

PuzzleCorner

report a new (for me at least) communication experience. I have met Puzzle Corner readers in strange places. For example, in August I literally bumped into one hiking in Grand Teton National Park. I am also aware that considerable science is accomplished while in airplanes (significant portions of GNAT, the GNU NYU Ada Translator, were written above 30,000 feet). However, the following paragraph taken from an e-mail message Ben Zuckerman sent to me is a first.

"By the way, I am typing and sending this message to you as I sit at 14,000 feet in the dome of the 10-meter Keck telescope near the summit of Mauna Kea, Hawaii waiting, without any real hope, for the clouds to go away so that we can open the dome."

I am sure you all join me in extending to Zuckerman the wish for eternal dark and clear skies. To see what astronomers think of while waiting for the skies to clear, see this issue's speed problem.

Problems

F/M 1. Larry Kells offers a sequel to his N/D 1 bridge problem, where 7NT was unbeatable despite one defender having 26 points.

On a later date, in another high-stakes game, I saw the same couple defend unsuccessfully against another 7NT, redoubled and vulnerable. This time in the aftermath they argued as follows:

Husband: That was really fine of you, the way you kept criticizing me for doubling 7NT when I didn't have all four suits stopped. You just did the same thing!

Wife: But I had THIRTY points! I knew we had to be able to beat 7NT. And we would have if you had led any card other than the one you did. They would have been down TEN!! But you had to lead

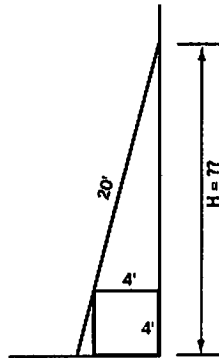
the one card that let them make it!
Husband: But how could I have known, when that suit was never bid?

Wife: You should have known that if you had led one of the other suits, and it turned out badly, at least they couldn't have run so many tricks in it!

Assuming they were telling the truth, reconstruct the deal.

F/M 2. Victor Baracas has a bunch of regular n-gons (prizes from winning the gon show?) and asks, "If a regular n-gon has area A and perimeter P, express the ratio $P^2/4A$ as a function and find the limit as n approaches infinity."

F/M 3. George Blondin wonders how high on the wall does a 20-foot ladder reach when it rests against the edge of a 4-foot cube?



Speed Department

Ben Zuckerman asks what letter completes the following set of letters: BADROP. He also wants the longest word or name one can construct from these seven letters (duplicates permitted).

Solutions

OCT 1. We begin with a Bridge problem from Jorgen Harmse:

♠ A K 3 2
 ♥ 9 8 3
 ♦ A Q 10 6
 ♣ 4 3
 ♠ 9 8 7
 ♥ 10 7 x 2
 ♦ 4 3 2
 ♣ 7 6 2

You lead the deuce of hearts against 3NT, and your partner's ace brings down Declarer's king. Your partner leads the queen and Declarer discards. Explain the importance of your third heart (marked x).

Unfortunately a misprint caused dummy to contain 14 cards including both the 10 and T of diamonds. Since T was to stand for 10, many readers figured out the error and were able to submit correct solutions, including the following offering from Doug Abramson.

The unidentified card x is either a 4, 5 or 6 and how it is played will determine if your team will be able to take 4 or 5 tricks in hearts. If not played correctly you may not be able to get back into your partner's hand using hearts while your team has the lead. Of course taking 5 off the top prevents 3NT from being realized by your opponent so in order to play it right depends on x:

If x is a 6 then it should be played on the second trick (your partner's queen). Your partner needs to be aware that at this point his jack is the only way back into his hand to win 5 tricks so he must next lead low to your 10 and allow you to lead your 7 back to his jack and other heart.

If x is a 4 or a 5 then the way to get 5 tricks is quite different. Instead you should play your 10 on his queen, your 7 on his jack and your x on his 6 so that the lead can stay in his hand for the full set of hearts.

I just have one question, how come when I play bridge I always get hands like West in this example, but I have never seen how I play my 4, 5, or 6 to be of any significance? I guess I was never that good at bridge anyhow, but it sure was a fun excuse for staying up all hours of the night at MIT.

OCT 2. Nob Yoshigahara has a color-based cryptarithmic problem. As usual, you are to substitute digits for letters to validate the following equations.

YELLOW + YELLOW + RED = ORANGE
 RED x BLUE = YELLOW
 RED x RED = WHITE

Steve Feldman found

```

  1 4 3 3 2 9
  1 4 3 3 2 9
+   - - 8 4 6
- - - - -
  2 8 7 5 0 4

                1 4 8
x           6 3 7 4
- - - - -
  9 4 3 3 5 2

                2 4 8
x           2 4 8
- - - - -
  6 1 5 0 4
  
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Although Feldman did not give his solution technique, several readers have said that computer searches show that the above solution is unique.

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SEND PROBLEMS, SOLUTIONS, AND COMMENTS TO: ALLAN GOTTLIEB
 NEW YORK UNIVERSITY
 715 BROADWAY, 10TH FLOOR
 NEW YORK, N.Y. 10012
 OR TO: GOTTLIEB@NYU.EDU

Puzzle

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OCT 3. Winslow Hartford writes that his mispent youth at conventions infested with salesmen convinced him to write the following in a column about cancer clusters for the *Charlotte Observer*: "Dollar-bill poker": This is a friendly scam practiced at conventions. As there are eight numbers on the bill and 10 digits in all, you'd think multiple digits would be rare. But of 10 bills drawn from my wallet, nine showed "clusters" (two full-houses, four two-pair, three one-pair). (The "operator" of this scam, having changed a \$50 bill in advance, is almost sure to have five of a kind). This report suggests a question for Puzzle Corner: How many random \$1 bills does the operator need to:

- a) have a 50% chance of 5 of a kind?
- b) have a 90% chance of 5 of a kind?

It is not clear whether 6, 7, or 8 of a kind qualify as 5 of a kind. I believe the normal convention is that it does not, agreeing with Howard Stern's solution given below. If you wish them to qualify, change 9^3 to 10^3 in Stern's solution. Alan Shuchat made this assumption and, with the help of Mathematica obtained 161 and 533 as the answers to parts a and b. It does appear that changing a \$50 bill does not ensure success. I can imagine that one might disallow 5555333 as five of a kind since it is some sort of super full house. However, I have not acted on that imagination. Here is Stern's solution:

First, determine the probability that a randomly drawn bill will show a 5 of a kind:

Since the two letters can never contribute to a five of a kind, their presence is irrelevant in determining the probability. The problem reduces to just looking at the 8 numbers. There are 10 digits possible (0 to 9) that can be used to form an 8-digit number. The total number of possibilities is the number of ways of arranging 10 distinct objects, 8 at a time, with repetitions allowed. This is:

$$10^8$$

There are 10 types of 5-of-a-kind hands, corresponding to the 10 different digits. The remaining 9 digits can be arranged in

9^3 ways since 3 additional numbers are needed to form an 8-digit number. However, there are

$$\binom{8}{5}$$

ways to arrange each type of 5-of-a-kind hand. Multiplying out gives:

$$10 \binom{8}{5} 9^3 = 408,240$$

total ways to get a 5-of-a-kind hand. The probability of a 5 of a kind is:

$$\frac{10 \binom{8}{5} 9^3}{10^8} \approx .00408$$

To find out how many bills are needed to have (at least one) 5 of a kind with probability, p , reason as follows: The probability of not having a 5 of a kind is $(1-.00408)^N$. Therefore, the probability of N bills having at least one 5 of a kind is $1-(1-.00408)^N$.

If $p=50\%$, then $N \geq 170$. If $p=90\%$, then $N \geq 563$.

Better Late Than Never

M/J 1. Dudley Church and Jorgen Harmse note that South must hold the diamond jack.

M/J 3. Charles Wampler writes "The 'trepidation' you mention in publishing the solution to M/J 3 is well-founded, as I imagine you are going to get a few comments on this one!" Indeed, I did. Due to space limitations, details will appear in the next issue.

Other Responders

Responses have also been received from J. Chandler, T. Chase, R. Eiss, M. Fountain, D. Goldfarb, D. Goldman, J. Grossman, T. Harriman, W. Hartford, R. Hess, A. Katzenstein, A. Ornstein, D. Rosato, D. Savage, L. Schaider, R. Seaforth, and I. Shalom.

Proposer's Solution to Speed Problem

Q. These are the only capital letters with closed loops. BARBARA.

and management. Thanks for the notes.—Helen Fanucci, secretary, 502 Valley Forge Way, Campbell, CA 95008, e-mail: <Fan-Group@aol.com>

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The following information comes out of the Space Systems Lab at the University of Maryland: Susan and John Piotti are the proud parents of Anna Piotti, born in August

1994, their first. . . . Robert Kline-Schoder recently moved from Palo Alto to Norwich, Vt. . . . Charlie Lamb and Linda Lee are living in Lexington, Mass. . . . Howard Colodny is in Amsterdam. . . . Walter K. Daniel is in Bowie, Md., working for ITHACO Space Systems.

Michael Santullo and his company, Sled

Corp., have introduced a new Internet service that allows people, including classmates, to find Internet addresses for people they are trying to correspond with. The service is free and you can find out more about it by e-mailing Mike at <santullo@sled.com> or <http://www.four11.com>. The Four11 service already has 500,000 Internet addresses listed. You can search for people by a variety of criteria and can even get public keys to send confidential messages.

James F. Kirk is in Newberry, Fla., where he writes that he is on the home stretch, finishing up a PhD in materials science at the University of Florida. James notes that by this time next year he hopes to be a productive member of society once again. . . . Dan Schwin's company, Shiva Corp., is going public. The company, based in Burlington, Mass., filed a 2.1 mil-

lion share offering through Goldman Sachs and Cowen & Co. By the time this is printed, you can look the stock up on NASDAQ with the symbol SHVA. . . . Matt Haggerty's company, Product Genesis, was recently featured in the *Boston Herald* (and you thought Matt's publicist only had an "in" with your class secretary). Product Genesis, based in Cambridge, Mass., now employs 40 people and is up to \$5 million in annual sales.

Please keep those cards and letters coming.—Jonathan M. Goldstein, secretary, c/o TA Associates, High Street Tower, 125 High St., Suite 2500, Boston, MA 02110, Fax: (617) 574-6728

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Just a quick update this month. Suzanne Greene-Burcat is now married (as you can tell from her new last name), living in San Jose, Calif., and a mother! "Hope everyone

had fun at the reunion," she writes. "Sorry I had to miss it. I didn't make plans to go because I thought I'd be nine months pregnant. Instead I was home trying to figure out how to take care of a week-old baby! Bryan Abraham Burcat was born May 29, 1994. He is a beautiful and wonderful baby! (Really! I'm just saying it because it's true!)" . . . Marc DiNardo married Elizabeth Thompson Drum this past August. The newlyweds are living in Wyncote, Pa. Marc works as an aeronautical engineer for Martin Marietta Corp.

Zahid Ansari has been promoted to VP for product engineering at Orbit Semiconductor in Sunnyvale, Calif. Zahid is responsible for all post-fabrication operations as well as support of Orbit's ENCORE! software. In the 12 months that he's been there, his responsibilities have grown by 300 percent. "This dramatic growth makes Orbit an exciting place to be," he says. Before joining Orbit in 1993, Zahid was an independent consultant for two years, an engineer working on GaAs PLDs at Triquint Semiconductor, and a designer of bipolar and CMOS programmable logic at Monolithic Memories.

Send me your news, classmates! No matter how mundane, trivial, shameful, outlandish, or downright embarrassing, I'll plaster these pages with it and make you famous for an instant. (Now who else can promise you that?)

This month's tag line is: I'm so glad we had this time together. We'll start the day tomorrow with a brand new...column!—Jonathan Miller, secretary, 78 Roosevelt Cir., Palo Alto, CA 94306; tel: (415) 494-7430; fax: (415) 813-1130; e-mail: <jonathan_miller@logitech.com>

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10th Reunion

It is a light month for news. Steve Soares writes, "Kirsten Domingo, '90, and I attended the wedding of Rich Higgins and Karen Henderson on September 22. Other MIT '85s from Next House attending were Walter Baker (best man), Eric Liebler, Roy Wetherbee, Dan Boder (ushers), David Wu, Dave Trempel and wife Debbie, Babak Ashrafi, '86, Jerry Knaublach and wife Connie (hope I didn't forget anyone). Dave Trempel and his wife are expecting their second child. Dave Wu is back in Mas-