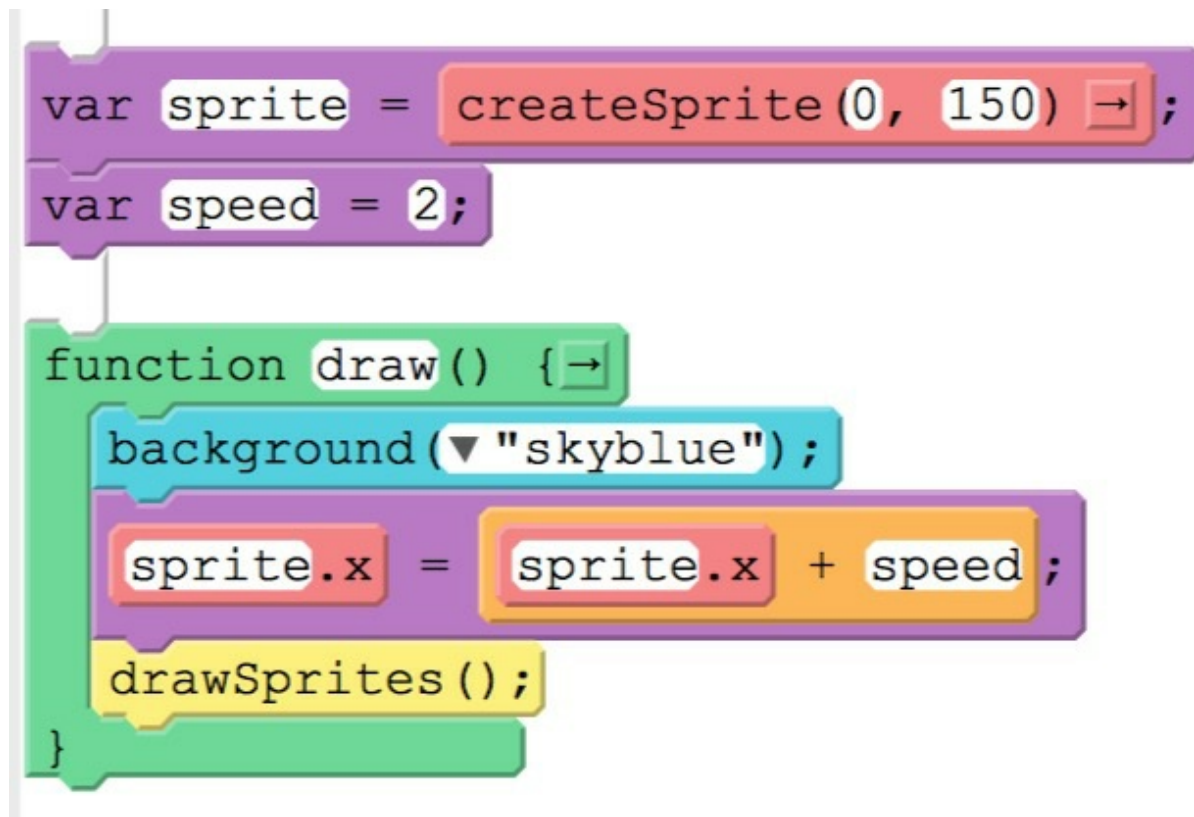# Lesson 8: The Counter Pattern

Patterns are insights into writing code that give us solutions to commonly occurring problems that we need to solve as we create programs. One of the most common problems is implementing an incremental change over time - for example a sprite moving across the screen - the **counter pattern** gives us a very simple solution to this problem.

The Counter Pattern

The counter pattern works by repeatedly adding (or subtracting) a value to a counter. In our example the counter is **sprite.x**, the value we add is **speed** and the **draw()** loop provides the repetition. In this example the counter is used to move the sprite across the screen.

If you want some practice with the counter patter before diving into the project, the first half of lesson nine on the Code.Org website

Learning Targets:

- I can explain how a sprite's location properties (*sprite*.**x** and *sprite*.**y**) can be used to make the sprite appear to move on the screen.
- I can read and follow the steps of a short program written in **pseudocode** that manipulates variable values.
- I can describe and use the **counter pattern** in a program that moves a sprite in my scene.

Project

For this project we will use the **Project** facility on the Code.Org web site to create an animated scene using the full GameLab IDE.

Before you start coding, work out your ideas for a scene that "tells a story" in your notes (be sure they are dated) - remember to include an element that uses the counter pattern. When you are ready to start coding, you can get to the Projects section by:

1. Go to **My Dashboard** to get there:
   - Click on the black Code.Org logo in the upper left hand corner.
   - Click on the pancake (there horizontal lines) logo in the uppper right hand corner, then select **My Dashboard** from the dropdown menu.
2. In the menu bar at the top of the window, click on the **Projects** tab.
3. From the projects page, select the **GameLab** IDE.

Your goal is to code a scene in which you show off the skills that you have been developing:

- **Creating simple shapes and backgrounds** - including selecting and assigning colors and controling the stroke.
- **Using the** `randomNumber()` **function.** Try to use `randomNumber()` in a meaningful way - in a place where using a random number makes sense in the context of the story you are trying to tell - and with sensible values.
- **Using variables to make your easier to read and maintain.**
- **Creating sprites and adding an animation (image) to them.**
- **Adding text to scenes** (including controlling the size and color).
- **Managing the drawing order** so that objects are appropriately in front and in back of each other - and so moving objects don't leave a trail.
- **Using the *draw loop* to animate a scene.** Typically this would involve moving a sprite using the **counter pattern**.

Another important skill for game programmers is being a "self-directed learner" - expanding your

knowledge of the tools that you are using and employing that knowledge to create more engaging games.

Submissions

Finalize your project for submission by clicking on the **Share** button, then copy the resulting URL to include in your submission.

Please make sure that your name is on the **Variables Unplugged** acticvity guide and turn it in.

Submit a PDF document in which you:

- Explain the **Counter Pattern** in your own words:
    - What problem does the counter pattern solve?
    - How does the counter pattern work?
    - Where can we see the counter pattern in your project?
- Include a link to your project on Game Lab.