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Scratch Exercise 2: Creating a Simple Sight Word Game using Random Motion and Conditional Statements.

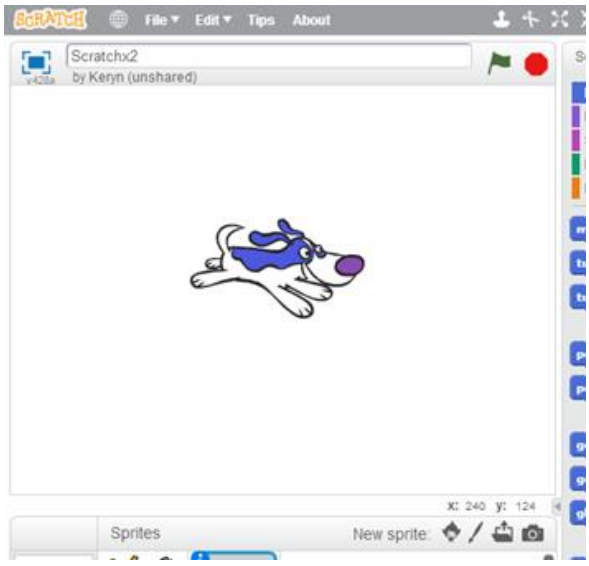
The real power in programming lies in the ability to have objects ("Sprites") in your world interact with each other and cause changes in behaviour or action. In Exercise 2 we will learn how to:

- Draw your own Sprite.
- Have a Sprite move randomly about the screen by itself.
- Create an "If" statement to have the program do an action when the Sprites touch.

Programming Tip: Scratch uses a programming technique called "Object Orientated Programming." Object Orientated Programming treats each "object" (Sprites in the case of Scratch) as a separate unit on which instructions or code direct the action. Think of your Sprites as little robots that you will command to do certain tasks. Objects in your program can interact with each other or broadcast messages to other objects. In Exercise 2, the "chaser Sprite" (the one you control with the arrow keys) pursues another Sprite (which moves on its own.)

Step 1: Create a new Sprite.

1. Open Scratch
2. Click the **"New Project"** button.
3. Right-click on the Cat Sprite to delete it.
4. Click the **"New Sprite"** icon.
5. Choose any Sprite you like to be the Sprite you move about, I have picked a Dog.



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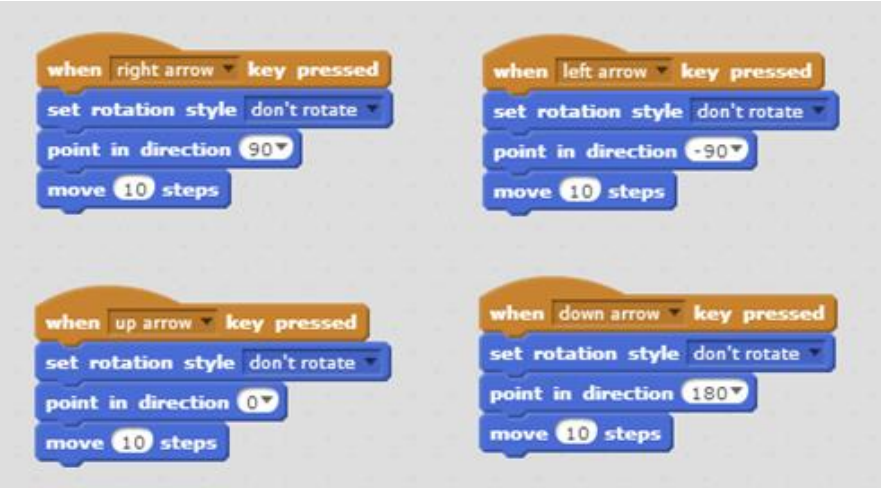
To make the Dog move about the screen we need to give it directions.



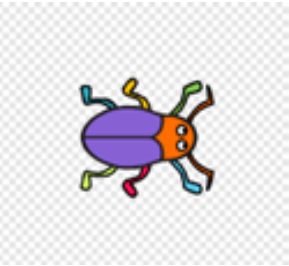
In the scripts tab for the Dog create 4 direction blocks for each command we can give the Dog, (up, down, left and right). For each block add a 'set rotation style' block and set it to 'don't rotate'. Add a direction block to indicate which direction corresponds to the button being pressed. And finally we drag in a 'move 10 steps' to each block.

Step 2: Making the bug move about the screen under its own power.

Programming Tip: Sprite's locations are based on a coordinate plane grid that measures from -240 to 240 on the x axis and -180 to 180 on the y axis. A Sprite's current location is shown beneath the "Status" area in the centre pane. To make the bug move by itself, we must write a command to make random numbers for the following values:

- x axis
- y axis
- speed

6. Click the **"New Sprite"** icon.
7. Click on a bug Sprite to add this to your project. This will be the Sprite that moves by itself.



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8. Click on the **"Scripts"** tab belonging to the bug.

a. Select the brown **"Events"** section.

b. Drag the: 

block to the scripts pane. (This command directs code to start when user clicks the "green flag" to run the program.)

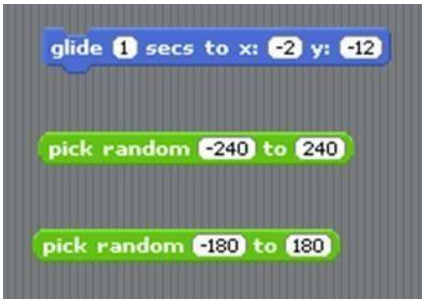
10. Drag a 

(**forever** block) to the scripts area because we want this action to continue as long as the game is running.

11. Select the "**Motion**" section. Drag the "**glide '1' seconds to 'x' 'y'**'" block to the scripts area.
12. We now need some values. Click on the green **"Operators"** button. Drag a **"pick random 1 to 10"** block to the scripts pane.
13. The green **"pick random"** block generates a random number in the range of the block. We will use this block to select an x value. Type "-240" in the first slot of the pick random block and a "240" in the second slot.

Note: The first "-240" is a MINUS 240.

14. Drag another **"pick random"** block to the scripts area and type "-180" and "180" for the y value.



15. Drag another **"pick random"** block to the scripts area and type "1" and "3" for the seconds value.

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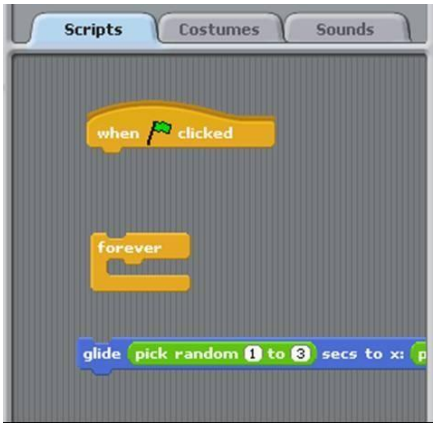
16. These commands still will not work until we "click" them together like puzzle parts. Drag the **"180" to "180"** green block into the y value of the **"glide"** command: (Don't worry if you can't see the whole block.)

17. Drag the **"-240" to "240"** value into the x value of the **"glide"** command. Drag the "1" to "3" into the "secs" value. Again, don't worry if you can't see the whole block.



18. Almost done! Drag the **"glide"** block inside the **"forever"** block.
19. Connect the **"forever"** block to the **"When Green Flag Clicked"** block.

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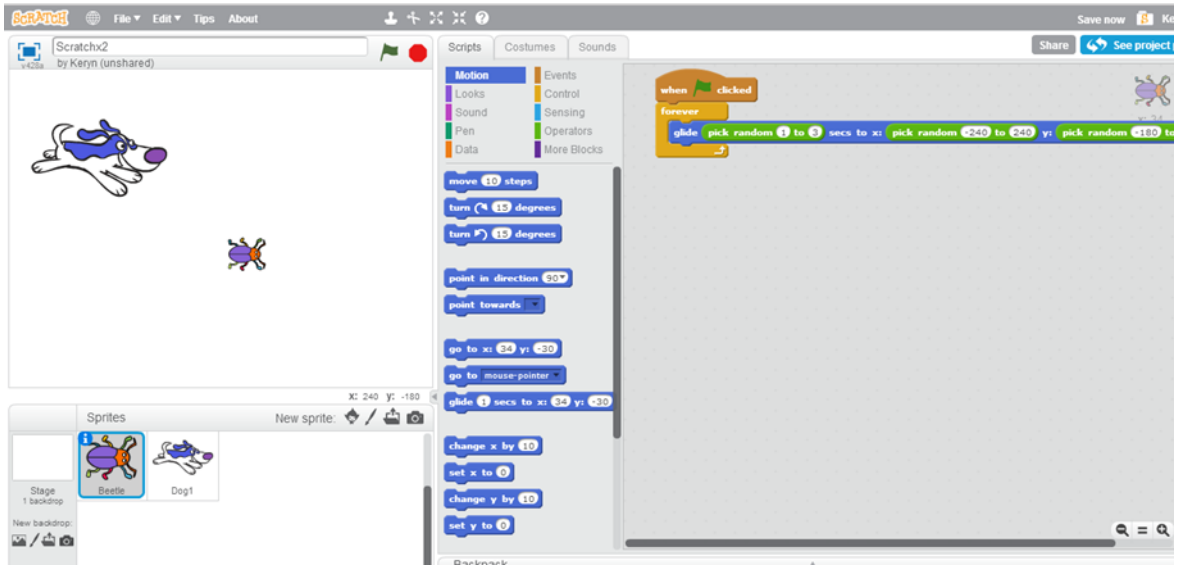

20. Time for action! Click the green flag icon and watch your bug float around the screen!
21. Click 'File' on the grey toolbar and click 'Save Now'.

Step 3: When your Sprite touches the bug, an action will happen (Sprite will change appearance).

To accomplish this step the bug sprite will need to know if it is "touching" the Dog and an action to do once they touch. The sequence of directions will go something like:

If bug is touching Dog - then change Dog's appearance.

We will use a "forever if" block for this command.

22. Drag a 

block to the Scripts panel of Dog.

Remember:

If you want an action to start when the program starts - use a 

block.

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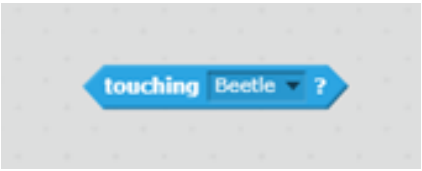
Click Looks and attach a ‘switch costume’ block to the ‘when flag is clicked’ block, and from the drop down options choose dog1-a. This resets the Dog to the starting costume when the green flag is clicked.

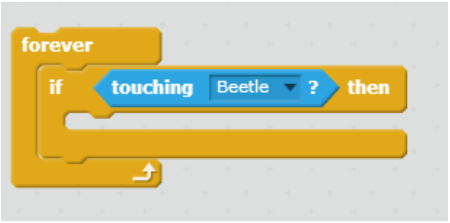
26. Drag a ‘forever’ block and an ‘if__then’ block to the Scripts panel.

The **"forever if"** block sets up an argument that starts a specific action if the conditions of the argument are met.

27. We are going to use the **"Sensing"** section to "sense" if the bug is touching the Dog
a. Click on the **"Sensing"** section.
b. Drag the **"touching _"** block over to the scripts pane.
c. Select the bug from the list in the **"touching _"** block .



28. Drag the **"touching"** block into the hexagon shape in the **"forever if__then"** command.



29. Now we have the statement that goes like:

Forever: If Dog is touching Bug, Then . . .

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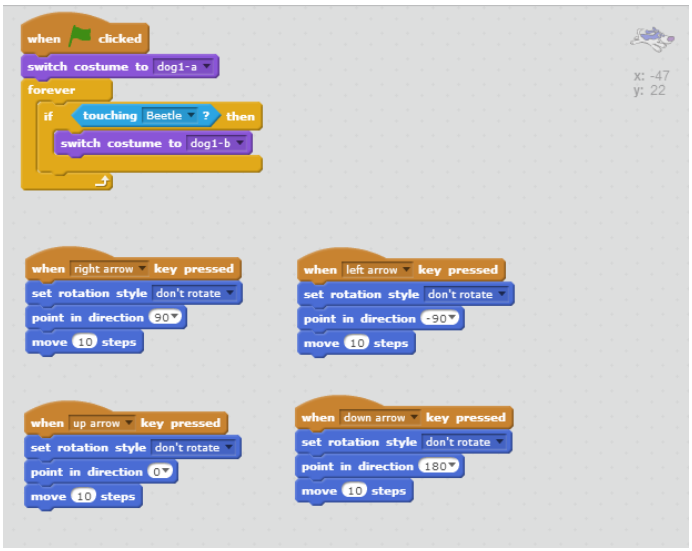
We need to put an action inside the **"forever if__then"** statement. This is where we will change Dogs's appearance.

30. Select the **Costumes** tab of Dog, and click on **Import**. Import dog1-b.

31. Select the **Looks** section, and drag a **"switch to costume"** block and place it inside the **"forever if__then"** block. Make sure it is set to **"switch costume to dog1-b".**

Connect the **"forever"** block to the **"when green flag clicked"** block.



32. You are done! Click **"Save"** and then click the Green Flag to start your game. Chase the bug with your Dog and see if the Dog changes appearance!

33. Question: Can I make my characters bigger or smaller? Yes! Use the **"Grow"** or **"Shrink"** icons at the top of the screen to change size. Click the icon and then click your Sprite. I used the "Shrink" to make my dog smaller.