

I U P U I
MATH CLUB TEASER #40

March 26, 2010
(due April 2, 2010)

SOLUTION

First, let's find out how many cheese bits are awarded per game. This number divides 39 (the total number of bits awarded so far), so it is 1, 3, 13, or 39. The first two options are not possible because there would not be enough to award 1st, 2nd, and 3rd places. Also, 39 bits per maze would mean that only one maze was run, and we know there were at least two mazes. In short, every maze awards 13 bits of cheese.

Next we find the value of x (number of bits awarded for 1st place). If $x \leq 7$, the only way Alice can earn 20 bits is by winning $x = 7$ twice and $y = 6$ once (for her 2nd place). But that leaves one 1st and two 2nd places for Bob and Carol, so one of them would earn 12 bits of more. This does not happen, so $x \geq 8$.

Now, the mouse that finished 1st in the first maze gets at least $x + 1 + 1 \geq 10$ cheese bits, so it can only be Bob. Even more, since Bob got exactly 10 bits, we know now that $x = 8$ and z (the number of bits earned by a 3rd place) is equal to 1. Since $x + y + z = 13$, we have $y = 4$.

Alice must have earned 4 bits in the first maze and 8 bits in each of the other two mazes. Bob got 8 bits in the first and 1 in each of the others. Then **Carol placed 3rd, 2nd, 2nd, for a total of $1 + 4 + 4 = 9$ points.**

SOLVED BY:

Captain Nemo, Think Before you Act.