**Problem of the Week**

There are a number of problems that involve weighing items on scales. Here are two. The first one is a new one (to me) that I came across lately. The other an old favorite. Feel free to submit a solution to either or both. Enjoy.

40. Suppose you are given two red balls, two blue balls, and two white balls, together with the information that one ball of each color has weight $A$ and one ball of each color has weight $B$, with $A$ not equal to $B$. Using only an equal-arm balance, what is the smallest number of weighings that suffices to learn the weights of all of the balls?

41. Weird Wizard Wally offers you the following challenge. Wally will provide you with an equal-arm balance and $n$ visually indistinguishable coins. Exactly one of the $n$ coins is counterfeit and either slightly heavier or slightly lighter than the remaining coins, but you are not told which. You are allowed only three weighings, after which you must identify the counterfeit coin and whether it is too heavy or too light. If you are correct, you keep all the coins ($n - 1$ valuable coins and one worthless coin). If you are incorrect, you get nothing.

How many coins should you choose? (How large should $n$ be?)

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How the Problem of the Week works:

1. **Any Calvin Student** is invited to participate in the Problem of the Week on any week. Solutions (or partial solutions) may be submitted by individual students or by groups of students.

2. **Copies** of the Problem of the Week will be hung on the bulletin board outside the Department office and in various locations around the Department of Mathematics and Statistics. Additional copies are available in one of the boxes outside the office and on the web at [http://www.calvin.edu/~rpruim/pow/](http://www.calvin.edu/~rpruim/pow/)

3. **Solutions** to this problem are due on **Thursday, October 4**. Solutions should be turned in to Professor Pruim (NH 284). Be sure to include your name(s) on your paper.

4. **A list of solvers and example solutions** will be posted on the bulletin board outside the Mathematics Department office.