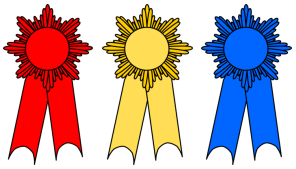

Problem of the Week
Problem E and Solution
Best in Show

Problem

Four puppies, Bruno, Kitty, O'Reilly, and Sweetie, competed in the Annual Puppies of the World Fair. Prizes were awarded for the top three competitors as follows: first place received a Red Ribbon, second place received a Yellow Ribbon, and third place received a Blue Ribbon.

Three members of the audience predicted how the prizes would be awarded.

- Lucie predicted that Sweetie would win a Red Ribbon, Kitty would win a Yellow Ribbon, and O'Reilly would win a Blue Ribbon.
- Jenn predicted that Bruno would win a Red Ribbon, Sweetie would win a Yellow Ribbon, and O'Reilly would win a Blue Ribbon.
- Brenton predicted that Kitty would win a Red Ribbon, Bruno would win a Yellow Ribbon, and Sweetie would win a Blue Ribbon.

It turns out that each audience member predicted exactly one prize winner correctly.

Determine which dog won which prize.

Solution

Let's look at Lucie's prize predictions. Assume she is correct that Sweetie won a Red Ribbon. This leads to the following six possibilities.

First - Red Ribbon	Second - Yellow Ribbon	Third - Blue Ribbon	Fourth - No Prize	
Sweetie	Bruno	Kitty	O'Reilly	(1)
Sweetie	Bruno	O'Reilly	Kitty	(2)
Sweetie	Kitty	Bruno	O'Reilly	(3)
Sweetie	Kitty	O'Reilly	Bruno	(4)
Sweetie	O'Reilly	Bruno	Kitty	(5)
Sweetie	O'Reilly	Kitty	Bruno	(6)

Since the other two parts of Lucie's prize prediction are not correct, Kitty cannot win a Yellow Ribbon prize so we can rule out (3) and (4), and O'Reilly cannot win a Blue Ribbon so we can also rule out (2). This leaves (1), (5) and (6) as the only possibilities for Lucie.

First - Red Ribbon	Second - Yellow Ribbon	Third - Blue Ribbon	Fourth - No Prize	
Sweetie	Bruno	Kitty	O'Reilly	(1)
Sweetie	O'Reilly	Bruno	Kitty	(5)
Sweetie	O'Reilly	Kitty	Bruno	(6)

Now look at Jenn's prize predictions in light of Lucie's three valid possibilities. Jenn makes exactly one true prize prediction. None of Lucie's possibilities would ever make one of Jenn's prize predictions true. Therefore, our original assumption that Lucie correctly predicted Sweetie to win a Red Ribbon was incorrect.

So now we assume that Lucie correctly predicts that Kitty would win a Yellow Ribbon prize. This leads to the following six possibilities.

First - Red Ribbon	Second - Yellow Ribbon	Third - Blue Ribbon	Fourth - No Prize	
Bruno	Kitty	O'Reilly	Sweetie	(7)
Bruno	Kitty	Sweetie	O'Reilly	(8)
O'Reilly	Kitty	Bruno	Sweetie	(9)
O'Reilly	Kitty	Sweetie	Bruno	(10)
Sweetie	Kitty	Bruno	O'Reilly	(11)
Sweetie	Kitty	O'Reilly	Bruno	(12)

Since the other two parts of Lucie's prize prediction are not correct, Sweetie cannot win a Red Ribbon so we can rule out (11) and (12), and O'Reilly cannot win a Blue Ribbon so we can also rule out (7). This leaves (8), (9) and (10) as the only possibilities for Lucie.

First - Red Ribbon	Second - Yellow Ribbon	Third - Blue Ribbon	Fourth - No Prize	
Bruno	Kitty	Sweetie	O'Reilly	(8)
O'Reilly	Kitty	Bruno	Sweetie	(9)
O'Reilly	Kitty	Sweetie	Bruno	(10)

Now look at Jenn's prize predictions in light of Lucie's three valid possibilities. Jenn makes exactly one true prize prediction. Possibility (8) is the only one of the possibilities that works for Jenn.
Now we must check Brenton's prize prediction to see if it is still valid with (8). Brenton predicted that Kitty would win a Red Ribbon, Bruno would win a Yellow Ribbon and Sweetie would win a Blue Ribbon. This prediction works since exactly one of Brenton's prize predictions, that Sweetie wins a Blue Ribbon, is true. The other two predictions are false.

We should check to see that this is the only correct solution. We do this by assuming Lucie's third prediction, O'Reilly wins a Blue Ribbon, was her only correct prediction. This leads to the following six possibilities.

First - Red Ribbon	Second - Yellow Ribbon	Third - Blue Ribbon	Fourth - No Prize	
Bruno	Kitty	O'Reilly	Sweetie	(13)
Bruno	Sweetie	O'Reilly	Kitty	(14)
Kitty	Bruno	O'Reilly	Sweetie	(15)
Kitty	Sweetie	O'Reilly	Bruno	(16)
Sweetie	Bruno	O'Reilly	Kitty	(17)
Sweetie	Kitty	O'Reilly	Bruno	(18)

Since the other two parts of Lucie's prize prediction are not correct, Sweetie cannot win a Red Ribbon so we can rule out (17) and (18), and Kitty cannot win a Yellow Ribbon so we can also rule out (13). This leaves (14), (15) and (16) as the only possibilities for Lucie.

First - Red Ribbon	Second - Yellow Ribbon	Third - Blue Ribbon	Fourth - No Prize	
Bruno	Sweetie	O'Reilly	Kitty	(14)
Kitty	Bruno	O'Reilly	Sweetie	(15)
Kitty	Sweetie	O'Reilly	Bruno	(16)

Now look at Jenn's prize predictions in light of Lucie's three valid possibilities. Jenn makes exactly one true prize prediction. Possibility (15) is the only one of the possibilities that works for Jenn. In both (14) and (16) Jenn would make at least two correct prize predictions.
Now we must check Brenton's prize prediction to see if it is still valid with (15). Brenton predicted that Kitty would win a Red Ribbon, Bruno would win a Yellow Ribbon and Sweetie would win a Blue Ribbon. Since two of Brenton's prize predictions would be true in (15) but Brenton only made one correct prize prediction, (15) does not work for Brenton.

Therefore, the only possibility is that Bruno finishes first and wins a Red Ribbon, Kitty finishes second and wins a Yellow Ribbon, and Sweetie finishes third and gets a Blue Ribbon. O'Reilly finishes fourth.