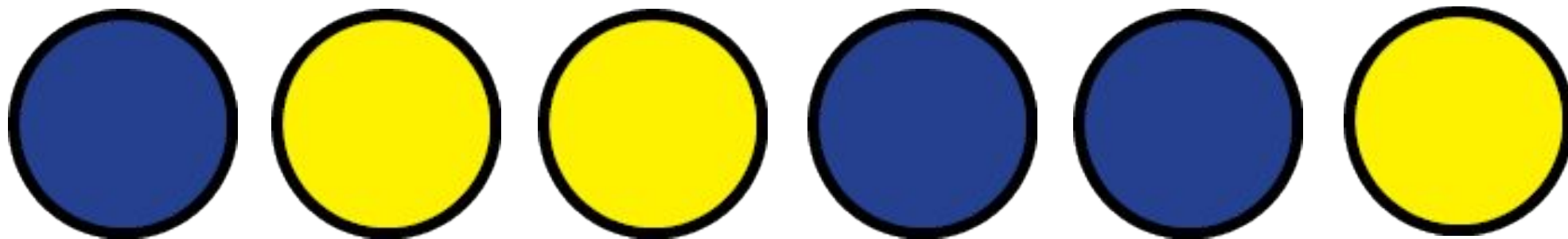# Blue Dot Solitaire

**Objective:** Remove all dots.

Setup:

Make a line of dots, and choose any number of them to be blue. Make the rest yellow. Below is an example with 6 dots.

Rules:

1. You may only remove blue dots, one at a time.
2. When you remove a blue dot, any dots next to it change color, either from blue to yellow or yellow to blue. For example, when the fourth dot is removed, the two dots circled in red change color.
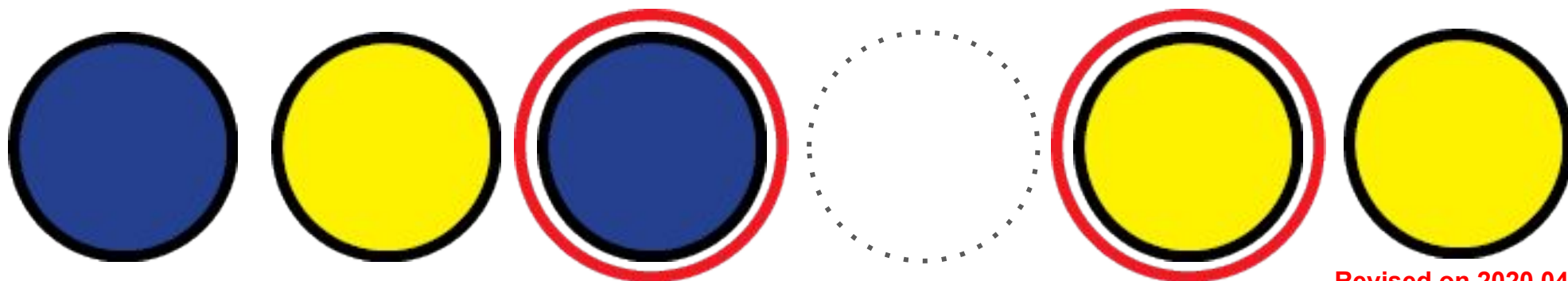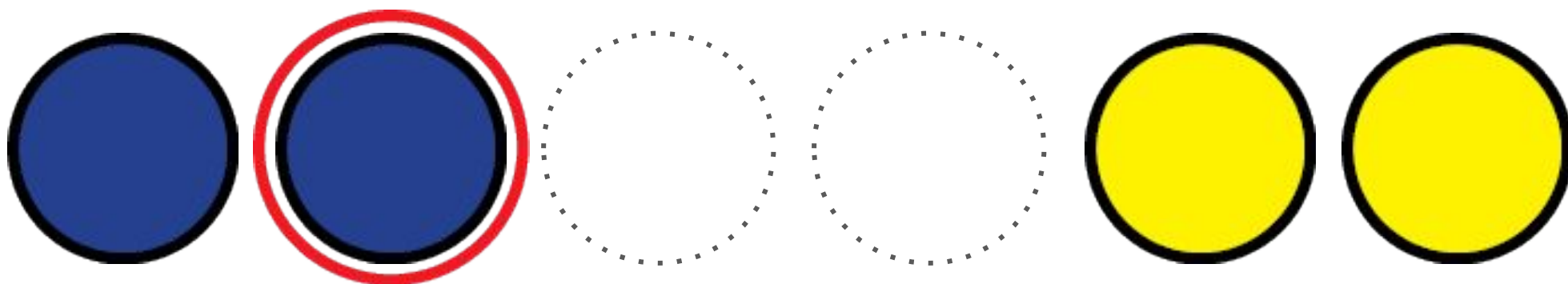
Rules:

3. If there is a space between two dots, they do not affect one another. When the blue dot next to the empty space on the previous slide is removed, only the dot circled in red changes color.
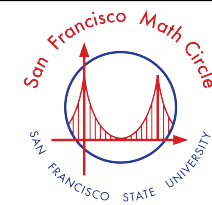

4. If there are only yellow dots left, then there is nothing left to do. When the blue dot on the right is removed, the last blue dot changes to a yellow dot. We can't do anything else except to reset and try again!
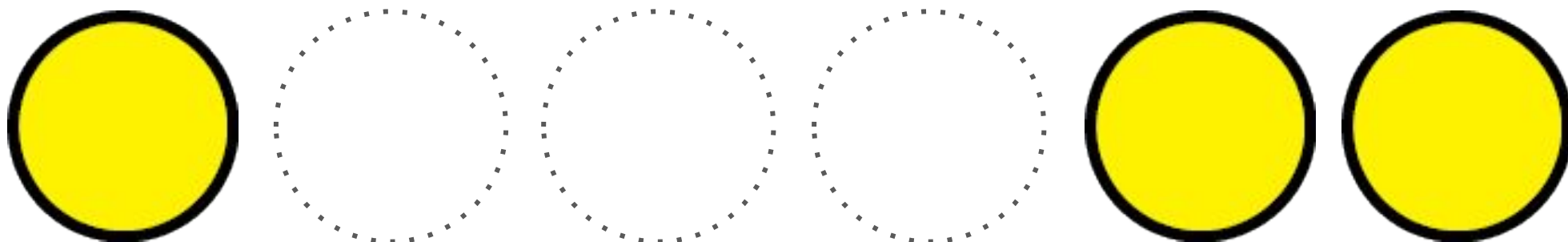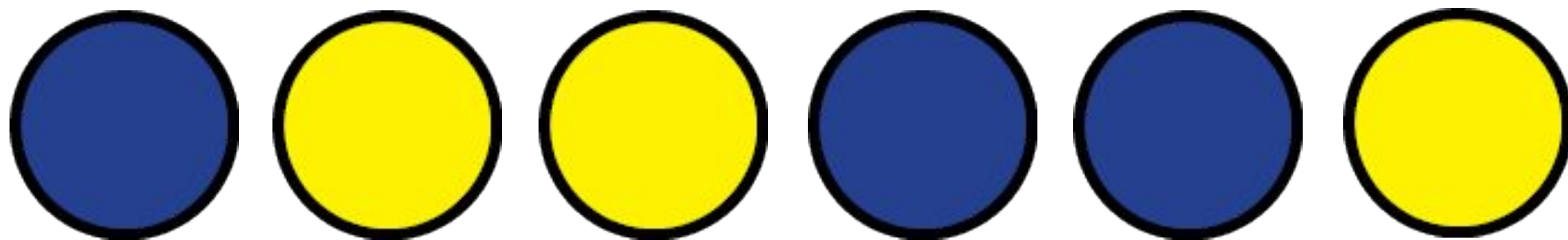
Questions:

1. There is a way to remove all the dots in the example we walked through (reprinted below). How can you do it? Can you find more than one way to do it?

2. Create and play with your own patterns of dots. While playing, try to answer one or more of the following questions:

   a. What would be a good strategy to remove all dots if you started with only 3 dots?

   b. How many different patterns can you find with 4 dots? What makes them different? For which of these patterns can you remove all of the dots?

   c. Start with 1 blue dot and 3 yellow dots. Can you remove all of the dots? How about 1 blue dot and 4 yellow dots? 1 blue dot and any number of yellow dots?

   d. Come up with your own question(s) and try to answer them. Share them with others!

Challenge Questions:

1. Find at least two different rows of 6 dots for which it is impossible to remove all of the dots. Why is it impossible for these patterns?

2. Given any row of 6 dots, can you figure out a way to determine whether it is possible to remove all of the dots just by looking at the initial pattern?

3. What about if you started with a row of 5 dots? 7 dots? N dots?