

CS111: Introduction to Computer Science – Recitation 1

Exercise 1: Weighing Coins

a. Assume that you have 8 coins, and you know that 7 are ‘okay’ but one is ‘bad’. You know that the bad coin has a different weight than the good coins, but you don’t know whether it is heavier or lighter.

Construct an algorithm to find out which is the bad coin using just 3 weighings on a balance scale. (Hint: Find a way to determine that half of the coins are ‘okay’ with just 1 weighing.) Write your algorithm in the form of a flowchart.

b. Now do the same thing assuming that you have 9 coins, one of which is bad. (Still use just 3 weighings to find the bad coin.)

c. And now for a real challenge, do the same thing assuming that you have 13 coins.