Warm-Up: Passing Balls

Prepared by Mark on January 27, 2025

Problem 1:

Twelve people are standing in a circle. Each is assigned a number between 1 and 12. Participants numbered 1, 2, 3, and 4 hold red, green, yellow, and black balls, respectively. Everyone else is empty-handed.

Each participant can pass their ball to any student that is exactly 5 positions away. Balls cannot be passed to someone who has one in hand.

After a number of passes, the first four participants again hold all the balls. Participant 1 has a black ball. Which balls are held by participants 2, 3, and 4?