Computer Game Thriller

This Issue's Puzzles

Mr. Green, a disgruntled employee of a computer software company called GameShop, is given a lay-off notice. Having some grudge against the company's management, he decides to infect a recently written computer game, *Levels*, with a virus that threatens to wipe out all the files on the GameShop's computer system. Sales of the game are vital to GameShop's survival, and the game cannot be pulled. Somebody needs to get into the coding and remove the virus. Mr. Green, however, left a note to the virus tester, Mr. Orange, telling him to read instructions carefully before proceeding.

Levels is a very simple game. A player wins the game if he or she completes 1,024 levels by collecting diamonds.

When Mr. Orange turned on the game, the note from Mr. Green appeared. It read as follows: "The virus I wrote does not affect the game at a number of consecutive levels, starting from level 1. However, beginning with a certain level and above, the virus is active and may damage the computer system. You have only two lives. If you test a level and there is no virus, you can test another level. If you hit the virus, you lose the first life. If you hit the virus on your second life, an irreversible process will start and GameShop will lose all its files. Once you correctly determine the level at which the virus is activated, you can kill the virus and the computer system will be saved. You have one hour to find the virus. The clock has started. Good luck!"

Mr. Orange knows that it takes exactly one minute to test a single level for the presence of virus. In addition, it takes five minutes to deactivate the virus if it's found. Assuming no time is wasted between testing different levels, please answer the following questions:

1. When will his job be completed?
2. Will he be able to save the company's files?
3. What is the maximum number of levels the game can have so that one hour is just enough to detect the infected level and kill the virus?

Solutions to Last Issue's Puzzles

Logicians at King Louis's dinner. Three brilliant, flawless logicians-A, B, and C-having solved all hat problems so far, found themselves at a dinner party hosted by a tyrant king Louis the Horrible. King Louis was known to be very generous to anyone who could solve his puzzles. At the same time he did not tolerate if someone was not up to the challenge and the result was beheading.

Each of the three logicians was blindfolded and randomly drew a hat from a sack that contained three hats with positive integers written on each hat. Each logician took a hat and placed it on his/her head. Their blindfolds were then removed; they faced each other in a circle and each could see the hats the others were wearing, but not his/her own hat.

They knew that two of the numbers added up to the third. In order to be generously rewarded they needed to figure out what number was written on their hats.

Here is the conversation that took place:

Logician A: "I don't know what my number is".

Logician B: "I don't know what my number is".

Logician C: "I don't know what my number is".

Logician A: "Now I know what my number is. It is 50".

Immediately afterwards the other two logicians knew their numbers.

What are the other numbers and why did logician A spoke only at round 2?

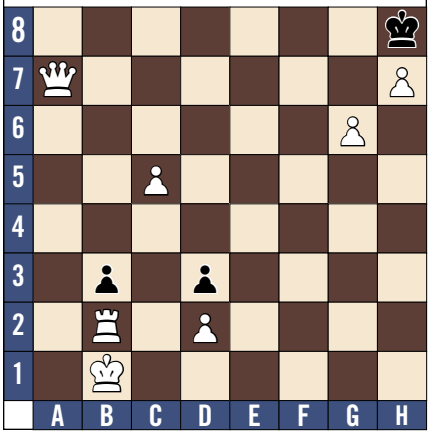
Answer: 20 (logician B) and 30 (logician C).

I would like to start by apologizing for not being clear on what I was looking for. I hoped to see a solution, result of which would be the actual answer to the puzzle. However, most of the readers guessed the correct answer and then showed why logician A ('A') would speak in round 2. Such an approach does not show uniqueness of an answer, though. There were only three people, David Promislow, Noam Segal and Virginia Young who presented a *complete* solution of the puzzle. David and Noam, actually, provided a more generic approach. It is clear that A would speak immediately (in round 1) only if the other numbers are equal. In such a case, she would know that her number is double the number she saw on logician B's (B) or C's (C) hat. It can be shown that, in general:

- B would speak in round 1 if the combination of numbers on A's, B's and C's hats corresponds to all positive multiples of vectors (1,2,1) and (2,3,1);
- C would speak in round 1 if the combination of numbers on A's, B's and C's hats corresponds to all positive multiples of vectors (1,1,2), (2,1,3), (1,2,3) and (2,3,5);
- A would speak in round 2 if the combination of numbers on A's, B's and C's hats corresponds to all positive multiples of vectors (3,2,1), (4,3,1), (3,1,2), (4,1,3), (5,2,3) and (8,3,5).

CHESS PUZZLE

White to Move and Mate in Three



Given that A did speak in round 2 and her number was 50, the only answer would be 20 for B and 30 for C. If you need additional information on the generic solution please write to Noam or David directly. Their e-mail addresses could be found on the SOA web site.

Here is how the logicians reason given that A wears hat with number 50:

1. "A": I could have 50 or 10. I cannot deduce anything at this point.

2. "B": I could have 20 or 80. I cannot deduce anything at this point.

Solutions may be e-mailed to
cont_puzzles @yahoo.com
or mailed to
Puzzles, 25 Sparrow Walk,
Newtown, Pa. 18940.

In order to make the solver lists (separately maintained for the regular and chess puzzles), please submit your answers and solutions by May 31, 2005. Depending on the response volume, solver lists may contain only the names of people who solved puzzles on first attempt.

3. "C": I could have 30 or 70. I cannot deduce anything at this point.

4. "A": If I had 10, then consider C in round 1. C would have reasoned as follows: "I could have 10 or 30. If I had 10, B would have spoken out since A and C had the same numbers. Therefore, I have 30. I will say this now." However, C was silent. It means I have 50.

Chess Puzzle. White to move and mate in three.
Initial position:
White: Ka4, Qc2, Nc7, Bf4
Black: Kd4, Bh3, pawns: c5, f3, f7, g4

► **Case A.** **1.** Bc1—any response except f2, Ke5 or c4; **2.** Bb2+ Ke3; **3.** Nd5#

► **Case B1.** **1.** Bc1 f2; **2.** Qe2—any response except c4; **3.** Bb2#

► **Case B2.** **1.** Bc1 f2; **2.** Qe2 c4; **3.** Qe3#

► **Case C1.** **1.** Bc1 Ke5; **2.** Qxc5+ Ke4; **3.** Qd5#

► **Case C2.** **1.** Bc1 Ke5; **2.** Qxc5+ Kf6; **3.** Qg5#

► **Case D1.** **1.** Bc1 c4; **2.** Qf5—any response except c3; **3.** Nb5#

► **Case D2.** **1.** Bc1 c4; **2.** Qf5 c3; **3.** Qd5#

Solver lists

Due to an administrative deadline, names of only those people who submitted correct solutions by March 31, 2005, are shown on the lists.

Logician Puzzle: *Noam Segal*, David Promislow*, Virginia Young*, Geoff Bridges, Bob Byrne, Chris Chase, John Cook, Brad Dow, Gary Faber, Michael Failor, Chris Fievoli, Steven Gallancy, Bob Hupf, James Kenney, Albert Kovalyov, Chi Kwok, Warren Leisinger, Bruce Lundeen, Anna Mayzel, Lee Michelson, David Oakden, Brad Ramirez, Carver Roya, Kurt Schneider, Sally Smith, Al Spooner, Elnatan Sulimanoff, Kevin Trapp, Zorast Wadia, Matthew Wickwire*

** sent complete solutions*

Chess Puzzle: *Mike Crooks, June Meimban, Lee Michelson, Kevin Trapp*