

NCCN

506

NORTHWEST COMPUTER CLUB NEWS

BOX 242, RENTON, WA 98055

2-12

DECEMBER 1977

MEETINGS

The Northwest Computer Society meets at the Pacific Science Center, in Seattle, on the first and third Wednesday of each month at 7:30PM. The first meeting of the month is usually held in room 200, behind the Lasarium ticket booth and to the right. This meeting is usually more formal with a featured speaker or a demonstration. The second meeting of the month is usually held in the math room, down the stairs at the south side of the arched fountain. This meeting is usually more informal with freewheeling discussion and problem solving. Below are some of the things planned for the next few months.

Roy Gillette
Program Manager
524-0596 (evenings)

7 DECEMBER ROOM 200-202 7:30PM

PLASMA TERMINAL by Magnavox. Larry Chernis will demonstrate this flat screen CRT that can include slide projection through the rear. Elections and Annual meeting have been rescheduled for January.

21 DECEMBER MATH ROOM 7:30PM

General Meeting

4 JANUARY ROOM 200-202 7:30PM

OUTSIDE WORLD CONNECTIONS What can you connect to your personal computer both for practical purposes and just for fun? John Marshall will show and tell us. ELECTIONS for sure this time. The slate of candidates are shown in this issue. ANNUAL MEETING Our Attorney will be present to present our articles of incorporation..

18 January MATH ROOM 7:30PM

General Meeting

The next meeting of the ACM (Association for Computing Machinery) local chapter should be of interest to us. Details are below:

SPEAKER: John Birdleough, Byte Shop, Bellevue
TOPIC: Microsystems
DATE: Thursday, December 8, 7:30PM sharp
LOCATION: Byte Shop, 14701 NE 20th, Bellevue
DINNER: 5:45PM, Saratoga Trunk, 2239 148th NE

SCIENCE CIRCUS

26 DECEMBER - 2 JANUARY

The Science Circus is an annual event of the Pacific Science Center. Dozens of displays and exhibits are setup throughout the Science Center for thousands of families to see. This year there will be an exhibit of personal computers and time sharing terminals for the public to see. Northwest Computer Society members will be on hand to help operate the equipment and answer questions. We hope to arouse enough curiosity about personal computing that people will want to attend the personal computing fair scheduled for April.

FAIR

8-9 APRIL 1978

THE FIRST NORTHWEST PERSONAL COMPUTING FAIR (if you can think of a better name let us know). This fair is sponsored by The Pacific Science Center and The Northwest Computer Society. Every local manufacturer and dealer of personal computing products, calculators, TV games, and other micro-processor based consumer products, will be on hand to demonstrate their wares. Members of the Northwest Computer Society will be on hand, demonstrating the favorite things they like to do with their own personal computer systems. This will be a non-technical fair, designed primarily for public interest. Bob Wallace is managing booth registration, John Marshall is managing publicity. For more information contact either. Should be a lot of fun.

21-22 OCTOBER 1978

THE SECOND NORTHWEST PERSONAL COMPUTING FAIR (Again, if you can think of a better name let us know). This fair is sponsored by The Northwest Computer Society and will be held at the Seattle Center. We expect to have the manufacturers and dealers on hand again (How else do we finance these events. Besides we all have an interest in the latest gizmo.) But, this fair will be riddled with technical seminars and featured speakers. If things work out, there will be a swap fest too.

CONTEST

This is an experiment designed to build up the Northwest Computer Society software library and to increase the availability of software to all computer hobbyists. If the concept works out expect to see more, concurrent, contests.

WHAT TO ENTER:

1. any program
2. in assembly language
3. written for any 8 bit microprocessor (if other than 8080, 6502, Z-80, or 6800 be prepared to supply your own hardware.)
4. 2K bytes or less of object code

HOW MUCH: \$7.00 entry fee. Now why should I submit a program that I have spent a great deal of time on and have to pay money on top? Read on!

EVERYBODY WINS: Each entry will receive a choice of 10 submitted programs on paper tape or cassette.

EVERYBODY JUDGES: By choosing your 10 programs you will be voting for the programs. The 10 programs receiving the most votes, authors will receive Grand Prizes (to be determined, perhaps TI Programmers).

EVERYBODY ELIGIBLE: This contest open to anyone. No restrictions.

DEADLINE FOR ENTRY: 23 September 1978

WINNERS ANNOUNCED: 21 October 1978

SEND FOR DETAILS TO: SOFTWARE CONTEST
Northwest Computer Society
PO Box 242
Renton, WA 98055

Include a stamped self addressed business envelope.

Many of the "buzzwords" of the computer hobby revolve around number systems. When you read the magazines or attend meetings, terms like "split octal", "hex address", "opcode", etc. are all around. Why are these items important, and what do they mean?

To begin with, if you are doing your programming exclusively in BASIC and never have to deal with a front panel with a big row of switches and lights, there is little need to get mixed up with number systems; you can do it all in good old decimal. My guess is that in a few years most hobbyists will be in this position. I can recall an old friend who worked on one of the first transistorized computers at Lincoln Labs in Boston around 1957. He was doing machine-language programming in Octal. The 'pros' have come a long way since then, and the hobbyists are following in their footsteps - but at a faster pace, since they don't have to invent computing, they merely have to make it cheap.

Base n - I assume that everybody has heard of the New Math enough to know that number systems have bases. The Decimal system uses Base 10. One can invent number systems that have any desired base, i.e., 7 or 11 or 2744. The base simply put, is the number of different characters in the number system. Digital computers use circuits that have two states (on/off, high/low); the binary system which also has two states (1/0) is fundamentally related to the way computers work.

Numbers can be used in two ways: for counting and for mathematics. Numbering, or identifying an item by a unique numerical label, is part of counting. I am largely planning to consider counting functions here, and let mathematics go with the understanding that you can do math in any number system.

Numbering is quite important when dealing with computers. The central processor of a computer has certain built-in capabilities from which the programmer selects in order to get a desired result. We tell the processor "do thing no. 5"; if it is an 8080 chip, thing no. 5 means "subtract 1 from the value in the B register". For convenience we also assign a short letter code, "DCR B", for this function. We have an Opcode (5), a mnemonic (DCR B), and an explanation for each function. In a similar manner, characters to be printed are numbered. The ASCII code is merely a table assigning certain numbers to the characters this code can express.

Let's see how the first sixteen numbers look in Binary (Base 2), Octal (Base 8), Decimal (Base 10), and Hexadecimal, or Hex (Base 16):

BINARY	OCTAL	DECIMAL	HEX
0	0	0	0
1	1	1	1
10	2	2	2
11	3	3	3
100	4	4	4
101	5	5	5
110	6	6	6
111	7	7	7
1000	10	8	8
1001	11	9	9
1010	12	10	A
1011	13	11	B
1100	14	12	C
1101	15	13	D
1110	16	14	E
1111	17	15	F

Notice that in Binary we use only the numbers 0 and 1, in Octal we use the numbers 0-7, and in Hex we must invent six new numbers. Our old computer friends, IBM, set the de-facto standard of using the first six letters for them.

We know computers deal with two states that can be represented by the Binary digits 1 and 0. They are also designed to operate at one time with a fixed-length group of binary digits, called a "word". Most microcomputers use a word of 8 digits, or "bits", also called a "byte". An 8-bit binary number can have 256 distinct states (00000000 binary equals 0 decimal, and 11111111 binary equals 255 decimal). The memory of a computer is an extremely important part; to find anything in it, you have to specify a location, or "address". Most microcomputers use a 16-bit address that can express 65,536 locations.

Communicating With the Computer - Our task, then, is to give the computer Opcodes, ASCII characters, memory addresses, and other data in a form that it will understand and that is also comprehensible to us. With a fast computer, plenty of memory, and a fancy operating system we need only use an ASCII terminal to communicate in terms of alphabetical characters and decimal numbers. The operating system or the high level language takes care of all translating into the terms the computer needs. Again, the professionals work this way, but many hobbyists are still in the dark ages.

So we are frequently faced with giving the computer an 8-bit opcode such as 10101111, or an address such as 0000110111101000. How jolly. We could manually convert these numbers to decimal, but not many people can do this quickly, in their heads. What to do?

Octal, Split Octal, and Hex - Even a simple person, such as me, can memorize the eight things necessary to convert between binary and octal (0=0, 1=1, 10=2, 11=3, 100=4, 101=5, 110=6, 111=7). Let's add leading zeros to make each octal digit stand for three binary digits (000=0, 001=1, 010=2, 011=3). Now the monster 10101111 becomes 257. ("That requires nine bits, not eight", you say. Well, yes, but we can let the first octal digit represent binary 00 to 11). Alternatively, we can learn the 16 things necessary to convert between binary and hex, and our 10101111 neatly becomes AF.

The reason we care so much about a numbering system that is easily converted to binary is that front panel with all the switches and lights. If you are using the switches to enter a program, you must ultimately set eight switches in a binary bit pattern to enter one byte. If you are debugging a program, you examine places in memory (by entering the 16-bit address as a binary bit pattern) and receive an output of eight lights lit and dark in a binary bit pattern. So you need a convenient numbering system that works better for you than a long string of 1's and 0's but which is easy to convert to and from a bit pattern.

What about those 16-bit addresses? They are easy in Hex, because four digits express them quite neatly. Often a space is inserted between the first two digits and the second two. Thus our 0000110111101000 address becomes 0DL8 or 0B F8. Since the Octal representation does not come out even at 8 bits or 16 bits, the most common means of writing a 16 bit address in Octal is called Split Octal: each 8 bit byte is given separately. Point off the 16 bits as follows: 00 001 101 11 101 000 Then convert each group to Octal, with a space in the middle: 015 350.

You will see both Hex and Split Octal notations in the literature, so it is probably necessary to be able to handle both. My Altair front panel is marked for Octal and I find eight conversions easier to remember than 16 so I use Octal by preference. But there is enough software around using Hex that I can't ignore it..and Hex certainly is shorter and neater.

RENEW

As January is the start of a New Year so is January the start of a new club year. Our Mailing list file will be completely purged and will be rebuilt according to renewals. There are three types of membership available, one of them applies to you. Kindly follow the appropriate instructions outlined below:

EXCHANGE: If you exchange club newsletters with us kindly fill in the card as appropriate and return it promptly. Send no money.

COMPLIMENTARY: If you have been receiving complimentary copies of the newsletter and would like to continue receiving the newsletter, you must fill in the card as appropriate. In the comments section indicate why you should receive the newsletter (magazine, industry, important person in personal computing, etc.) and of what use the newsletter is to you.

REGULAR MEMBER: Regular members should fill in the card as appropriate and return it promptly along with a check for \$7.00. Members with less than six issues of NCCN Volume 2 and do not want back issues may renew their membership for half price, \$3.50. If you have back issues missing, indicate which ones in the comments section. I will try supply them as quickly as possible. You must renew membership even if you joined only last week. I know it seems kind of unfair.

SEATTLE

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TACOMA

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SUPPLIES

**Hours: Tues., Weds., Thurs. 12 to 6 / Friday 12 to 8
Saturday 10 to 5 — and by appointment**

GROUP BUY

I have been talking about another memory group purchase for several months. Vendors from AMD to Zilog had to be negotiated with. No puns intended but the memory market is extremely volatile; monthly advances in technology, new products announced each week, rumors, price changes, shortages, announced parts that aren't "real" yet, allocated parts. Sorting it all out is a real hassle. I know that some of you are running out of patience, but I've been trying to put together the "Best" memory at the lowest possible price.

The "Best" memory is at least a controversial subject. Members have indicated an interest in all three types of memory. So, I have decided to do a group buy with four different chips and boards. Each chip type that receives orders for 1000 or more pieces will be followed through. Any chip that does not get orders for 1000 pieces will be dropped, and your money refunded. The four offerings are:

S-100 RAM

- 1A. 4K FULLY STATIC RAM IC
structure: 4Kx1 18 pin DIP
access time: 250ns
cycle time: 250ns
power: +5V @ 35ma
price: \$9.25 each
- 1B. 16K BYTE FULLY STATIC RAM BOARD
uses chips above (32)
price: \$350.00 each
- 2A. 4K CLOCKED STATIC RAM IC (NEC uPD410)
structure: 4Kx1 22 pin DIP
access time: 200ns
cycle time: 350ns
power: +12V @ 200ua/50ma
+5V @ 10ma
-5V @ 100ua
price: \$8.25 each
- 2B. 16K CLOCKED STATIC RAM BOARD
uses chips above (32)
price: \$315.00 each
- 3A. 4K DYNAMIC RAM IC
structure: 4Kx1 16 pin DIP
access time: 200ns
cycle time: 320ns
power: +12V @ 0.7ma/24ma
+5V @ 10ua
-5V @ 5ua
- 3B. 16K BYTE DYNAMIC RAM BOARD
USES CHIPS ABOVE (32)
price: \$170.00

- 4A. 16K DYNAMIC RAM IC
structure: 16K1 16 pin DIP
access time: 200ns
cycle time: 320ns
power: +12V @ 1.2ma/53ma
+5V @ 10ua
-5V @ 1ua
price: \$25.00
- 4B. 64K (65,536) BYTE DYNAMIC RAM BOARD
uses chips above (32)
price: \$830.00

BUZZ WORDS

fully buffered inputs, tri-state outputs, silk screened, solder masked, low power, plated through holes, zero wait states, memory protect, able to bank switch or shadow boot, Z-80 at 4MHz, sockets for all chips.

FINE PRINT

1. This group buy is open to members of the Northwest Computer Society and to any computer society that the Northwest Computer Society (NCCN) regularly corresponds.
2. You may specify a preference order for chips or boards. To insure that you get in on the buy even if your preferred memory is cancelled. Supply enough money to cover the most expensive memory you desire. Excess money will be refunded.
3. If the buy is cancelled your money will be refunded.
4. If you want your order promptly acknowledged enclose a stamped self addressed business size envelope.
5. If you live in Washington State add 5.4% sales tax to your order.
6. If you want the memory shipped to you add \$5.00 for packing materials, postage, and insurance.
7. Deadline for ordering is January 16, 1978. This allows time for other clubs to make announcements at their meetings as we well as put a notice in their newsletters.
8. The memory will be delivered before March 3, 1978.
9. If memory prices drop between now and January 16, 1978 you will receive a refund. *I'm sure they will by at least 10%*
10. Make checks payable to NWCS GROUP BUY.
11. If you have questions send them with a stamped self addressed envelope.
12. Assembled and tested boards will be available for \$50 additional each.

NAME: _____

STREET: _____

CITY: _____ STATE: _____ ZIP: _____

please print.

TAPE HERE

TAPE HERE

COMMENTS:

FOLD HERE

**NCCN
BOX 242
RENTON, WA 98055**

FOLD HERE

ITEM	DESCRIPTION	QUANTITY	EACH	COST	CODE
1A	4Kx1, 250ns STATIC RAM IC		9.25		
1B	16Kx8 STATIC RAM BOARD		350.00		
2A	4Kx1, 200ns CLOCKED RAM		8.25		
2B	16Kx8 CLOCKED RAM BOARD		315.00		
3A	4Kx1, 200ns DYNAMIC RAM		3.60		
3B	16Kx8 DYNAMIC RAM BOARD		170.00		
4A	16Kx1, 200ns DYNAMIC RAM		25.00		
4B	64Kx8, DYNAMIC RAM BOARD		830.00		

WASHINGTON STATE SALES TAX 5.4%

SHIPPING

TOTAL

CODES:

0- I want this memory only. If there are not enough orders for 1000 pieces, send me my money back.

1- This is my first choice however if there are not enough orders for 1000 pieces of this memory I will accept my choice #2 with appropriate cost adjustment.

2- Similar to 1.

3- And so on.

Bringing Up a SCAMP

Part 5

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by C. R. Britten

Of Bugs and Debugs

There used to be a time, and not so very long ago either, when it was all too common for software types to blame hardware for typical computer system problems, and of course the hardware types always blamed the software rather than admit that hardware could fail. One of the healthier trends among microcomputer enthusiasts is the relative absence of the overspecialization that leads to such silly finger pointing. So many of the new generation involved with small business and personal computers are combining software and hardware skills under the same hat that they may be spared some of the more myopic views that prevailed in the past. If hardware is the candle and software is the flame, suffice it to say that it takes both to make a useful light in the dark.

Yet in spite of our best efforts bugs will occur in hardware and software alike. According to Murphy's Law, anything that can possibly go wrong certainly will. And when it does you need to be prepared with the best debugging tools available.

Tools of the Trade -- The Logic Probe

One of the most common and useful tools for hardware debugging is the logic probe, and the least expensive yet versatile probe I have found is the James JE-803 kit for \$9.95. This little gem has a seven segment LED digit that displays a \square for a low logic level or open circuit, a \uparrow for a high (near +5v) level, and a P for a pulse signal up to 45MHz. The kit contains a tiny printed circuit board that fits inside a clear plexiglas tube to hold the parts. On the PC board goes a 2N2222A preamplifier transistor, a proprietary 14 pin IC, and a small handful of other parts besides the seven segment digit.

An item you will need that is not supplied with the kit is a tube of superglue, such as Eastman Kodak 910, to attach the probe tip to a plug that fits into the end of the plexiglas tube. Otherwise assembly of the kit is practically trivial. What could go wrong, Professor Murphy? Well, one thing is that you need to sand the end plugs carefully for a good fit or they will split the tube when forced.

James Electronics warns that the JE-803 is not safe for use on some MOS circuits. A little checking reveals that the probe tip draws 400 microamps from a +5v source, and zero amps from ground. Unfortunately, most TTL family gates can source only about 100 to 400 microamps from a high level output. The James probe could conceivably alter the logic state of some circuits, or give a false reading, depending on the other loads present. Check your data sheets carefully for the maximum output current at logic level high if in doubt about a particular circuit.



PHOTO 1 -- SUSAN PAGE USING THE SQUAWKER

The Squawker

So you have just finished building a brand new board probably worth a couple hundred in groceries, you power it up and, just as Murphy's Law predicts, it doesn't work.

Where should you begin?

After looking at some of the obvious things like power and ground on each chip with the logic probe it is time to start checking continuity of critical signal paths for open circuits due to cold solder joints or poor socket contacts, and short circuits to adjacent signal paths due to solder bridges. Enter the audio continuity tester, also called the squawker, another inexpensive but invaluable hardware debugging tool.

An audio continuity tester can be built with a 555 timer chip that sounds a distinctive buzzing tone for a good short circuit between its probes, and a different tone or series of ticks for higher impedances up to several megohms. Such a squawker is especially handy because you can hear the state of the contacts without taking your eyes off of the circuit under test, and this greatly speeds up testing.

In a recent Kilobaud (#10, page 75) George Young gave a circuit for a 555 squawker, but his circuit used a nine volt transistor radio battery in such a way that it was unsafe for use directly on TTL circuits. A variation of the circuit that is safe with TTL families is given here. It is safe because the potential between the two probes cannot exceed three volts, and the current limiting resistors limit the peak instantaneous current to about one milliamp. The average short circuit current between the probes is less than 10 microamps. It usually makes no sense to use the squawker on circuits that have power applied.

The squawker shown here was built from mostly Radio Shack parts for under \$10.

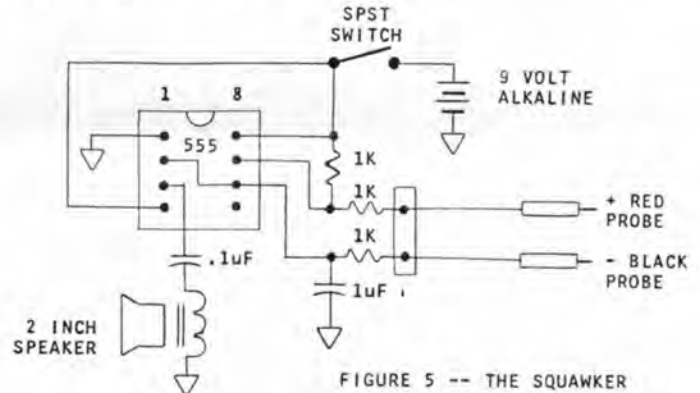


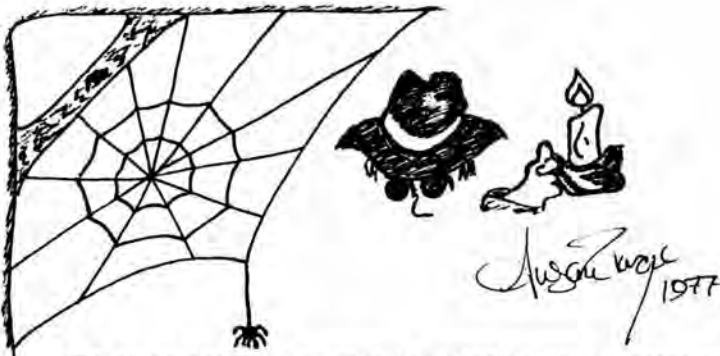
FIGURE 5 -- THE SQUAWKER

Super Mon

A few years ago, while working for a large Renton kite factory, I did some research on debugging programs for mini-computers. The end result of the exercise was a simple but elegant debugging program written in a low level machine independent language, which I implemented on a couple of different computers. What used to be called a debugging program for minicomputers is now generally called a monitor in the context of microcomputers. I'd like to share the design concepts of my debugging program brought up to date as a Super Monitor for microcomputers.

Typical monitor or debugger commands include the ability to access and alter the contents of memory, dump the contents of selected memory areas to a terminal or other peripheral device, copy the contents of memory to another area, initialize the contents of memory to a given value, set a trap (also called a breakpoint) at a chosen location, go to a location in memory and if a trap is encountered then return to the monitor with the state of the machine preserved for examination, and search memory for a pattern using a mask to define partial contents. You can probably think of many more commands to add to this list.

The commands should have meaningful names so that examples are readable and largely self-explanatory. On the other hand experienced users tend to want terse commands to avoid unnecessary typing. The best solution to this dilemma is to allow full spelling of a command name or an abbreviation, usually a single letter. Experience confirms that after the full spelling has been used once or twice the abbreviation is generally preferred forever after, except in examples for beginners.



The thing that makes Super Mon particularly elegant and useful is its use of an expression evaluator which accepts any expression, not just a number, and evaluates it on the spot. This makes it possible to use it as a calculator to check the calculations of a program under test. Operators in expressions include + for add, - for subtract, * for multiply, / for divide, & for and, ! for inclusive or, % for exclusive or, and parentheses () used to group subexpressions together. Precedence of operators is also provided so that the My Dear Aunt Sally rule of high school algebra is followed, * and / will be done before + and -, and & is done before ! and %.

A form of indirect addressing is also provided so that the square brackets in [300] denote the contents of location 300. But is this location octal 300, or hexadecimal? To be fair to the users of many different computers we must accept both possibilities, and we might as well allow binary and decimal as well. A simple and elegant way to provide these is with a single

RADIX exp

command that sets the radix for subsequent commands.

I have run out of room in this month's column but a future article will be devoted to the inner workings of Super Mon and its expression evaluator that you can implement on your favorite microcomputer. In the meantime you might look up two articles called "My Dear Aunt Sally" and "Processing Algebraic Expressions" in the February, 1976 issue of BYTE. If you can read these two articles you will find my techniques relatively easy, and similar to the hex calculator program I described in a previous article. However it will probably be a challenge to get Super Mon to fit in 2K bytes on the SCAMP!

TABLE 1 -- COMMANDS FOR SUPER MON

<u>ACCESS</u> exp	Access the location given by exp and display its contents.
<u>ALTER</u> exp1=exp2	Alter the contents of exp1 by setting it to the value of exp2, display the result.
<u>COPY</u> exp1,exp2,exp3	Copy memory from exp1 to exp2, the new copy begins at exp3.
<u>DUMP</u> exp1,exp2	Dump memory from exp1 to exp2.
<u>INIT</u> exp1,exp2,exp3	Initialize memory from exp1 to exp2 to the value of exp3.
<u>SEARCH</u> exp1,exp2,exp3,exp4	Search memory from exp1 to exp2 for the pattern given by exp3. The mask exp4 specifies bit positions that must match exactly by ones, and don't care positions by zeros.
<u>TRAP</u> exp	Place a trap at location exp. If the trap location is executed its original contents are restored and the state of the machine is preserved for examination, and control returns to Super Mon.
<u>GO TO</u> exp	Go to location exp. If this is a return from a trap the state of the machine is restored.
<u>ZERO</u> exp1,exp2	Zero the contents of memory from exp1 to exp2.

Note that the underlined character in each command is the allowed abbreviation, the other characters in a command name are actually ignored.

Club timesharing is available on the NORDATA system, a PDP-11/70, at very low rates and no minimum charge. Contact Roy Gillette at 524-0596 for details. All programs mentioned in this article can be accessed by any club timesharer; read the MAIL on the club account to find out how.

Last month I was singing the praises of EDIT1, a simple-minded editor for simple-minded people like me. Now there's EDIT3, still simple-minded but better. You can get very powerful performance by writing and correcting your text with EDIT3 but paying no attention to even-length lines or paging. You embed commands for RUNOFF in the text for paragraphing, etc. Then you use the latter program to print out your text beautifully formatted.

ANSWER is an easy-to-use data base program I am using to hand-assemble programs for my ALTAIR. Instructions for using ANSWER are available in the program. First, the CREATE command is used to define the fields in the data base, and save the definitions in a "structure" file. I program in split octal, so I defined five three-character strings, one for each byte (ADD,RES,OP,IMM,HI). I have three six-character strings for the LABEL,OPCODE, and IMMEDIATES. The COMMENT can occupy up to 24 characters. At the left, a four-digit integer field LINE is defined.

Once the fields are defined, name your program with a BASE command (i.e., BASE DELAY USING ASSEM, where DELAY will be the data file and ASSEM is the structure file previously created). Then ADD records, incrementing LINE numbers just as you would in BASIC. You can leave the address blank at first, calculate addresses after the program is written, and put them in with a CHANGE ADD,RES command. You can correct errors with a CHANGE command. You can insert a line by using an appropriate LINE number and using the command SORT BY LINE. The following example is a dump of the structure file and a short sample program (a delay loop of about 1 sec).

```

READY
PIP ASSEM.STR
  10 , 61 , 59      10 Fields
I, 4 ,LINE,####   61 Characters print
C, 3 ,ADD,         (plus one space per field)
C, 3 ,RES,         59 Bytes stored per record
C, 3 ,OP,
C, 3 ,IMM,         For Each Field:
C, 3 ,HI,         I=integer, C=characters
C, 6 ,LABEL,      The number is width in characters
C, 6 ,OPCODE,    The text is the name of the field
C, 6 ,IMMED,     The ### formats the number
C, 24 ,COMMENT,

```

READY

OK: ? 1-14 LIS

01-Nov-77

LINE	ADD	RES	OP	IMM	HI	LABEL	OPCODE	IMMED	COMMENT
10									SR FOR A 1-SEC DELAY
20	002	000	345			DELAY	PUS	HL	save addr on stack
30	002	001	257				XRA	A	clear accum
40	002	002	157				MOV	LA	put 0 in L
50	002	003	147				MOV	HA	put 0 in H
60	002	004	353			STALL	XCHG		waste..
70	002	005	353				XCHG		..time
80	002	006	054				INR	L	increment L
90	002	007	302	004	002		JNZ	STALL	loop 377 times
100	002	012	044				INR	H	increment H
110	002	013	302	004	002		JNZ	STALL	big loop 377 times
120	002	016	341				POP	HL	retrieve the addr
130	002	017	311				RET		return
140									

OK: ? END
DONE

Ready



Bob's Bits

or, Rumblings from
Bob Wallace

Expo in April

Next April 8 and 9, our club and the Pacific Science Center will co-sponsor a personal computer fair. This will be aimed at the general public, and include demonstrations and retailer booths about microcomputers. We hope to have some calculator oriented displays, and local computer-related businesses, as well. The general theme will be educational, showing people what computers are, how they work, and what's available. Our club hopes to make some money on this, to support a more technically oriented conference next fall. So far, John Marshall will be doing publicity, and I'll be handling booth sales. We especially need someone to find demonstrations and talks of interest to the general public.

Club Board Meeting

We had a "board" meeting last October 26 (since we still aren't officially incorporated I guess it wasn't a Board meeting officially). Attending were John Marshall, Roy Gillette, John Aurelius, and myself. The first order of business was the upcoming election. Using our still not ratified by-laws, we talked about nominations. The part of the by-laws dealing with elections reads:

"Elections of Officers and Directors at Large take place at the Annual Meeting of the Society, which is the first meeting in December. At least 60 days prior to the Annual Meeting, the Board shall appoint at least 7 members to the Nominating Committee, who shall nominate at least 2 members for each office and 4 members for Directors at Large who are ready and willing to serve. One member may be nominated for as many as two positions. All nominees shall have the opportunity to distribute a written statement to all members. These statements, together with notification of the time and place of the Annual Meeting, must be distributed to the members at least 30 days prior to the Annual Meeting."

"At the Annual Meeting, elections take place in the following order: President, Newsletter Editor, Program Manager, Treasurer, Secretary, other officers, Board Members at Large. Before the vote for each position, further nominations from the floor will be accepted, provided they are seconded, and accepted by the nominee. Voting shall be by show of hands, or by secret ballot if requested by a majority of members present at the meeting. Every member has one vote; a nominee must receive a majority of votes cast to be elected. In the event no nominee receives a majority, the two nominees receiving the highest vote participate in a run-off election. Any member may hold a maximum of two offices, excluding Board Members at Large positions. Note that from 3 to 5 members will be officers, and 4 to 2 will be Directors at Large, to insure a total of 7 members on the Board of Directors."

Unfortunately, only four people showed up at the "board" meeting / nominating committee, and we couldn't find two people for each office. So far, we have:

President: Roy Gillette, John Marshall
Newsletter Editor: John Marshall
Program Manager: Bob Wallace
Treasurer: John Aurelius, Roy Gillette, Bob Wallace
Secretary: John Aurelius*
(* as long as he doesn't have to take minutes!)

We also came up with the following people as possible Board Members at Large (they haven't been contacted yet):

Randal Britten, Dick Curtis, Richard Peterson, Joe Pizzorno (sp?), Dave Smith, Steve Southworth

Being a Board Member at Large just means coming to a couple

of meetings in the coming year, and kind of watching over the officers to make sure they don't get out of line.

Besides the election, the "board meeting" discussed the library briefly, the programming contest at length, the time sharing with Nordata, and spreading out newsletter tasks. John Marshall is formulating the programming contest idea, and (I think) will be writing about it separately. Much time was spent on how to get more people working on the newsletter. We made up a task list:

printing, folding, and mailing
maintaining and printing the mailing list
advertising and store sales
typing articles, the "unclassified", etc.
writing and typing the "meetings" announcements
pasteup, layout, and tying it all together

We figured that the program manager should do the "meetings" announcements, and the secretary (especially if he doesn't have to take minutes) could maintain the mailing list, and print, fold, and mail. If all authors could submit camera ready copy, that would help the typing situation. Anybody interested in working on the newsletter please contact John Marshall.

Datamation Tidbits

(Sept) "The audience laughed at a personal computing session at the recent NCC when speaker Bruce Venetta of IMSAI, which sells personal computers, said, 'I don't know if the general user is aware of it, but it costs money to get the last bug out of a piece of hardware and there are a couple of interesting ways you can get (it done) - you can ship it at some point in the design cycle.' Then, he added, the money starts flowing in and you have hundreds of technicians out there working on your board. 'You go through your morning mail and do your engineering that way.' Venetta said all the companies in the personal computer market have done this, although the five or six largest (which would include Im Sai - Bob) don't do it anymore"

The article goes on to state that CCW Data Systems has filed suit for damages and \$5,000 against IMSAI and Kentucky Fried Computers, charging breach of warranty and fraud, over a floppy disk drive.

(Oct) Ever wonder who did "Star Wars" computer graphics sequences? It was Larry Cuba, working as an independent contractor, who has also worked with John Whitney on the film, "Arabesque". He used Tom DeFanti's GRASS graphics language on a PDF-11/45, drawing the images on a Vector General display. The scenes involved are the briefing room graphics, where they show the Dark Star and zoom in to the fatal thermal exhaust port; and the display screen readouts used in the fighter battle computer (which, of course, Luke doesn't need because the Force is with him). Cuba currently has his own film in progress.

Personal Computers in 1976

(from "Bits & Bytes, Sol Libes column in ACGNJ's newsletter, who got it from the August 22 Electronics News).

The Personal Computer Market in 1976 totaled \$27 million, distributed as follows:

MITS	25%
IMSAI	17%
Processor Technology	8%
SWTP	8%
Digital Group	4%
Polymorphic	4%
Ohio Scientific	4%
Cromemco	4%
MOS Technology	3%
Others	23%

In the past year, MITS share has dropped, and Processor Technology's has grown (P.T. says they're now number 2). Cromemco's share has probably grown as well. Although MOS Technology only collected 3% of the money, that's all \$250 KIM-1's, as opposed to \$1K-\$2K per system from the others.

(Bob's Bits, continued)

Heathkit?

One interesting thing I noticed about Heathkit's triple parallel port: each parallel port is a UAID connected serially to a USAID! Nobody to date has figured out why they do it this way. Their system is not particularly cost effective or interesting for the serious hardware or software enthusiast, unless you're going for the LSI-11 anyway and want to save some money.

ACM Convention

The National ACM Convention was in Seattle last October 17-19, and was quite a success. John Backus, co-inventor of FORTRAN and Backus Normal Form, gave the annual Turing lecture, which I hear was very good, and included references to personal computing. All the computer science book publishers had booths, as well as the University of California at San Diego. UCSD has PASCAL up and running on a LSI-11, and is working on an 8080 and Z-80 version. PASCAL is a new, powerful, and very structured language, very popular at U.W. and other universities. They are offering a complete release (source and object code, user and system documentation, updates at least three times in the next twelve months, questions answered, etc.) for \$200. Contact: PASCAL Group, Inst. for Information Systems, UCSD Mail-code C-021, La Jolla, CA 92093.

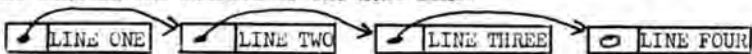
Programming Tricks

This one's from Polymorphic's 4.0 monitor. Their system has from one to three 1K byte PROM's. At one point in the first PROM, the program jumps to the second PROM (if any), to do the additional functions in the second PROM. The second one probably does the same thing to optionally execute the third PROM. The code is very short:

```
LXI H,PROM2
INR H
JZ CONT
PCHL
CONT:
```

First, it loads the address of the second PROM into the HL register. Then it does an increment of the first byte of the PROM, if it is there. If the PROM is there, naturally the byte is not really incremented (being read-only); however, the zero flag is set false (except in the unlikely event that the first instruction is "MST 7"). If there is no PROM at that address, the bus lines all float high, producing a "byte" of all ones, or the value -1. When the "-1" is incremented, the zero flag is set. Therefore, if there is no PROM, execution resumes at CONT; and if there is a PROM, the PCHL instruction jumps to it. Clever, although hard to understand at first!

For my next trick, I'll traverse a list forward and backward using only one address in each item. This is a "list processing" trick, so first some background. A "list" is a bunch of memory blocks (called cells or atoms or items), where each block contains the address of other block(s). For example, say you have a number of things you want to keep in order; perhaps you're doing a text editor, and you want to keep a bunch of lines in memory. You could make every line a fixed length, and just store all the lines sequentially, but if you want to add or delete a line, you have to move a lot of memory around! So you use the following structure, where two bytes at the beginning of each line contain the address of the next line:



Now, if you want to insert a new line, it's easy to break the chain and make the new line part of the chain. One problem here is that we can only go down the list in one direction (forward). Since the user will probably want to scroll backward, we need two pointers, one to go forward and one to go backward.

Or do we? Suppose we put, in each item, the exclusive-or of the address of the next item and the address of the previous item. Keep around the address of the current entry, and the entry following; in the example above, let's say that's line 2 and line 3.

Suppose we want to go forward, to lines 3 and 4. If we exclusive-or the address of line 2 with the 2 byte value in line 3, we get the address of line 4! In a similar way, the exclusive-or of the address of line 3 with the value in line 2 gives the address of line 1! Thanks to Knuth's "Fundamental Algorithms" for that trick. If you use it, be sure to document it well!

List are an extremely powerful tool; it's almost impossible to do a large piece of software (like a compiler or interpreter or operating system) without them. With lists you can make trees, graphs, rings, and other interesting structures. The programming language LISP, by the way, in its pure form operates exclusively on lists.

Personal Computer Applications

Recently, I made a little list:

Entertainment

Music Synthesis: Several 5-100 music boards are available for less than \$100; see the September Creative Computing or Byte, or PCC's booklet on Alphanumeric Music (not to mention the Computer Music Journal).

Video Art: You can do interesting pictures on just a black and white system; color is even better. See the book "Artist and Computer", the October Byte, or (for the technical minded) the Matriox application note).

Games: There must be 300 games in BASIC in publications of People's Computer Company, Creative Computing, and others. There are also books on computer chess, and a book by Hayden on learning BASIC by looking at game programs.

Numerical Work

Calculations: Naturally BASIC in direct mode makes a great calculator. Finding curves that fit experimental data, crosstabulations on questionnaire data, and just playing with numbers are all reasonable in BASIC.

Finances: If you're an investor in stocks, commodities, or whatever, use your computer to find trends and keep performance records. You can do home amortization records, other interest calculations, and personal budget analysis.

Bookkeeping: Keep track of tax deductions, or how much you've spent in each of your budget categories. If you have a part-time business, you can use your computer to keep your accounts, and produce financial statements.

Education

Hardware: If your computer has an 8 bit input/output port, use it to control your logic design experiments, or try building an analog converter and use it to analyze transistor circuits.

Software: Having your own interactive computer is the absolute best way to learn programming. You can get into artificial intelligence, language translators, or any number of fascinating topics. Create your own world where you're in complete control!

Children: By all means, teach your older kids basic. For the younger ones, a mathematics drill or foreign language vocabulary test is easy to program. Computers are more patient and objective, which some kids like.

Text Processing

Writing: Once you've done an article or story with a good text editor, you'll always bemoan using a typewriter. You'll need a Selectric or daisy wheel printer for quality output.

(continued)

"DIETING IS DIFFICULT,"

**YOUR COMPUTER
REMINDS
YOU...**

... Typing at 30 characters per second. "The best diets attempt to maintain a balance of food types, so that daily nutritional requirements are met."

After giving some additional good advice, your computer asks for your current height, weight and age, and then continues: "How many hours per day do you spend sleeping or resting?" You type in a number. "How many hours sitting?" Another number, and so on as it learns in general about your daily activities.

"Now we may begin a weight reduction plan based upon your caloric needs. Remember, gradual loss (i.e. 1 lb./week) is better nutritionally, easier to attain, and should never leave you feeling 'starved'."

"How much weight do you want to lose?" And, "How many weeks do you plan to take?" it asks finally, and then prints out a chart showing you your allowed calorie intake per day for you to succeed in your diet plan.

It even wishes you Good Luck!



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GROUP PURCHASE

Jim Van Zee is about to buy a quantity of EMM SEMI 4200A's. He was quoted \$9.90 each and delivery was from local stock. If the quantity is high enough the price could be substantially less. If you need to fill the memory board that you bought during our last group purchase, do it now. Call Jim at U of W 543-2576 or home 522-6950.

Send a note to NCCN if you are interested in a printed circuit board for the Originate/Auto answer MODEM by Roger Moeen that appeared in NCCN 2-10. We'll see what we can do if there is enough interest.

UNCLASSIFIED

FOR SALE- SEALS 8KSC-Z 8K static memory card for S-100 bus, 250ns. Assembled, tested, perfect condition. \$290. Call Bill Pilce 362-2229.

FOR SALE- DIGITAL GROUP system 18K Z-80, keyboard, CRT monitor, cassette, spare 8K board (blank). Complete with cabinets. Up and running Extended BASIC and others. \$1150 Call John 927-6341.

FOR SALE T-132 line printer, 100 lines per minute. Call Roy Gillette (H) 524-0596.(W) 625-2381.

FOR SALE- MODEL 28'S ASR machines complete and operating. Send a post card for details. \$185 each or offer. FOB Seattle. Also, GE TPL VHF transceiver complete 30 watt, \$45. Bob Schaeffer, PO Box 4-1983, Anchorage, AK 99529.

Palmetto Bible Chapel

Jack Weaver, Pastor
Bill Adams, Asst. Pastor
Phone 238-4837

MAIL ADDRESS:
16255 S.W. 82 Avenue
Miami, Florida, 33157

Northwest Computer Club
Pacific Science Center, Room 200
2nd Avenue
North Seattle, WA.

Gentlemen:

Please excuse me if this letter seems to be a little uncommon, but I have come to the conclusion that you may be in a position to help us in our work here in south Florida.

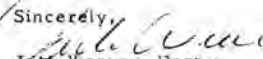
Our church and youth group have decided to try to computerize our records. All hardware that we have heard of is so extremely expensive that it looks to be out of the question. This is unfortunate because we had hoped to use the computer hardware to train some of our young people on the use of computer and computer technology.

Can or will your computer club or organization be able to help us or steer us to someone who can help. We are unable to purchase the equipment in question, but we are a certified Non Profit organization-so listed by the IRS, and able to give a letter to any person or organization making hardware donation to our church, indicating and describing the gift. Then the donor can assign his or her true value to the donation, tax deductible through IRS.

We would appreciate any help you could give, or any recommendations you may have.

As best I can determine, we could use something like the following: SOL 20 or Altair 8800 or IMSAI 8080 with about 24-32K memory, TV terminal, ASCII Alpha-Numeric keyboard, Floppy Disk System, and dependable fast printer.

If your group can help in any way the Lord knows that our church and young people will appreciate it.

Sincerely,

Jack Weaver, Pastor

FOR SALE 3 each, Digital Group, 8K, 250ns, low power memory factory assembled and burned in. \$275 each. Call Greg White 457-3315 days, 457-3917 evenings.

WANTED: Tally Model 420 paper tape punch with PD-60 punch driver should be in working condition. Call John Marshall 226-7775.

FOR SALE DEC VT50, great shape, 1 year old, \$750. IMSAI 4K PROM board, assembled and working. Board only \$80, or \$150 including 16 each 1702A's. Call Roger Palmer 743-6934.

FOR SALE If the yellow self-mailing page is missing from this newsletter, you have missed our latest group buy for memory at prices on one else can touch. Send a self addressed stamped envelope for information. NCCN, PO box 24 242, Renton, WA 98055.

CONSIGNED: 2 each, Decitek optical paper tape reader, 200 cps, dual capstan drive, new, \$125 each. 1 each, Roytron paper tape perforator, advance feed, used, \$75. 1 each, Roytron, paper tape perforator, 60cps, center feed, used \$75. Call John Marshall 226-7775.



CANDIDATES: Left, top to bottom, John Aurelius, Randy Britten, Roy Gillette, John Marshall. Right, top to bottom, Dave Smith, Joe Pizzorno, Bob Wallace, Jay Wicklund. Photos by John Aurelius.



ELECTIONS: The election of officers was scheduled for the first meeting in December. It has been rescheduled for the first meeting in January. We have a good slate of candidates as listed below:

PRESIDENT: Roy Gillette, John Marshall
 NEWSLETTER EDITOR: John Marshall
 PROGRAM MANAGER: Bob Wallace
 TREASURER: John Aurelius, Roy Gillette, Bob Wallace
 SECRETARY: John Aurelius, Joe Pizzorno
 BOARD MEMBERS AT LARGE: Randy Britten, Joe Pizzorno, Dave Smith, Jay Wicklund.

Candidates were to have submitted campaign platforms. The only one received was from Bob Wallace. But, John Aurelius' camera caught all of the candidates at a recent meeting. So, we all have a chance to see who is running for what. Come to the January meeting and vote.



NCCN is now accepting limited, relevant, commercial advertising. Ads will reduce losses from running NCCN and will hopefully keep us informed of new products and services as they appear on the market place. The rates listed below are effective 2 May 1977-TFN:

TIMES	FULL PAGE	HALF PAGE	CARD
1	\$36	\$24	\$12
3	33	22	11
12	30	20	10

The above prices are for each edition. Camera ready copy is assumed. FULL PAGES may be any size. HALF PAGES should be 6" X 16.2" vertical, or 12.5" X 7.7" horizontal paste-up size. Make special arrangements for paste-up, half-tones, etc. Terms are cash in advance. Net 10 days from invoice to well rate firms. The above rates apply only for regular circulation. Special rates apply when there is expanded circulation. Rates are subject to change at any time without prior notice.



THE NORTHWEST COMPUTER CLUB PEOPLE

PRESIDENT	John L Marshall	226-7775
SECRETARY	Bob Wallace	525-7359
PROGRAM MANAGER	Roy Gillette	524-0596
LIBRARIAN	Marc Herold	486-2035
EDITOR	John L Marshall	226-7775
CONTRIBUTORS	Bob Wallace	525-7359
	Randy Britten	522-1736
	Roger Modeen	246-3260
	Roy Gillette	524-0596
	John Aurelius	284-8347
	Charles Worstell	927-6038

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