Four the Same

Imagine a square platform that can rotate about its centre. On each of the four corners of the platform is an identical container with a lid. Inside each container is a coin. Each coin can show either heads or tails. The coins are also identical. No part of the apparatus can be marked not the coins, containers, or any part of the platform. This set-up is part of a puzzle that works as follows:

- Initially, the containers with coins are locked and you cannot look inside.
- When you press '*start*' the coins in the containers are shaken up, so that each one is randomly placed in a certain position, either heads or tails.
- When you press '*continue*' the lights go out and the platform turns around its centre and stops at a random point (like a roulette wheel). The lights come on again.[1]
- The containers unlock and you are now allowed to look inside any two containers (as soon as you have opened two the others lock again).[2]
- You may change the way the two coins you can see are placed, from heads to tails or vice versa (you may change none, one, or two).
- You close the containers and press '*continue*'; the previous three steps are repeated until you have solved the puzzle.
- The puzzle is solved when all the coins are turned the same way, either all heads *or* all tails. When this state has been reached a bell will ring to tell you that you have solved the puzzle successfully.

Task

1. Devise a method by which you can guarantee to solve this puzzle in a finite number of steps.
2. Find the minimum number of steps in which you can solve it.
3. Write a report, clearly describing your method and why it will work.

[1] Your night vision is poor, and you have no way to make a light, so you cannot tell which corner is which.

[2] You are not allowed to open first one, look inside and on the basis of what you see decide which other one to open. You must decide which two before you open them.

Relates to Objectives

1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.9, 2.10, 4.1, 4.2, 4.7, 4.8

(1 point, Group)