**Chapter 3 Observations**

**Problem 3:**

For this problem, I took a random background from Open Game Art and cropped it to the exact size of the normal background. With this, the discontinuity is very easy to see. For my background, a tree gets cut off right in the middle which makes the loop obvious. This shows how important it is to have looping backgrounds in a side scrolling game.

**Problem 1:**

For this problem, I set up the shadow properties to have a color of black with 50% opacity, an X offset of -5, a Y offset of 5, and a blur of 4. Everything follows the same rules as the normal canvas context, including grid directions. I made the color translucent to sell the appearance of an actual shadow instead of a solid black rectangle. This makes it look like there is light up and to the right of the platforms. One thing I noticed is that the shadows don’t look like they’re in the background. This may be because shadows get bigger when the wall is further away. Much more to explore here. Another thing I noticed is that a shadow is applied to the runner despite the instructions being in the drawPlatform() function. This is because the instructions given are permanently applied to the canvas context if the canvas is not saved at the beginning and loaded at the end. Finally, I didn’t notice any changes to the FPS when drawing shadows. However, I looked at the performance of the page and saw that it took an extra 4ms to complete the drawPlatform() function when drawing shadows. This could impact lower-end hardware.

**Problem 2:**

The problem presented in this question is that the runner has a shadow drawn behind it in addition to the platforms. This isn’t supposed to happen. The solution is to save the canvas context at the beginning of the drawPlatform() function and restore the canvas at the end of the function. This works because saving the canvas context saves all settings associated with the canvas at that point in time. We are then able to make modifications to the canvas context settings specifically for platform drawing and then restore the original canvas context settings. Normally, changing canvas context settings would be permanent without using save and restore.

**Problem 4:**

To perform this experiment, I used the chapter 3, problem 2 version of the game. My computer is high-end, so getting it to slow the frame rate was a difficult task. The suggested methods of reducing the frame rate didn’t work for me. The easiest way to drop the FPS was to switch tabs. When switching back, I was able to see that the frame rate dropped to as low as 2 FPS. The other way I was able to drop the FPS was by running FurMark2 in the background. FurMark2 is an intense GPU stress test. This forced my GPU usage up to 100% and dropped the game’s FPS down to 25.