1 Gift organisation

Author: Lotte Weedage (University of Twente)
Project: 4TU.AMI

1.1 Challenge

The elves need your help! There is a large, perfectly square warehouse in Santa's village where they store all gifts. To be sure they do not miss any gift, they arrange their gifts as follows: the first gift is stored in the exact middle of the warehouse, and every next gift is stored 1 meter away in a counter clockwise spiraling motion around this gift. In Figure 1 we show an example: the first gift is in the middle, the second gift is stored one meter to the right of this gift, the third gift one meter above the second gift, et cetera. The system can also be seen as a two-dimensional grid: we call the location of the first gift $(0,0)$, then the location of the second gift is $(1,0)$.
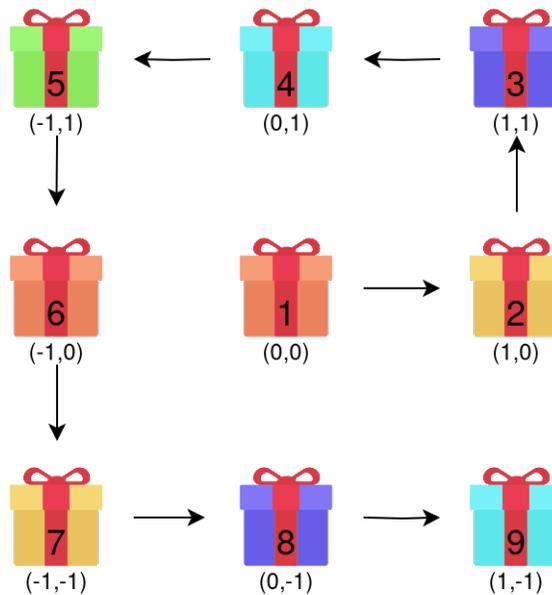

Figure 1: The organisation of gifts in the warehouse.

Moreover, there are 5 types of gifts: peach, yellow, purple, turquoise and green ones. The gifts need to be stored in this exact order. The first gift (in the center of the warehouse) is peach, the second gift is yellow, the third purple, et cetera. After the five colors, we start again with peach.

One day, when almost all gifts were already delivered and therefore not anymore in the warehouse, the cleaning elves had to clean the warehouse and did not know about this important ordering system of the other elves. They moved around all remaining gifts. Now, the gift elves are panicking since they do not know anymore which gifts need to be on location $(-49, 50)$ and $(-39, 49)$.

What is the color of the gifts at locations $(-49, 50)$ and $(-39, 49)$?

Possible answers:

1. The gift at $(-49, 50)$ is peach and the gift at $(-39, 49)$ is turquoise.

2. The gift at $(-49, 50)$ is yellow and the gift at $(-39, 49)$ is turquoise.

3. The gift at $(-49, 50)$ is green and the gift at $(-39, 49)$ is green.

4. The gift at $(-49, 50)$ is green and the gift at $(-39, 49)$ is turquoise.

5. The gift at $(-49, 50)$ is purple and the gift at $(-39, 49)$ is peach.

6. The gift at $(-49, 50)$ is yellow and the gift at $(-39, 49)$ is purple.

7. The gift at $(-49, 50)$ is purple and the gift at $(-39, 49)$ is yellow.

8. The gift at $(-49, 50)$ is peach and the gift at $(-39, 49)$ is purple.

9. The gift at $(-49, 50)$ is turquoise and the gift at $(-39, 49)$ is green.

10. The gift at $(-49, 50)$ is purple and the gift at $(-39, 49)$ is turquoise.