

RECREATIONAL & EDUCATIONAL COMPUTING

A Mathemagical Panoply of Computer Recreations For Involved Readers

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Computer Hardware, Software, and Ideas



Recreational & Educational Computing (REC) is a personal, semi-professional two-way communication between subscribers and the editor, assisted by contributors. Our focus consists of challenging "mathemagic" and mathematics, recreation, education, programming, and other computer activity, including reviews, news, editorial, humor, & special offers. **REC** is published 8 issues per year (April-March, some issues combined) at 909 Violet Terrace/ Clarks Summit, PA 18411. Annual subscriptions \$27 in U.S., mailed 1st class. All payments in US funds on a US bank: \$28 to Canada, \$36 abroad.

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About the Image: This is Wispy, one of my cats 30 years in the future (2023). (The truth? The original image was corrupted, so replaced.)

Dr. Mike Ecker's *Recreational & Educational Computing (REC)*

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DrMWEcker@aol.com

Contributing Mathematical Editors: Martin Gardner, recreational mathematics author, North Carolina; Prof. Robert E. Stong, University of Virginia; Prof. Fred Galvin, University of Kansas; & Warut Roonguthai, Bangkok, Thailand.

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Computers Used & Supported by REC: IBM-PC / compatibles, Macintosh, Amiga, TRS-80, Sanyo 55x, Apple II.

About this Issue's Programs, Graphics, and Cover

This issue of **REC** was composed on a Macintosh Performa 450 with color monitor and printed on a GCC Technologies PLP II laser printer. The software used was *Microsoft Word 5.1a* for the Macintosh along with a variety of other programs and/or desk accessories, primarily for fonts and/or graphics. Other graphics are of PC programs running on a '486 PC with the help of *Collage Complete for DOS and Windows* for screen dumps. Most programs in **REC** are for both PCs and Macintoshes. With adjustments, they may run on other platforms (whether supported or not supported by this publication).

The original cover (*not shown*) was produced using LogoStorner version 2.5 for Macintosh, an excellent commercial product available from the author, Jonathan Macagba/ PO Box 14013/ Philadelphia, PA 19122 (USA)/ Telephone-Fax 215-634-0634. With the use of various panels and masks, one can produce 10,000 different logo effects - or more if using symbols together.

Personal to Readers

Welcome to the latest issue of **REC**! Besides the usual and new goodies, one big concern has been catching up on promised matters. Alas, that must wait still further, as I have a lot of correspondence.

ADDENDUM: For this issue, some items have been updated for 2023, for archiving this as a PDF.

PC Mathemagical Farrago XIII

As promised earlier, Mathemagical Farrago XIII (13) is available, and you all should have received a flyer with the last double-issue of **REC**. Though I still think Farrago XII (12) was our best ever, Farrago the 13th was also well-received.

Important Communication Reminder:

When you write, it will help if you would please:

- Include a disk (prefer PC or Mac) with your programs -- saved in ASCII format, if possible.
- Include a copy of your letter on disk, saved in ASCII, along with your programs (unless letter is very short & you're not sending programs).
- Send compiled, ready-to-run .EXE files with ASCII source (if using QuickBASIC, C, Pascal...).

America Online: If you are on AOL, please leave mail & PC / Mac programs for DrMWEcker. If you are on a different service, use my Internet address for e-mail: DrMWEcker@aol.com (updated 2023)

Amiga Support!: I bought a used Amiga 1000. Please send me programs and lots of disks. I'll thank you, and so will my kids.

I welcome your involvement and feedback!
Enjoy REC #57! Mike

Clarifications: REctifications and CorREctions

In case you missed the supplementary note with **REC** 55-56, there were two minor errors. On my diatribe against Monte Zenger on page 18, the word "write" should be replaced by its homonym, "right" - as in "right down to the ..." On page 24 I meant to speak of Arcade running as a program group under Windows (add s).

In addition, Fred Galvin says that I misspelled the name of a mathematical game on the last page (p. 28). That brings the error count to three. But he is wrong when he says I am wrong in saying there were two errors last issue. After all, if there really were three errors, then *a fortiori*, there certainly were two errors.

(Note to all: I am indulging in some word play with multiple negatives and also with logic. Don't take it too seriously!)

Correspondence: Letters, Solutions, Programs

Reminder: Your letters, questions, solutions, programs, articles, corrections, and donations are most welcome. To correspond with **REC**, I like regular mail: Dr. M. Ecker, REC/ 909 Violet Terrace/ Clarks Summit, PA 18411 (USA). Include a SASE (self-addressed, stamped envelope) if you need a reply. Or, contact DrMichaelE on America Online or DrMichaelE@aol.com via Internet so you and I will be part of the information age. (Please do not send mail to my university address or registered.)

Letters and Articles Policy - All materials sent to **REC** are subject to editing for grammar (e.g., the user inserts *his* disk, or *his or her* disk, but not "*their*" disk); length (as warranted by topic and treatment); and style. Of course, perceived value and interest constitute the main consideration, with PC-compatibility or portability being important. I try to publish as many as feasible, but cannot print all. Those that I can print I often cannot print on a timely basis. Publication consideration is greatly improved by including a PC or Mac disk (any standard size, though I appreciate other disks: Amiga, Sanyo, TRS-80, Apple II) with both text and programs saved in ASCII and native formats. Label disks with your name, address, disk type, contents.

Note: More-detailed program & article guidelines are available free upon request. Just write to me.

From: Fred Blechman (West Hills, Calif. - Oct. 29)
Dear Mike,

Wow! Just received (and read) latest double-**REC**!

When we first met, I thought you bordered on being a genius... As I got to know you better, I became more convinced you might be a genius... Now I'm convinced you're a genius!

How can you produce such a diverse magazine - from highly technical to anyone-can-understand all

by yourself?...Why, it's Amazing! Unbelievable! Astonishing! Stupefying! Dumbfounding!

And never mind just using the great man's picture: You *are* Albert Einstein reincarnated (without the accent and with black hair).

Editor's Reply: I never cease to be amazed at the good taste and perception of **REC** readers.

(P.S. Personal to Fred: Are you available to serve as president of the Mike Ecker fan club?)

From: Justin Smalley (Boulder, Col. - Oct. 24)
RE: REC 55-56 - Dear Mike:

I suggest replacing lines 170-200 on page 28 with:

170 ALPHACNT = INT(TEST/ALPHA)
180 BETACNT = INT(TEST/BETA)

Editor's Reply:

Before I forget, thanks, Justin, for your order for the discounted PC-Bridge (as advertised on the flyer supplement last issue). Let me know how you like it and whether it is worth the \$15.

Justin is correct that this would count how many times the integer parts of the integer multiples of alpha and beta don't exceed the top number (TEST, in this case). However, what he and others did not

know was I was setting up for a larger program that included printouts of the values.

Indeed, my original program prints out the results in two columns according to whether generated by multiple of alpha or beta, respectively. I believe I had both versions on REC-on-Disk last issue. For the benefit of others, here's the slightly longer

program. Bear in mind I would still like to see a modification, perhaps based on storage in arrays, that prints out the numbers in order -- but still keeps columns so that we know whether we are getting multiples of alpha or of beta.

The program follows:

Complementary (Beatty) Sequences Program With Printouts By Columns

```
10 CLS: TEST=10000: DIM a(TEST), b(TEST): 'Number of numbers to generate
20 PRINT "Beatty Sequences Test, Dr. M. Ecker, REC."
30 PRINT "We choose an approximation to an irrational decimal number, p"
40 PRINT "thus yielding also an irrational number, q = 1 - p."
50 PRINT "I will prompt you now for your choice of p.": PRINT
60 INPUT "Value of p (decimal with, say, 6 digits)": p
70 IF p <= 0 OR p>=1 THEN GOTO 60
80 q = 1 - p: alpha=1/p: beta=1/q
90 PRINT "We multiply each of 1/p =", alpha; "and 1/q =", beta; "by 1, 2, 3, ... &"
100 PRINT "take the integer part. If p were irrational, we would find that this"
110 PRINT "process would yield each natural number 1, 2, 3, ... exactly once."
120 PRINT "Moreover, the limiting density of occurrences should be as follows:"
130 PRINT "p =", p; "of the natural numbers being the integer part of multiples"
140 PRINT "of 1/p and q =", q; "of the numbers corresponding similarly to 1/q."
150 PRINT: PRINT "We'll generate "; TEST; "numbers going up only to"; TEST
160 INPUT "<ENTER> to begin ", b$: PRINT
170 FOR n=1 TO TEST
180 IF INT(n*alpha)<=TEST THEN PRINT n, INT(n*alpha): alphacnt=alphacnt+1
190 IF INT(n*beta)<=TEST THEN PRINT n,,INT(n*beta): betacnt=betacnt+1
200 NEXT n
210 PRINT: PRINT "We expected "; p; "as fraction for first column"
220 PRINT "and actually got "; alphacnt/TEST; "and for the second column"
230 PRINT "we expected"; q; "but actually got"; betacnt/TEST
240 PRINT: PRINT "(Any key to end...)"
250 IF INKEY$="" THEN 250
```

From: Prof. Fred Galvin, Contributing Math Editor
RE: Errors, Errors! - Dear Mike,

The correct spelling of that name is "Wythoff"...

There is some stuff about self-counting strings in the latest *Math. Mag*, Vol. 66, No. 4, Oct. 1993, pp. 276-277. It seems that the original source for this problem and its solution was an article by Steven Kahan in the Nov.-Dec. 1975 *Math Mag*.

My solution was just published with several annoying typos, even misspelling my last name.

Editor's Reply: After seeing how badly that mag botched your letter, with more mistakes in it than I usually make in an entire issue single-handedly, I'm feeling pretty good right now. But seriously, I commiserate with you: You were done a disservice!

Incidentally, Wythoff's game is related to the topic of complementary sequences. A good source for this is Prof. Ross Honsberger's excellent book, *Ingenuity in Mathematics*. It's a good source for mathematical recreation and also details the connections among the various topics that I've merely hinted at here.

Sequence of Non-Squares

Lagniappe (i.e., a bonus) - For those who want a little more *now*, here's a follow-up tidbit (that I might have had in an earlier **REC?**): We all know that the n^{th} square is given by $f(n) = n^2$. Is there a simple formula for $g(n) =$ the n^{th} *non-square*?

Surprisingly, there is: $g(n) = [n + \sqrt{n + .5}]$, where $[x] =$ (the greatest integer less than or equal to x).

You might enjoy modifying the complementary sequence program or starting from scratch to print out the squares and non-squares in columns. As a cursory check, you should calculate the first three values of $g(n)$: $g(1) = 2$, $g(2) = 3$, and $g(3) = 5$, exactly as expected.

Who Makes Money On Shareware?

From: Fred Blechman
RE: Shareware - Dear Mike,

The only people who make money on shareware are the vendors, not the authors.

Editor's Reply: I believe you're right (as usual). Few shareware authors make any money.

Of course, if you're going to program for fun and are not seriously relying on the income from shareware, I'd say go ahead -- as did RECKER Katharine Lindner with her delightful and highly graphical *GrowFrac for Windows* program. It has fractal trees, plants, and bushes, all available as just one part of the new Farrago XIII (\$29.95 with free shipping to **REC** subscribers).

Another Martin Gardner Goodie - By Nob Yoshigahara

From: Contributing Editor Martin Gardner, Nov. 2
Dear Mike: Nob Yoshigahara, Japan's top puzzle inventor, recently came up with this one, so far not published in the USA. I'm sure he would be pleased if you used it.

Place digits 1 through 9 in place of the letters to make the equation correct:

$$\frac{A}{DE} + \frac{B}{FG} + \frac{C}{HI} = 1$$

(Ed. Note: Here, DE, FG, and HI each denote positional notation for two-digit positive integers such as 13 or 25.)

Nob says the solution is unique. The challenge would be to write a good program to find the solution and prove its uniqueness.

Editor's Reply: I won't spoil the fun by giving the answer yet, but it is understood that uniqueness here is apart from the order of the three fractions. As a tip for newer programmers, you should probably not try

to solve this in the form shown, given computer arithmetic roundoff errors with decimals. We've had many programs in the past that used loops to check all permutations, but possibly some analysis (i.e., number theory, specifically divisibility) might cut down the $9!$ (= 362,880) choices to a more manageable number. Indeed, there are $9^9 = 387,420,489$ possibilities when you use nine loops of nine values each.

In any case, my program below, for PC, Mac, etc., uses all these ideas to find solutions (including all orders of listing the fractions) in mere minutes to many hours on various computers. Don't peek if you wish to write your own from scratch!

ÔΣΠ∂[□%Ô

Thanks, Martin, for another goodie. Readers may be pleased to know I still have at least a couple more "Gardner Gems" - regrettably delayed a year or more - upcoming in future issues.

----- **Program for** $\frac{A}{DE} + \frac{B}{FG} + \frac{C}{HI} = 1$ -----

```

1 CLS
10 FOR a=1 TO 9
20 FOR b=1 TO 9
21 IF b=a THEN 280
30 FOR c=1 TO 9
31 IF c=a OR c=b THEN 270

61 IF f=a OR f=b OR f=c OR f=d OR f=e THEN 240
70 FOR g=1 TO 9
71 IF g=a OR g=b OR g=c OR g=d OR g=e OR g=f THEN 230
80 FOR h=1 TO 9
81 IF h=a OR h=b OR h=c OR h=d OR h=e OR h=f OR h=g THEN 220
90 FOR i=1 TO 9
91 IF i=a OR i=b OR i=c OR i=d OR i=e OR i=f OR i=g OR i=h THEN 210
100 de=10*d+e: fg=10*f+g: hi=10*h+i
110 IF a*fg*hi + b*de*hi + c*de*fg = de*fg*hi THEN PRINT a;" ";de; "+"; b; "/" ;fg; "+";c;" ";hi; "= 1."

210 NEXT i
220 NEXT h
230 NEXT g
240 NEXT f
250 NEXT e
260 NEXT d

40 FOR d=1 TO 9
41 IF d=a OR d=b OR d=c THEN 260
50 FOR e=1 TO 9
51 IF e=a OR e=b OR e=c OR e=d THEN 250
60 FOR f=1 TO 9

270 NEXT c
280 NEXT b
290 NEXT a
300 PRINT "(Touch a key to terminate program.)"
310 IF INKEY$="" THEN 310

```

This program for PC and Macintosh appears on this issue's REC-on-Disk, along with a host of other programs and bonuses. REC-on-Disk is a disk supplement for REC subscribers with a PC or Macintosh. At least one disk comes with each issue of REC and does far more than save typing. Not the newsletter itself, it's a separate purchase: \$29 annually in USA, \$32 to Canada, \$38 abroad.

Spread the Word on REC

A simple request from your beloved editor: I maintain a lifelong commitment to **REC**, but I need your help with the expenses of technology as well as production. This is, after all, an enterprise I devote myself to almost incessantly in a drive to give you the best-edited production with the best features I can supply. That means extraordinary time and effort corresponding, programming, product testing, porting programs from and to other platforms, trouble-shooting, editing, desktop-publishing, and more. Some ways you can help:

Please spread the word. Tell colleagues and friends about **REC**. Remember that anytime - holiday season or not - you can take out a subscription for a friend, relative, or colleague. Maybe send a donation. Renew early. Take out a subscription to REC-on-Disk if you have a PC or Macintosh - thereby doing yourself a favor, too. Or order a Farrago or two for your PC and include a donation beyond the minimum level specified. Get a life membership / subscription and join our most exclusive coterie of members (who are listed in perpetuity every issue; see page 2, top, for current names, and bottom of cover page for rates). You can also order back issues to complete your collection. And, order other software by Recreational Mathemagical Software.

Thought of the Month - Part I

"Great minds discuss ideas; average minds discuss events; small minds discuss people."

Thought of the Month - Part II

"Leave symbols to the symbol-minded."

(Note: Thanks to comedian George Carlin for this great line. However, it refers not to the useful mathematical symbolism RECKers would likely know, but to the superficial kind that usually is passed off in lieu of something more substantial.)

Thought of the Month - Part III

A new police survey suggests that the gun of choice of criminal high-school students is the 9-millimeter...

I guess kids are finally taking to the metric system.

Goofy Definitions

Semi-colon: Wouldn't you agree that this is just a half-assed punctuation mark?

Recursion: See recursion.

More Letters, Solutions, and Programs

Polymorphic and Polygonal Numbers: Answer from Last Issue

From many readers, who say: It is an easy check from the formula that $P(n, 5) = 5(2n - 3)$. Since $2n - 3$ is odd, $P(n, 5) = 5(2n - 3)$ is an odd multiple of 5 and so ends in 5. Hence, use $r = 5$ for any given value of n .

From: James M. Mannon (Moss Beach, CA)

Dear Mike,

Your little opus gets sweeter each year! - Jim

Editor's Reply: You are most kind. Thank you! ...

Jim also sent information on the INSTAT function.

Bob Stong surmised pretty well that it had to do

with keyboard or interrupt status, but could not find it in the usual BASIC books.

Jim found it in the PowerBASIC reference guide. Basically, if a key has been pressed, INSTAT returns logical TRUE (non-zero). Its most common use is in loops that suspend program execution until user presses a key.

More Financial Freebie Offers

We interrupt this letters section for some quick, special announcements...

NEW! Recall last double-issue I gave information on Computer Associates' offer of its free financial software (other than a \$6.95 shipping/ handling charge). Now, Parsons Technology has followed suit and emulated CA with its own offer of a quarter-million free copies of *Tax Mate* (except for its own shipping/ handling charge, \$8). *Tax Mate* is a special edition of the company's tax-preparation software, *Personal Tax Edge*. To get your copy free (except for the \$8 charge), call 1-800-6TAXMATE. (That's actually 6TAXMAT... If you prefer to write, the address is Parsons Technology/ One Parsons Drive/ P.O. Box 100/ Hiawatha, IA 52233-0100.)

EXTENSION! After this news and since last issue, I've learned that Computer Associates has extended its original free offer again: *Kiplinger's CA-Simply Money* is free until 1994 April 15. This offer coincides with release of *CA-Simply Tax*, also free until then. Note these differences: Shipping/ handling charge (S&H) on *Simply Money* is still \$6.95 and the program requires Windows. *Simply Tax* S&H is \$9.95 but is for Windows *or* DOS. Note that if you order both together, S&H is \$14.95. For either offer or both, call 1-800-373-3666.

Personal Comment: Obviously, \$7 or \$8 is a reasonable charge for software usually selling for \$30, \$50, \$70 or even more. However, if the "shipping/ handling charges" of these offers continue to rise (CA's is now just a nickel short of \$10 for the tax package), the word "free" will eventually become devoid of meaning.

I'm sure you have your own horror stories of abuses of the word "free" in advertising. Perhaps the most outrageous to me is the offer made by the Discover Card. Discover has touted since early 1993 that you may have a cash advance "interest-free"! What a great offer, right?

Really? The fine print mentions a 2.5% cash advance fee for the month. Assuming repayment within the month, this is an annualized rate of 30% (more with compounding) - usually considered usury. If repayment is to be stretched out, the more customary interest of "only" around 20% annually applies thereafter.

From: Dr. Bob Stong, Contributing Math. Editor

Dear Mike: Some comments on the last issue of **REC**... On page 4 you say $96420 \times 87531 = 8,439,739,020$ is the second-best product for the contest. Though this is the largest product involving two or more factors, it is a long way from being second-best. The largest is 9876543210 and the next is only 9 smaller: 9876543201 . In fact, there are more than 360,000 larger numbers with first digit 9 just by permuting the digits 0-8. (Ed. Reply: True, but misses the intended spirit of second-best.)

On page 5 you discuss your new '486 and suggest that a '486 may be just a '386 with a math co-processor. That can't be correct. A '486 DX has a co-processor and a '486 SX does not. I don't know what the difference is, but it isn't the co-processor.

You seem to have been bitten by the QuickBASIC bug, possibly due to getting your (second) Mac. This causes you to spend an awful lot of time fussing about conversion to GWBASIC. Doing such conversions is superficial...

(Ed. Note: Bob inserted some suggestions for this. Since Contributing Editor John Straub has sent in his full GWBASIC program for Next Number, I will omit comments and include John's program - later - instead. I'll also try to have one from Harry J. Smith - transmitted to me via America Online.)

On page 10 the program by Reggie Still has eight possible choices for the calculation of the variable yr (i.e., there are really eight programs here). The remarks given with these mention pp values, but pp does not occur in this program. Obviously you lifted the equations from the next program.

(Ed. Note: Yes, obviously. I used the programs pretty much as I got them, which may explain why some might yield division-by-zero errors. As things stand I spend an exorbitant amount of time on **REC** programs, and some could criticize me for spending too much time on many things. (I can't win...)

Page 11's program *Interset* has the strange line:

```
IF INSTAT THEN END
```

I looked through all my books on GWBASIC, QuickBASIC, and QBASIC for IBM-compatibles and found no mention of this. My guess would be that INSTAT comes from some other version of BASIC (Ed. Note: Bingo!) and, still guessing, it looks like a shorthand for Input Status (Bingo again!). I assume this was intended to interrupt the program when a key was pressed.

Page 16: These are just Mandelbrot sets. The program is coloring the interior of the Mandelbrot set based on the minimal norm attained. Such things were done by Pickover in the first issue of *Algorithm*. You mentioned the program takes a very long time. One reason is that it is not very well done. The picture is symmetric with respect to the x-axis (as is the process) and the runtime can be cut in half just by using this symmetry (to plot two points instead of one for each calculation). Another thing is doing 100 iterations to find the minimum for each point. You don't need to do that many iterations to generate the pictures. In fact, I get the same ones with 32 iterations, thus dividing the time by 3. (Ed. Note: A similar point about Pickover's work was made by Malcolm Lichtenstein, who also wrote me in late November to show a different trick for speeding up output on his Amiga 500. It uses line segments instead of pixels -- analogous to the calculus strategy of approximating curves by lines.)

The next point is a serious criticism: You printed four pictures here and did not give the details. Producing fractals on computers takes a long time and it is not fair to the reader to produce an interesting picture but not tell him what needs to be done to obtain it (complete with details).

The only modifications you suggest for the program are to reduce the color ($Q\%+1$) modulo various numbers. That isn't what was done to produce the pictures. To produce picture number 2, one reduces $Q\%+1$ modulo 256 and then takes a color from 0 to 15 by replacing values larger than 15 by 15. Picture

number 3 is similar, but reduces modulo 32 first. Picture number 4 uses $Q\% = 150 * \text{SMALL}$ instead of $300 * \text{SMALL}$.

There is something strange about the program as well. In lines 140 and 150, you set the value of $Q\%$ and GOTO 180 depending on various things. (Ed. Note: No, actually *the author* did that...) Because line 180 resets $Q\%$, that does nothing except go to 180 -- which is evidently not a misprint, as going to 190 would create a much different picture by killing everything outside the Mandelbrot set.

On page 22 you give Charles Ashbacher's comments on polymorphic numbers. This material is nice. I presume Charles' observation is that $P(n,5)$ always has 5 as the last digit. (Ed.: Yep!)

From: Myer Boland (Manalapan, NJ - Nov. 12)
Dear Mike: Enclosed is my donation for Farrago 13. Now a few comments about Farrago 12...

Please, in the next newsletter, instruct program-makers to add PRINT statements and remarks to tell users how to proceed. I say that because some of the numerous programs lack instructions.

I'm enclosing a disk (1.44M) with many programs on it. I don't remember whether any are duplicates of some I sent you before... I'm enjoying all your stuff that you're doing for us *RECKers*.

In the final paragraph on page 22 you give a plug for Pickover and/or his books. Frankly, I am not all that impressed by Pickover, though his first book was interesting. You might want to be a bit cautious about RECommendations for his stuff...

Editor's Reply: I did not give details on the fractal graphics for a variety of reasons. First, the black-white printouts did not necessarily well reflect what the screen showed in color. Indeed, my printouts did not look like the original in *Fractal Report*, and I did not even change the program other than superficial titles and the like. Second, I was trying to encourage experimentation. Third, I do not believe that what Bob described is the way I actually got those pictures, though it is possible. But regardless, in view of my second point, I believe I succeeded in getting at least one person - viz., Bob - to explore!

Editor's Reply: Thanks for the kind closing words. Please let me know which programs need fixing up... Under separate cover you should have received from me a copy of the guidelines I send to prospective contributors of articles and/or programs. You will note that your point about instructions and Print statements is one of the first and most prominent of my criteria for all submissions... So, readers, please take note!

Thanks also for the disk. I'll include some of the programs on this issue's REC-on-Disk.

Harshad Numbers

By Charles Ashbacher, Contributing Editor

Editor's Introduction: The following QBASIC program from Charles Ashbacher searches for Harshad numbers,

```
10 CLS: DIM d(15)
20 PRINT "This program searches for Harshad numbers."
30 PRINT "Such numbers are integrally divisible by the"
40 PRINT "sum of their digits.": PRINT
50 PRINT "Program by Charles Ashbacher in response"
60 PRINT "to a reader challenge in Summer 103 REC."
70 total = 0: top = 10000
71 PRINT : INPUT "<ENTER> to run... ", a$
80 FOR num = 1 TO top
90 t1 = num
100 FOR i = 1 TO 15
110 d(i) = 0
120 NEXT i
130 count = 1
140 t2 = INT(t1 / 10)
150 d(count) = t1 - t2 * 10
160 IF t2 = 0 THEN GOTO 200
170 t1 = t2
180 count = count + 1
190 GOTO 140
200 sum = 0
210 FOR i = 1 TO count
220 sum = sum + d(i)
230 NEXT i
240 t1 = INT(num / sum)
250 t2 = num - t1 * sum
260 IF t2 <> 0 THEN GOTO 300
270 PRINT num;
280 total = total + 1
290 IF total/10=INT(total/10) THEN PRINT: 'Mac needs this
300 NEXT num
310 avg = total / top: PRINT : PRINT
320 PRINT "The ratio of Harshad numbers among first";
```

This runs under PC and Mac QuickBASIC and presumably PC GWBASIC as well. I've tested it and edited a tad, such as to allow easy change of number of numbers to test in line 70.

THE BIG SKI

Dear Mike: I recently read a problem in *Mathematics and Informatics Quarterly* that you may want to use.

A passenger carrying a ski recently attempted to board a bus. When asked how long it was, he replied that it was 1.6 meters in length. When told that no objects longer than one meter were allowed on the bus, he proceeded to put his skis in a cubical box with side length one meter. He was then allowed on the bus!

Editor's Reply: I love it (if only for the simplicity)! And it makes great sense, since the box itself does not violate the literal statement of the bus restriction on lengths. Explanation follows below in small print.

Charlie also cited the book *Mathematical Cranks* by Underwood Dudley after reading about my experience last issue with RB - whose full name is Roger L. Bagula. One fellow newsletter editor wrote to tell me of weird, complaining letters from this fellow, several **REC** subscribers have mentioned him, and two particularly said not to name them in **REC** - evidently concerned about being harassed & harangued by this obnoxious guy. I might add that I have just been named his "Outlaw of the Month" for his April 1994 issue, just coming out or out now (!). I have yet to figure out whether I am being excoriated or honored. However, all the distressing contacts with this brilliant but sick, anti-social individual lead me to expect nothing good.

Answer to Big Box Puzzle: There is no paradox. Place the ski along a body diagonal of the box. By the three-dimensional Pythagorean theorem, the length of this diagonal is $\sqrt{(1^2 + 1^2 + 1^2)} = \sqrt{3} \approx 1.732 > 1.6$, large enough for such skis.

Contest Updates and Prime Prize Contest

Last contest went well, except that the sponsor - Amaze, Inc. - was bought out by Delrina Software, which so far has refused to respond to my request to honor Amaze's commitment to award the prizes.

After I set up last one, I realized that the same contest would have been better using primes instead of composites - a point subsequently made by Contributing Mathematics Editor Prof. Fred Galvin.

Well, since it's time for another contest, I am going to follow the plan. Keep in mind that I will also want your programs to solve this:

Given the digits 0 through 9, your mission is to find two or more prime numbers that collectively use the

10 digits each exactly once and such that the product of your numbers is maximal.

Paraphrase: You are to choose at least two prime numbers. In creating the numbers, you are to use each of the 10 digits exactly one time altogether, so that each digit appears once in exactly one of your prime numbers. The object is to have the product of your numbers as large as possible.

Since I have not arranged any prizes, this one is purely for fun and your moment of fame. There is no deadline or special entry requirement, but if you use a program, I'd appreciate it and any text on disk. Thanks, and good luck all (but no luck is involved)!

CLOSE ISSUE #57

I wish all readers a joyous holiday season. In doing so, I humbly apologize for going back to such a small issue - which I do just to get something out on time. The truth is that I already have another 10

pages outlined, but not in finished condition, plus another 10 pages beyond that in very raw condition that will not be ready for many weeks. Fortunately, I have semester break to work on a larger issue #58,

replete with far more teasers, problems, reader letters, new programs, and a great new magic square that a contributing reader has graciously created for,

and dedicated to, yours truly. Thank you all!

Have a great new year! See you in 1994! Mike

ADDENDUM (January 2023)

Some of the content of this issue has been altered to reflect some changes. Why did I do this? First of all, there was the cover graphic that did not come out. Second, I was (foolishly) trying to get this to fit in the original 10 printed pages for this PDF. I could have succeeded by cutting down on the Close. (I was so close to cutting the Close!)

In the end, I decided not to edit the end but to add this addendum you are reading.

What changes? I edited some letters to waste a bit less space. I edited at least one program for the lines to fit nicer. I deleted one or two ads for **REC**-related offerings, things that really are no longer available. I changed the email to my current one.

There were some font issues, particularly related to my signature or personal fonts.

The cover graphic is now of one of my cats (at last count, five). FYI, there's a dog here, plus my domestic partner, Noelle McKay, living with me for the past seven years.

My life in retirement (since 2016): It is different, a kind of *Ship of Theseus* thing – I'm so different, and yet still me. (Look this up if that's not familiar.) One thing that has developed is my enormous collection of computers and kindred devices. I don't think I'm exaggerating when I mention that it is possible that I have a world record number (for an individual not in business). Of course, this begs the question of what counts as a computer, but the number is clearly well over 100, and likely as high as 150.

This is an odd kind of accomplishment to brag about, of course. I'm still active with problem-solving and once again serving as a problem section editor of a math journal. For the past two years I've also been working on my first novel, tentatively titled ***Xylemenium Doomsday: A Cosmic Encounter in Time***.

But I've also been spending time with working on archiving **REC**, a legacy project. For this I thank Steven Wentworth, with prodding by Prof. Ron Lancaster and Stephen Shaw (UK), who also contributed to this mammoth effort. As of now, at least, this is the only issue of **REC** that I've significantly fiddled with. As such, this addendum may wind up being noticed by even a tinier percent of the few who ever hear of **REC**.

Thank you for reading this, penned 18 January 2023. I can be reached at DrMWEcker@aol.com and would love to hear from you. *Best, Mike / Michael W. Ecker PhD*