CSC/MAT-220: Discrete Structures
EFY 7

Thomas R. Cameron

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Find the counterfeit. You are given a pan balance and 12 coins. All 12 coins are identical with the exception that one is of a different weight. Find the minimum number of weighings needed to guarantee that you can find the coin that differs.

Provide a clear and concise explanation of your answer.

Find John and the liar. There are two twins, one of whom name is John and the other name I don't remember. What I do remember is that one of them always lies and the other always tells the truth. Suppose you meet the two brothers on the street one day. Devise a three word question, answerable by yes or no, to determine which one is John. Next, devise a three word question, answerable by yes or no, to determine whether John is the liar or the one who tells the truth.

Use truth tables in your explanation.

Find the problem. The Barber of Seville lived in Seville and shaved all of and only those inhabitants of Seville who did not shave themselves. Did the Barber of Seville shave himself?

Provide a short logical description of your answer.