



## Scratch Exercise

- A. Choose **Start - All Programs - Class Software - Scratch - Scratch**.
- B. Let's start with a very simple project we'll call Dancing Sprite. This example has been adapted from the exercise "Getting Started with Scratch" found under the *Want Help?* menu.
  1. Drag the **move** block into the script area.
  2. Double click on the blue part of the **move** block. Notice the sprite moves. In the *object status area* there is a small representation of the sprite showing the sprites position and direction. The direction is 90 degrees and the position is x:10, y:0 because the sprite just moved 10 steps in direction 90. Double click on the **move** block again, did the sprite's status change as you expected?
  3. Choose **Sound** from the script types then drag the **play drum** block into the script area and attach it to the bottom of the **move** block. Double click on the **move** block, can you hear the drum?
  4. Let's make the sprite go backward, drag a second **move** block into the script area and attach it to the bottom of this program. Change the number of steps to -10. Next attach a second **play drum** block to the bottom of the program. Now what does the sprite do?
  5. This isn't much of a dance, it would be better if the sprite didn't stop. Choose **Control** from the script types then drag the **forever** block into the script area (do not attach it to anything). Drag the four blocks you've created into the **forever** block, it will stretch to accommodate them.
  6. Double click on the **forever** block. Now the sprite is dancing. To make it stop click the stop sign in the upper right corner of the Scratch window.
  7. Perhaps forever is too long, let's change our control command to a **repeat** block. First drag the four instructions out of the **forever** block. Drag the **forever** block left out of the script area, it will disappear. Now drag a **repeat** block into the script area and put the four commands inside it. Try this program.
  8. If we were to send this program to someone, we'd prefer they needn't be familiar with Scratch to run the program. To this end we're going to have the program run when the green flag is selected. Drag the **when flag clicked** block into the script area and attach it to the top of our program.
  9. Now choose the *Enter presentation mode* button which is found under the presentation preview area at the left end. Click the green flag in the upper right hand corner to watch your program run. Click the arrow in the upper left hand corner to exit presentation mode.
  10. Now this project can be saved and shared with others.

C. Now let's try a slightly more challenging project.

1. Choose **New**.
2. Let's add a second sprite. Click the *Choose new sprite from file* button which can be found under the presentation preview area. Double click on Animals then double click on bat1-a. This bat is now your selected sprite. Click the *costume* tab in the *object status area*. This sprite has only one costume, let's import a second costume. Choose **Import** then double click on bat1-b.
3. We're going to make the bat flap it's wings.  
Click the *scripts* tab in the *object status area*. Choose **Looks** from the script types then drag the **next costume** block to the scripts area. Choose **Control** from the script types then drag the **repeat** block into the script area. Put the **next costume** block inside the **repeat** block. Drag the **when flag clicked** block into the script area and attach it to the top of our program.  
Click on the green flag to test this program.
  - a. The wings are moving pretty fast, why don't we slow them down by adding a **wait** block into the program right after the **next costume** block.  
Try the program again.
  - b. The wait time seems a bit long, try changing it to 0.25 seconds.  
Try the program now.
4. Next we'd like to have the bat move forward as it flies but there isn't much room to have the bat move in the preview area. So let's do two things to help our testing:
  - a. Reduce the size of the bat. Click on the **Shrink sprite** button, it is the rightmost button in the line of buttons above the preview area. Now click on the bat until it's about half the size of the cat. Click anywhere other than on a sprite to stop shrinking.
  - b. Drag the bat to the left edge of the preview area.
5. Let's have the bat move forward when it flaps it's wings.  
Put a **move** block between the **next costume** block and the **wait** block.  
Try the program.
  - a. The flight seems a bit jerky. Try decreasing the number of steps it moves to 5.  
How does the bat's flight look now?  
It's better but still not all that smooth.
  - b. Perhaps the problem is the wait time, now that the bat is moving between costume changes we may not need a wait time. Change the number of steps back to 10 and remove the **wait** block.  
How does the bat's flight look now?
  - c. Feel free to fiddle with the numbers until you are satisfied.
6. What happens when the bat reaches the other side of the preview window?  
It would be better if the bat could notice when it reaches the edge, fortunately there is a

built-in command for this situation.

Drag the **if on edge, bounce** block into the script area and attach it to the **move** block. Now drag the bat to the center of the preview area and try running the program a few times.

7. Let's make the cat chase the bat.
 

Click on the *cat* in the *Object selection area* or double click on the *cat* in the *preview area*. The scripts area is empty because we haven't created any scripts for the cat yet. We'd like the cat to move towards the bat when the green flag is clicked.

  - a. Drag the **when flag clicked** block into the script area.
  - b. Attach a **point towards** block and from the pop-up menu choose Sprite2.
  - c. Attach a **move** block.
  - d. Move the bat away from the cat and click the green flag.  
We have a problem the cat only moves once but the bat moves several times. Ideally we want the cat to keep moving until it catches the bat.
  - e. Insert a **repeat until** block right after the **when flag clicked** block, then move the two motion blocks inside the loop.
  - f. Choose **Sensing** from the script types and drag the **touching** block into the hole in the **repeat until** block. Choose Sprite2 from the drop down menu in the **touching** block.
  - g. Now click the green flag, how is it working now?
8. The bat is pretty easy to catch for several reasons let's solve them one by one. Select the *bat* in the *Object selection area*.
  - a. The bat travels a predictable distance.  
Choose **Numbers** from the script types and drag **pick random** block into the hole in the **move** block. Let's change the range so that it will pick random 10 to 15. Test the new setting by clicking of the green flag.
  - b. The bat travels in a straight line back and forth across the screen.  
Insert a **turn clockwise** block after the **move** block. let's make the turns random too. Use the **pick random** block to make turns between 30 and 60 degrees. Test the new settings.  
My bat turns too far and doesn't move far enough, fiddle with the limits of the random values until you are satisfied with the results. Remember you can experiment with these later if something changes later on.
  - c. The bat stops running after a bit allowing the cat to catch it easily.  
Change the **repeat** block to a **repeat until** block.  
We want the bat to stop running when the cat catches it.  
Let's use the **touching** block again.  
Test the new settings several times.

9. Let's add a background to this little drama.

Click on the *stage* in the *Object selection area*. Then choose the *background* tab in the *object status area*. Click *Import*, double click *Indoors*, then double click *room2*.

10. Now let's give our actors starting spots.

- a. Click on the *bat* in the *Object selection area*. Drag the bat over to the left edge of the preview area in the middle of the window. Notice that the bat's position is given in the *Object status area*. Let's change the script so that this is our starting position.

Insert a **go to** block after the **when flag clicked** block. Notice that the *x* and *y* coordinates are the same as that of the bat right now.

Let's also start with the bat the right way up, that is facing 90 degrees. Use the **point in direction** block to accomplish this feat.

- b. Repeat the above procedure for the cat.
- c. Test the scripts by clicking on the green flag.

D. Another project or explore the demos

1. You can work on a project of your own design

OR

Choose **Open** to find the list of demos you can explore.

The image shows the Scratch 2.0 interface with several components labeled in red:

- Script Types:** Points to the left sidebar menu containing categories like Motion, Looks, Sound, Pen, Control, Sensing, Numbers, and Variables.
- Status area:** Points to the top status bar showing the sprite name 'Sprite1', its coordinates (x: 0, y: 0), and direction (90).
- Preview area:** Points to the top stage area where the cat sprite is currently visible.
- Scripts area:** Points to the large central workspace where script blocks are assembled.
- Object selection area:** Points to the bottom right area where the selected sprite 'Sprite1' is shown.
- Script blocks:** Points to a list of script blocks in the left sidebar, including 'move 10 steps', 'turn 15 degrees', 'point in direction 90', 'go to x: 0 y: 0', 'glide 1 secs to x: 0 y: 0', 'change x by 10', 'set x to 0', 'change y by 10', 'set y to 0', and 'if on edge, bounce'.