

## Lab 5.2 - Lots of Balls

In this lab, you will use cloning to create many identical sprites without having to reprogram each one individually.

### Part 1 - Follow the bouncing ball

1. Create a SNAP program that contains a single sprite. When the green flag is clicked, the sprite should go to the center of the stage, pick a random direction, and start moving in the chosen direction. If the sprite hits a wall, it should bounce off and keep moving.
2. Modify the program to be controlled by the stage rather than by the sprite itself. When the spacebar is pressed, the stage should broadcast a message that triggers the sprite's movement. Pressing the spacebar again should restart the sprite's movement, including a new speed and new direction.
3. What would you need to do to add a second bouncing ball (that behaved in the same way) to the program? What about 10 balls? 100 balls? What would happen if you wanted to change the speed of all the balls in the program after you had created 100?





#### Big Ideas

##### Personal design interests require the valuation and refinement of skills

As you complete this lab you are probably starting to think of how the random movement of sprites can be incorporated into some type of video game. Perhaps you have an idea of a sports game, or a ball avoidance game, or a Martian invasion type of game. You have developed a lot of skills that will help you complete these types of game, but it's important for you to also consider what skills are missing. Are there other components of a video game that you perhaps don't understand yet? What can you do to learn more about these components? Are there online tutorials, printed materials, experts in your area?

Evaluating your own skills and refining them is an important aspect of computer programming. There are always new technologies to learn and new concepts to apply. A computer programmer is always learning something new, and you should be too!

### Part 2 - Clones!

1. Modify your program so that, instead of a single sprite restarting each time the spacebar is pressed, a new clone of that sprite is created. You'll want to use the  and  blocks in place of  and .
2. What happens to the original ("master") sprite each time the spacebar is pressed? Does that seem useful? What role should the original sprite play now that we're cloning?



## Introduction to Computer Science

3. Modify the program so that the original ("master") sprite hides at the beginning of the program and each new sprite appears when it is created.
4. BONUS: Assign each clone a different value for some properties, such as speed, color, or size. Try controlling these values from the master sprite rather than having each clone choose its own.



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<b>Lab 5.2 Criteria</b>	
1.1 One bouncing sprite	0.5 points
1.2 Sprite controlled by stage	0.5 points
2.1 Clones created by stage	0.5 points
2.3 Hide master sprite	0.5 points
2.4 Sprites have different properties	0.5 points
<b>PROJECT TOTAL</b>	<b>2.5 points</b>