you should deduct  $\pounds 1$  from the prices shown above.

If you prefer, you may send in your own disks, in which case deduct 50p for each disk from the prices shown above.

For example, 8 disks supplied by you would work out at £20.60 -  $(8 \times 50p = £4) = £16.60$  nett.

All the above prices are inclusive of post and packing.

The pricing for programs recorded on cassette remains &1 per program, with an overall charge of 65p for post and packing.

PLEASE MAKE ALL CHEQUES PAYABLE TO "PETER BROOKS"

\_\_\_\_