Exercise 14 – Desert Rally Race

Create a game where you drive through the desert to reach the Great Pyramids, avoiding obstacles along the way!

In this exercise you will learn:

1. To create a scrolling game that moves.

2. To use variables and use x and y coordinates.

3. To communicate between different Sprites.

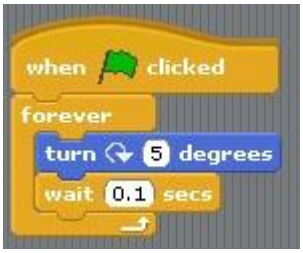
The Game:

1. Open the **J Drive** on your computer by clicking **Start**, then select **Computer** and click on **J Drive**. Open the **Scratch** folder. Right-click on **Exercise 14** and select **Open**.

2. You will see that all the Sprites for the game are already drawn for you. The **Day, Sunset, Night, and Sunrise** backgrounds are actually Sprites themselves and their scripts are already written for you. These scripts are all very similar. The scripts tell each Sprite to move downwards on the screen and when each Background Sprite gets to a certain point (when Y reaches zero), that Background Sprite calls the next Background Sprite to appear and move downwards on the screen. This gives the effect that the background is constantly changing! We will have to add the scripts for all the other Sprites though, so let's begin!

The Sun:

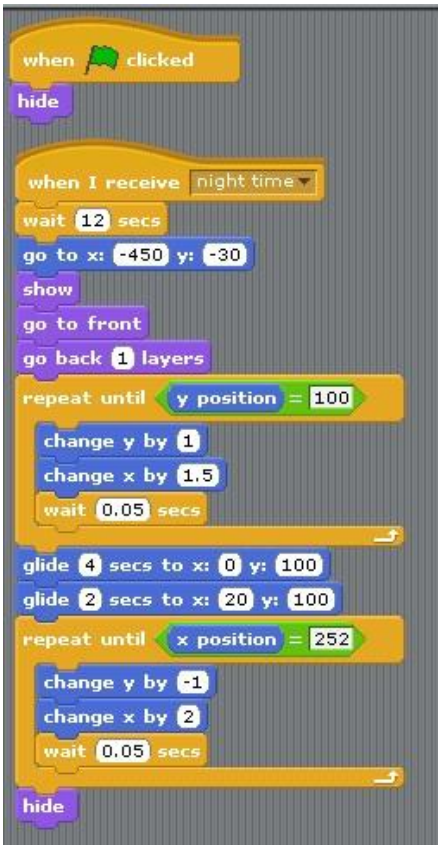
3. The Sun has a lot of scripts, so let's start with giving the Sun the first script below. This script will make the Sun spin constantly in the sky.



4. Now give the Sun the following script. This script will make the Sun rise in the sky on the left hand side of the screen, and then wait for a few seconds before setting in the right hand side of the screen. The '**repeat until'** blocks tell the Sun to rise and fall. The '**glide'** blocks tell the Sun to move slowly across the top of the screen. The '**broadcast'** block is a call to the next background Sprite (called 'Sunset') to appear. There is one more script to add to the sun, but we will add this later.

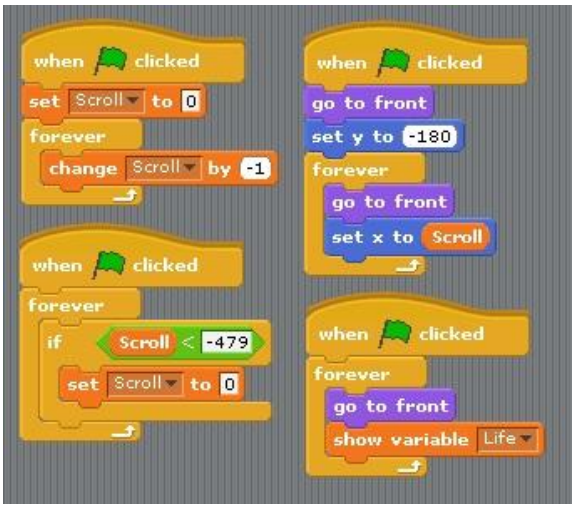
The Moon:

5. Now add the following script to the Moon. This script is similar to the Sun's script. It tells the Moon to rise and fall when it receives the 'night time' broadcast. You can put any message you want into the **'broadcast'** block, but it's best to keep it simple with something suitable like 'night time'!

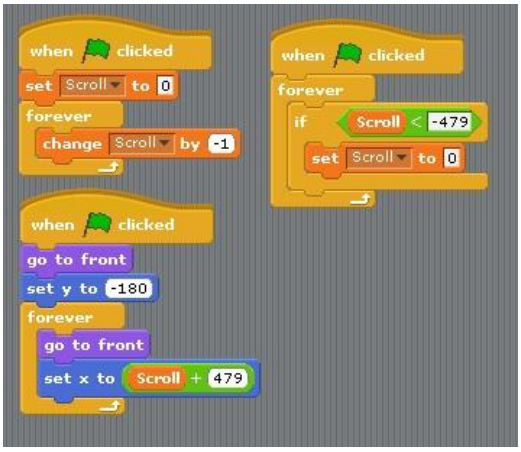


The Road:

6. Now we will give the **Road 1** Sprite the following script, but you will first have to create two new variables in the **Variables** section. Call these variables **'Scroll'** and **'Life'**. The script for the Road Sprite goes like this: The '**Scroll'** variable starts at zero, and keeps decreasing until it gets to -479, at which point it will return to the value zero. **The full width of the Scratch stage is 480 pixels**, so this means when **'Scroll'** reaches the end of the stage on the left hand side, it will go back to the start of the stage on the right hand side. Now we set the Road 1 Sprite to follow the values of the '**Scroll'** variable by using the **'set x to scroll'** block. So now the road will constantly move from one side of the Stage to the other side. We also include a script here for the **'Life'** variable. This just makes sure the **'Life'** variable is always shown on the screen during your game.



7. But now we need to write scripts for the **Road 2** Sprite! This is because when the Road 1 Sprite moves across the screen, it leaves a gap behind it. So we're going to fill that gap with the Road 2 Sprite! Firstly, copy Road 1's script into Road 2's script. You can do this by left-clicking and dragging one of Road 1's scripts over to the icon for Road 2 beneath the game screen, and releasing the mouse-clicker. That script has now been copied into Road 2's script! Do this for every script that Road 1 has, except for the script that contains the **'Life'** variable – we only need Road 1 to have this. Now we just have to make one small change to Road 2's script. We need to change the **'set x to scroll'** block. Select a **'plus'** block from the **Operators** section and put it into the **'set x to'** block. Put the **'Scroll'** variable into the left side of the **'plus'** block, and put the value **479** into the right side. This will make the Road 2 sprite follow behind the Road 1 Sprite, filling in the gap that Road 1 leaves behind! Your script for Road 2 should look like this:



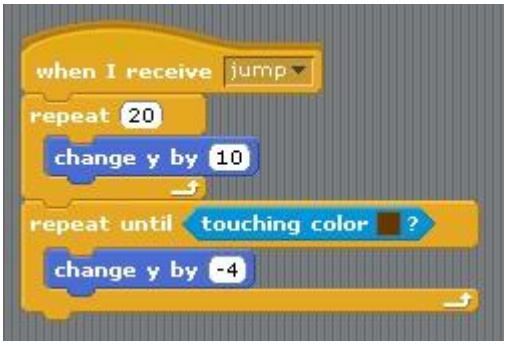
The Car:

8. Now we will write the scripts for the Car Sprite. The car does a lot of work in this game, so we have a few scripts to write for it! Firstly, the script below will set the car's starting position and its size. You may want to have different values in these blocks than the values in the image below, but that's ok! The **'if touching colour'** part of the script makes the car bounce if it touches the colour of your road, so set the colour to be the same colour as the outline on the road, in this case the colour is brown.

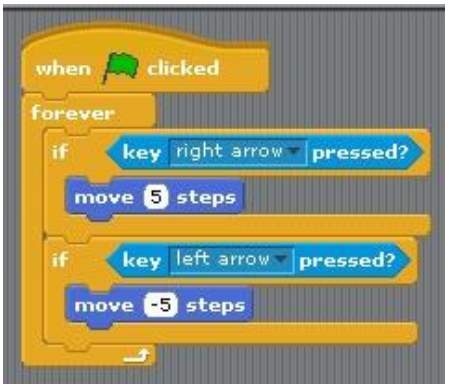
The second **'if'** block tells the Car to jump (we will write the Jump script in a moment!). Select the **'up arrow'** from the drop-down menu of the **'key pressed'** block. This will make your car jump if you press the up arrow key!

The third **'if'** block is for when you win the game. Select the Pyramids Sprite from the drop-down menu of the **'touching'** block. This will broadcast a message when the player has won the game. We will create a Sprite that receives this message later! But for now, add the following script to the Car sprite.

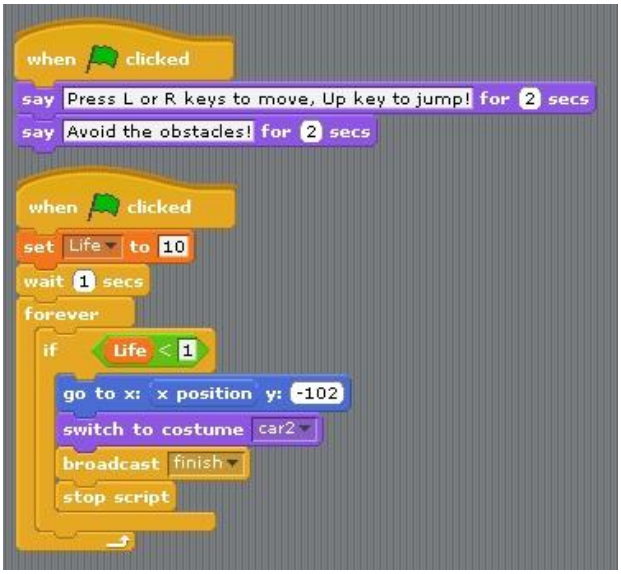
9. Now we will write the script that makes the car jump! Add the script below to the Car Sprite. Set the colour in the **'touching'** block to the colour of your road, in this case the colour is brown. This will allow the Car to land safely back on to the road after you jump.



10. Now we will add a script that tells the car how to move. Add the following script to the Car Sprite.



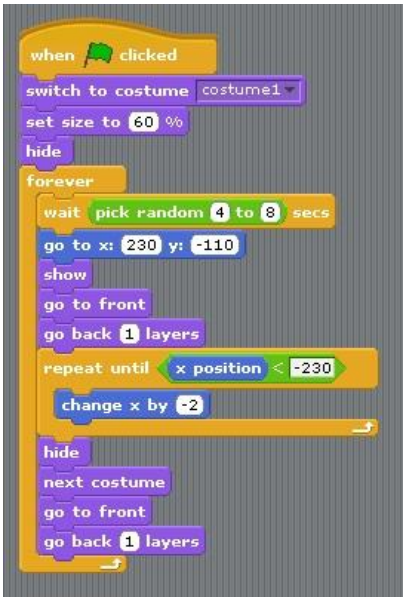
11. Now we will make two speech bubbles appear at the start of the game, giving the player instructions on how to play. We will also add a script that sets the number of lives the player has at the start of the game. This script will also tell the Car Sprite to change costume if the player has no more lives left and loses the game! If the player loses the game, the **'broadcast'** block broadcasts the message **'finish'**. This message will be received by a Sprite that we will create later! Add the following script to the Car Sprite. The messages I have written are "Press L or R keys to move, Up key to jump!" and "Avoid the obstacles!"



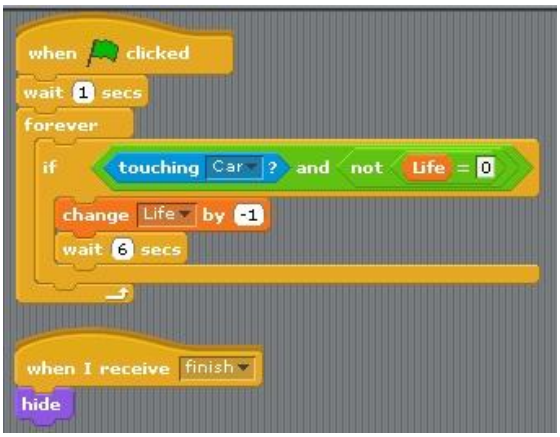
The Obstacles:

The Bush:

12. Now add the following script to the Bush Sprite. This script sets the Bush's starting position and its size, and also tells it to move across the screen. When it reaches the side of the stage it will switch to its second costume and repeat the process.

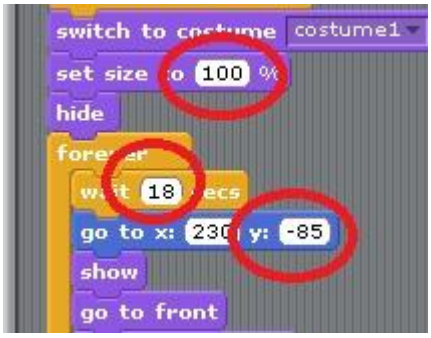


13. Now add the following scripts to the Bush Sprite as well. This script will take 1 life off the player if the Car comes into contact with the Bush. The **'And'** block checks if the Car has come into contact with the Bush **AND** checks if the player has more than zero lives. If the player has zero lives, the Bush can't take another life from the player if the car touches it! This is why we use the **'And'** block. It checks two things instead of one, before running the rest of the script. The second script will tell the Bush Sprite to disappear when the game finishes.



The Tower:

14. Now we will copy the Bush Sprite's script into the Tower Sprite's script. The Tower will act almost exactly like the Bush, so we will give the Tower the same script as the Bush. Select the **Script** tab of the Bush Sprite. Drag each group of blocks over to the Tower Sprite's icon underneath the game screen and release the mouse-clicker. This will automatically copy the Bush's scripts into the Tower's scripts. I have made three small changes to the Tower's script. I changed its size by changing its **'set size to'** block to **100%**. I set its **'wait for'** block to **18** seconds (this will make the Tower wait 18 seconds before appearing on the screen for the first time). I also set its **'go to x and y'** block to **x = 230** and **y =-85 (minus 85)**. You might want to change these blocks differently than I did, it's up to you!

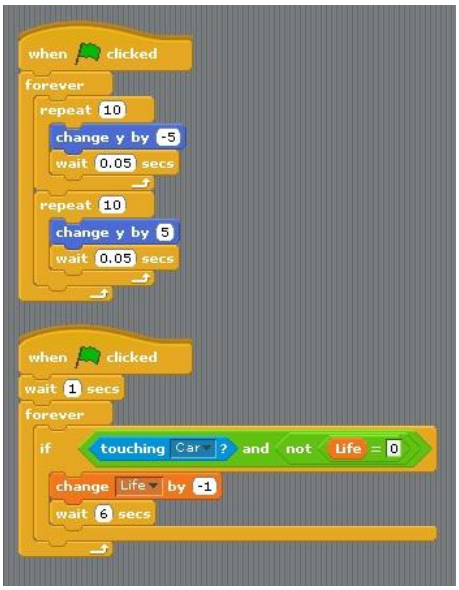


The Octopus:

15. Now we will write the script for the Octopus Sprite. Add the following script. These blocks set the Octopus' size, and sets the position where the Octopus will appear from, using the **'go to x and y'** block. The **'pick random'** block tells the Octopus to appear every 15 to 20 seconds, but because it is **random**, this value will change every time. The **'change x by'** block sets the speed of the Octopus.

The forever script with the **'next costume'** block switches between the Octopus' two costumes, making the Octopus' tentacles look like they're moving!

16. Next we will add these scripts to the Octopus' script. The first script will make the Octopus move up and down as it flies across the screen, by changing its **Y** position, using the **'change y by'** blocks. The second script is the same as we used for the Bush and Tower Sprites. It tells the Octopus to take away 1 life from the player if the Car Sprite comes into contact with it. Add the following scripts to the Octopus.



The Sun:

17. We will now go back to the Sun Sprite's script. The **'when I receive'** block receives the **'change to day'** message that the Sunrise background Sprite broadcasts. So select the **'when I receive'** block and select **'change to day'** from the drop-down menu. This message will activate the following script. When the Sun rises for the second time, when it gets to the top right corner of the screen it will stay in that position, and not set like it did the first time. It will then broadcast the '**End of game'** message using the **'broadcast'** block. This message will be received by the Pyramids Sprite which we will program next. But first, add the following script to the Sun.

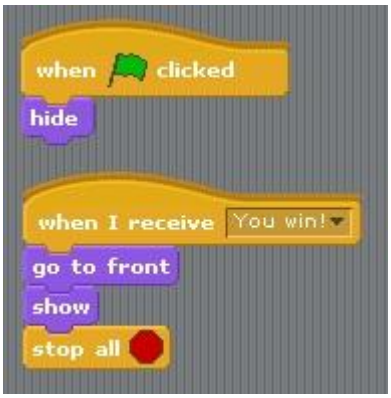
The Pyramids:

18. We will now write the script for the Pyramids Sprite. The following scripts will move the Pyramids across to the middle of the screen, but only after it has received the **'End of game'** message from the Sun Sprite. The **'go to x and** y' block sets the Pyramids position to be at the same level as the Road Sprites, to make it look like the Pyramids are on the road. Add the following scripts to the Pyramids Sprite.

End of the Game - We're nearly there!!

You Win The Game:

19. Now do you remember in the script for the Car, we had a **'broadcast'** block that broadcast the message **'You win!'** if the Car came into contact with the Pyramids Sprite? Well this is where we use that message! The 'You Win' Sprite receives the **'You win!'** message from the Car Sprite, and when it receives the message, it will appear on the screen. This will signal that the player has won the game! The game will then end. We stop everything in the game by using the **'Stop all'** block. Add the following scripts to the **'You Win'** Sprite.



You Lose The Game:

20. The 'You Lose' Sprite will appear if the player loses the game. The script is almost identical to the 'You Win' Sprite's script, except for one small, but very important difference. Instead of receiving the **'You win!'** message, the 'You Lose' Sprite will receive the **'finish'** message that the Car Sprite broadcasts if the player's lives reach zero. Add the following script to the 'You Lose' Sprite.

YOU'VE NOW FINISHED THE GAME! WELL DONE!!!! Make sure to save your game!

Challenge: Why don't you try to make your game more difficult by adding new instructions to the Obstacle Sprites! Or you could try making a new scrolling game where you draw and program all the Sprites yourself! Good luck!!