Scratch Programming Lesson 15

In this lesson, we will wrap up the Mini Mario game by making it scroll, among other things. Also, please go to http://shallwelearn.com to download MiniMarioLesson13.sb from Scratch Programming Lesson 13.

This is the snapshot of the sprite list when the project is opened.

![Sprite List](image)

**Step 1: Create a Variable to Represent Scrolling Amount**

Create a global variable called scroll to represent the amount of scrolling. When Mario moves to the right, the scrolling amount decreases, and when it moves to the left, the scrolling amount increases. If you are unfamiliar of how scrolling works in Scratch or in general, please refer to Shall We Learn Scratch Programming Lesson 14.
Delete “change x by ...” and replace with “chang scollX by -2.5”.

**Step 2: Make Platforms Scroll**

I am going to split Platform sprite into two sprites: Platform0 and Platform1. I will line these two platform sprites side-by-side. When the game starts, Platform0 is located at x = 0 or 0 * the stage width (=480). Platform1 is at x = 480 or 1 * the stage width.

stage_width = 480
my_platform for Platform0 = 0
my_platform for Platform1 = 1
Rename **Platform** to **Platform0**. Delete all scripts from **Platform0** and add the following scripts, which are very similar to what we built in Lesson 14, except that I added a global variable call **platform0_global_x**.

Then make a copy of **Platform0** and name the copy as **Platform1**. Delete costume **Level2** from **Platform0** and rename costume **Level1** to **Level** and delete costume **Level1** from **Platform1** and rename costume **Level2** to **Level**.
Then, as shown below, for **Platform1**, set `my_platform` to 1 when game starts. Then create a new global variable called `platform1_global_x` and place it in the place of `platform0_global_x`.

**TEST TIME:** Now test the game. You can scroll but there is an obvious problem. Both the brick and two coins keep following Mario so Mario could never get to them. We will fix it.
Step 3: Modify the **Brick** and **CoinToPass** to Stop Them from Following **Mario**

To keep the brick and coins from following **Mario**, we need to make them scroll, just like the platform sprites. We will copy the scripts pertaining to scrolling from platform sprites to both Brick and Coin sprite. But we need to make two changes. The first is to add a local variable call `offset_x`; this variable stores the distance from the left boundary of the platform to the sprite.

The location of the dot sprite will be

\[
\text{STARTING\_POSITION}_{\text{DOT}} = \text{PLATFORM\_INDEX} \times \text{STAGE\_WIDTH} + \text{OFFSET\_X} \\
\text{POSITION}_{\text{DOT}} = \text{STARTING\_POSITION}_{\text{DOT}} + \text{SCROLL\_X}_{\text{PLATFORM}}
\]
The second change is to change the show/hide boundary from STAGE_WIDTH (=480) to STAGE_WIDTH/2 (=240). The graph below shows the snapshot of the stage before and after the scrolling to the right by 270 (scrollX = -270).

\[
\text{STARTING\_POSITION}_{\text{DOT}} = \text{STARTING\_POSITION}_{\text{RED\_PLATFORM}} + \text{OFFSET\_X} \\
= \text{PLATFORM\_INDEX} \times \text{STAGE\_WIDTH} + \text{OFFSET\_X} \\
= 0 \times 480 + 30 = 30
\]

\[
\text{POSITION}_{\text{DOT}} = \text{POSITION}_{\text{RED\_PLATFORM}} + \text{OFFSET\_X} \\
= \text{STARTING\_POSITION}_{\text{RED}} + \text{SCROLL\_X}_{\text{PLATFORM}} + \text{OFFSET\_X} \\
= 0 \times 480 + (-270) + 30 = 30
\]

The snapshot below shows Brick's script blocks relevant to scrolling.
Next, we will change **CoinToPass** sprite. First remove all motion-related scripts and copy all scrolling related scripts from **Brick** to **CoinToPass**.
Step 4: Upgrade the **Bullet** and Turn **Brick** to a Mini Platform

If you would like, you can upgrade the **Bullet** so that you can shoot from all four directions. Below is the updated script for the **Bullet**.
To turn the **Brick** into a mini platform, just add a top pink layer (the same pink used to create the top layer of the **Platform0** and **Platform1** sprites).

Then **Mario** can stand on the **Brick** as well.

![Mario on Brick](image)

This concludes Lesson 15, the last lesson of Mini Mario Game series. I hope you have enjoyed this series and leave with enough know-how to make your own platform games!