

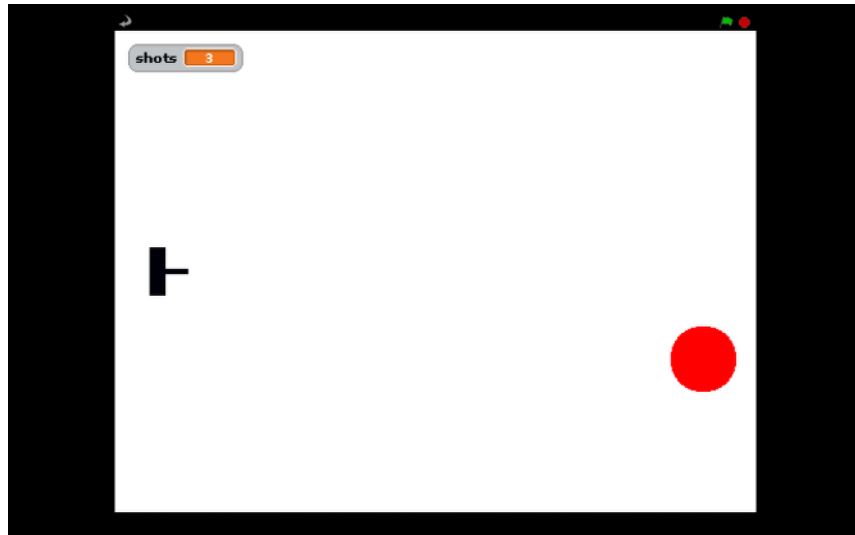


SCRATCH

Pong Game

Intermediate

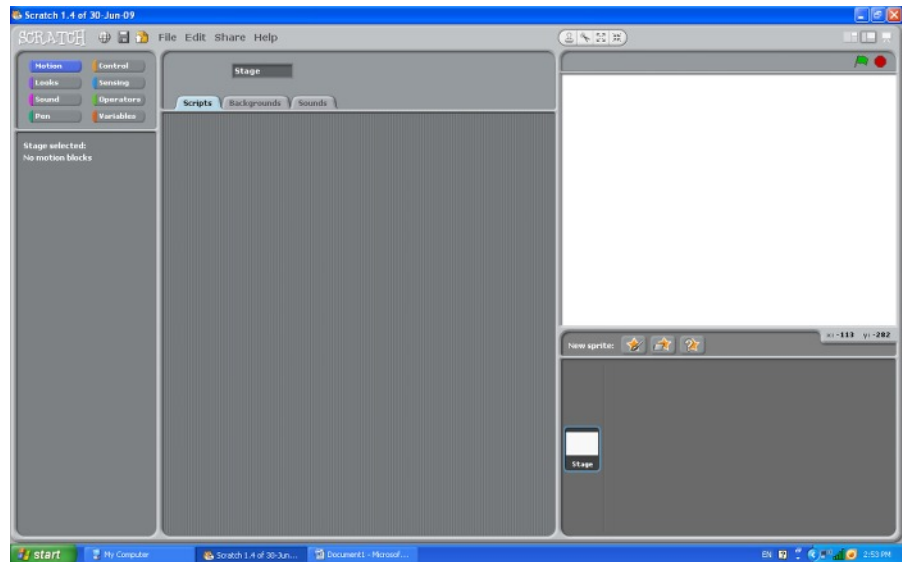
Programming a Computer Game



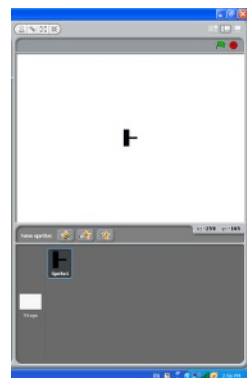
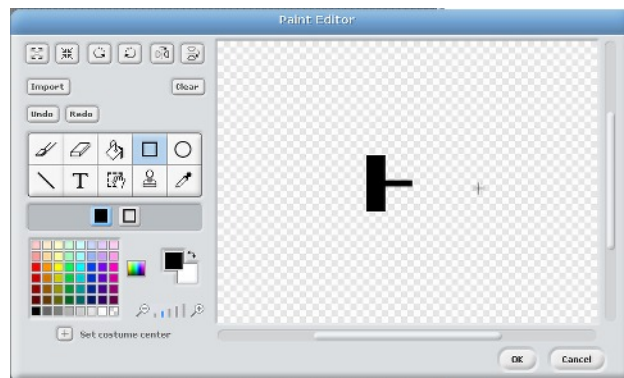
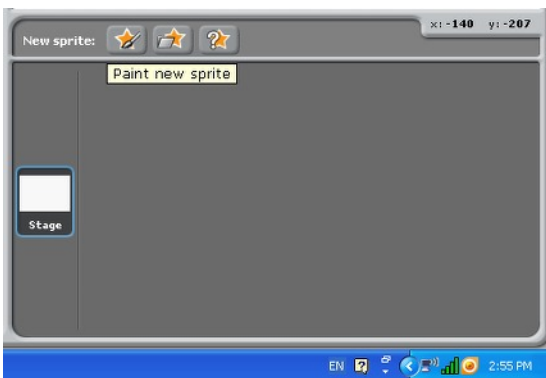
This tutorial will show you how to make a simple computer game using Scratch. You will use the up and down arrows to control a gun. The space bar will be used to fire at a moving target.



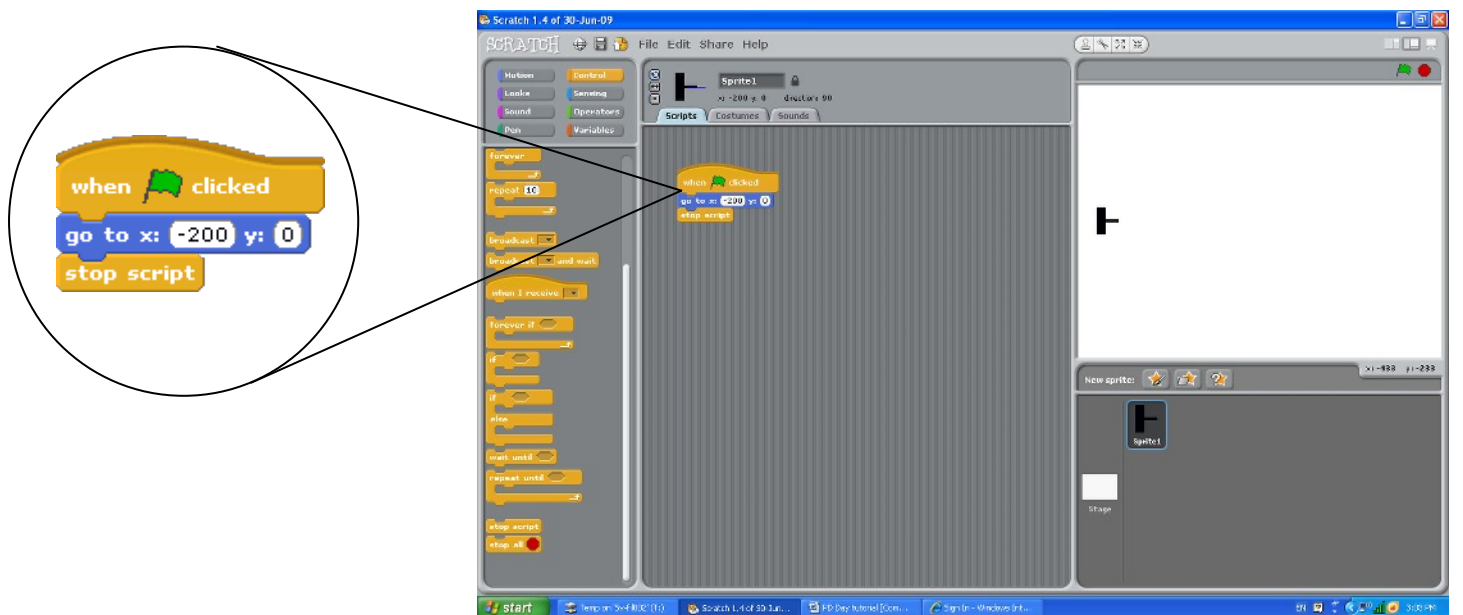
1. Right click on the cat sprite and delete it.



2. Create a new sprite and draw something in the shape of our gun.



3. When the game first starts (when we click the green flag), we would like our gun to be at the middle-left side of the screen. Enter the following commands into the *Scripts* box. This tells the computer that when the green flag is clicked, the gun should be positioned at (-200,0), the left side of the screen.



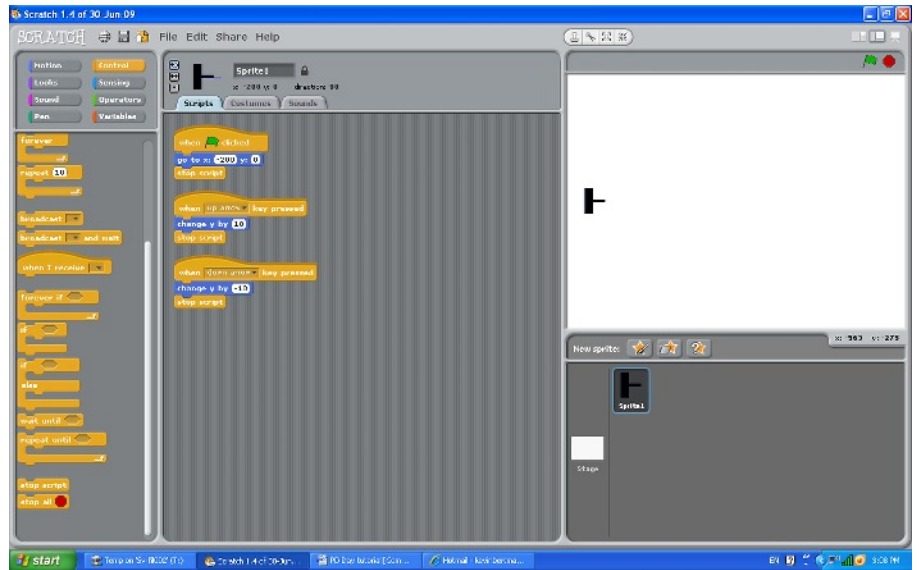
4. Now, we need to control the gun using the up and down arrows. Enter the following. They tell the computer to move the gun up when the up arrow is pressed, and to move it down when the down arrow is pressed. Its common sense.

```

when up arrow key pressed
change y by 10
stop script

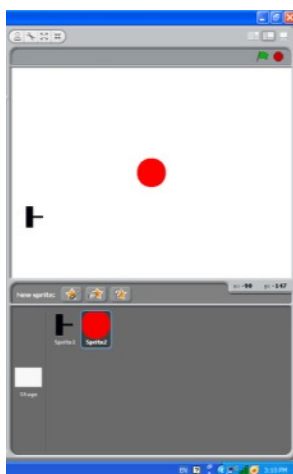
when down arrow key pressed
change y by -10
stop script

```



5. Click the green flag to start the script and test whether the controls work.

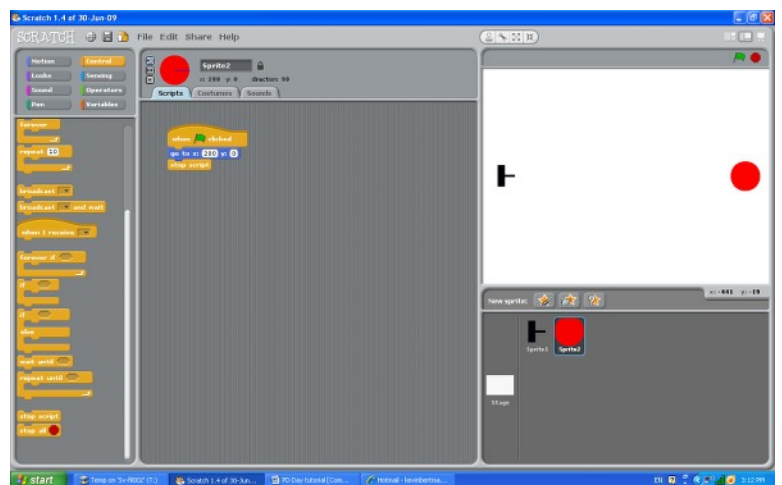
6. Now, we need to create our target. Create a new sprite (as in step 2) and draw a target (a red circle). At the beginning of the game when the green flag is pressed the target should position itself at the middle-right side of the screen. Create the following code for the target.



```

when green flag clicked
go to x: 200 y: 0
stop script

```



7. The target should automatically begin to move up and down. Change the code you created in the previous step to:

```

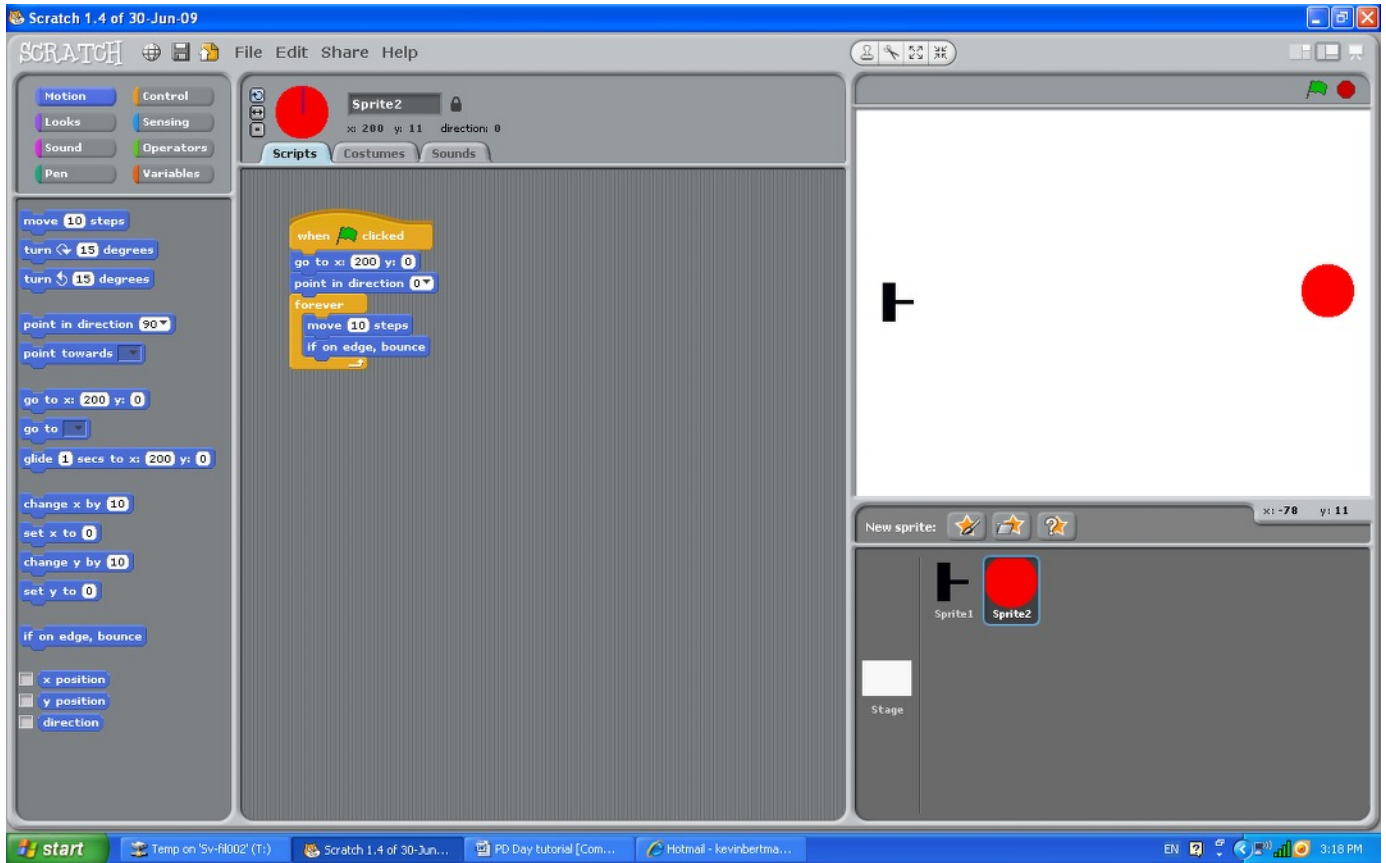
when green flag clicked
go to x: 200 y: 0
point in direction 0
forever
move 10 steps
if on edge, bounce

```

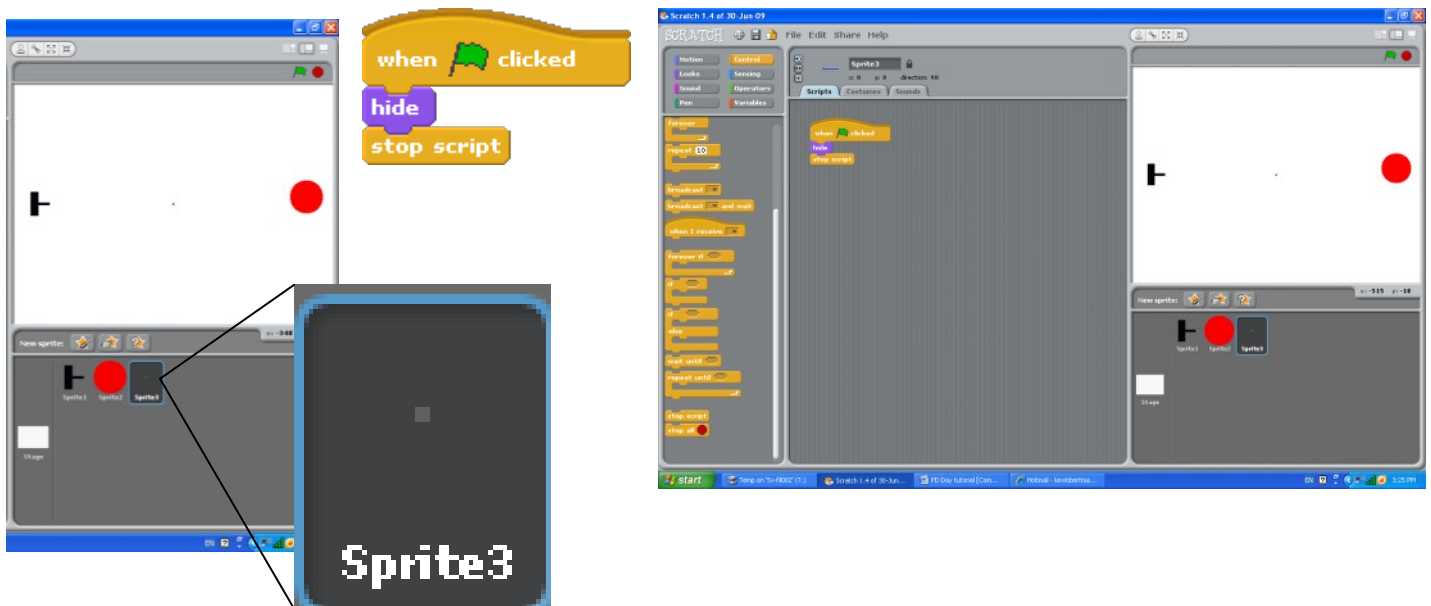
This tells the computer to initially set the position to (200,0), then point the sprite upwards, it then repeats whatever is inside the forever loop... forever.

In this case it is moving the spite forwards by 10 units, checking to see if it has reached the edge of the screen, and if it has changing its direction.

8. Your project should now look like this. Test to see if it works by pressing the green button and playing around with the up and down arrows.



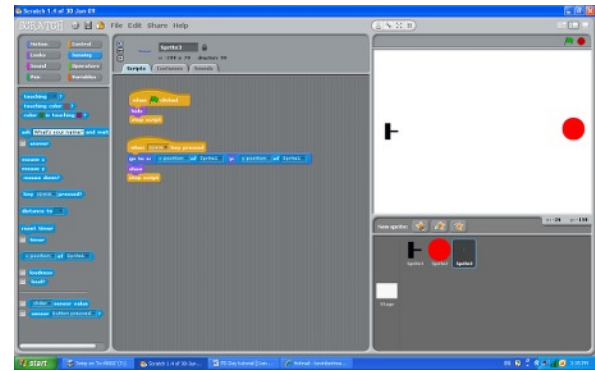
9. Now, we need to create a bullet for the gun. The bullet will be fired by pressing the space bar. Create a new sprite in the shape of a very small square (as in step 2). This will be the bullet. When we first start our game we need the bullet to be hidden, because we have not yet fired our gun. Create the following code for the bullet. This tells the computer to hide the bullet when the game starts (when the green flag is clicked).



10. Now, when we press the space bar to fire the bullet, the sprite should appear. It should appear at the same position as the gun. Enter the following code. Its meaning is self explanatory.

```

when space key pressed
  go to x: x position of Sprite1 y: y position of Sprite1
  show
  stop script
  
```



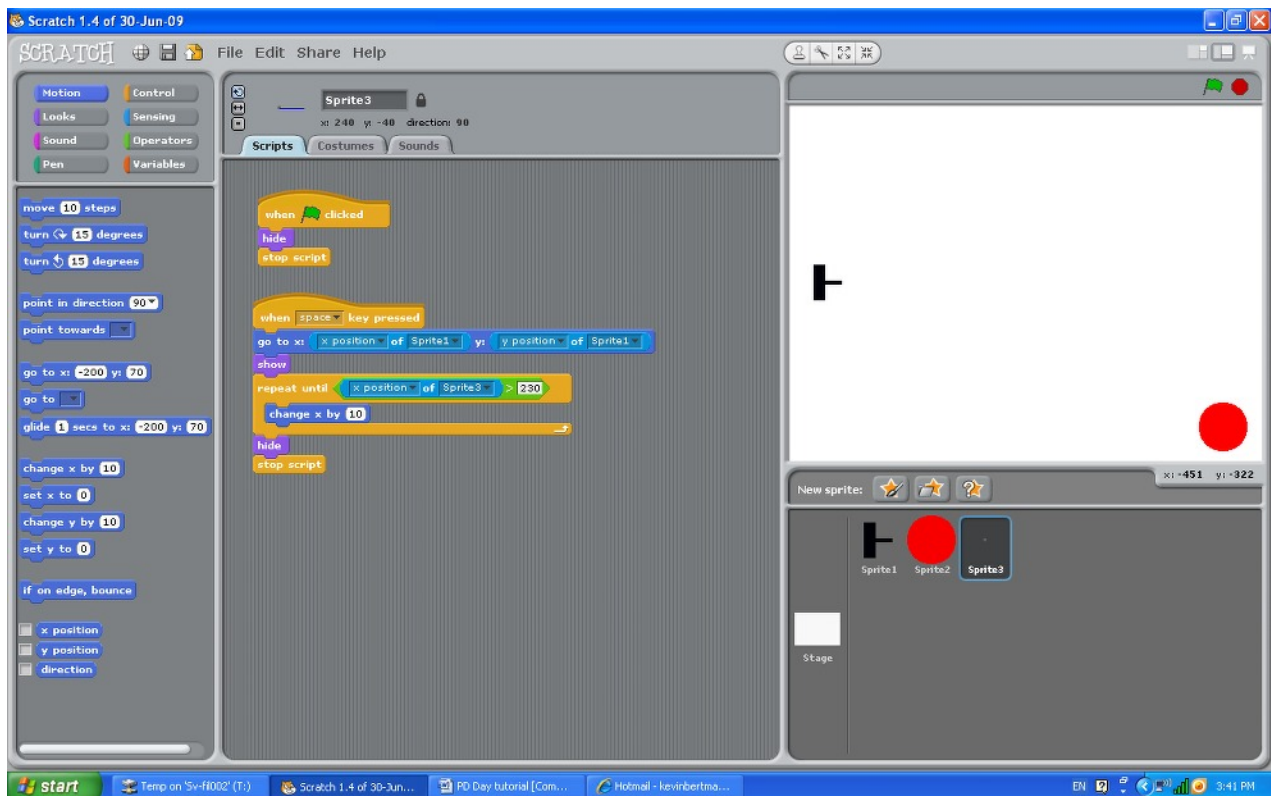
11. We would like the bullet to move after it has been fired. Change the code in the previous step to:

```

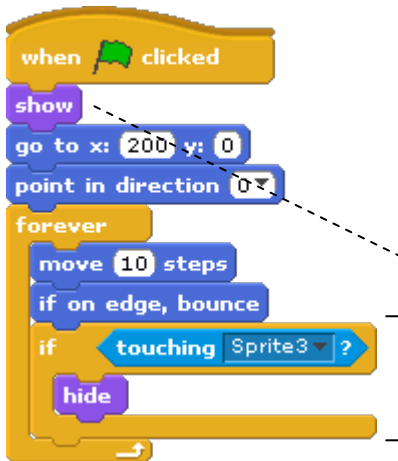
when space key pressed
  go to x: x position of Sprite1 y: y position of Sprite1
  show
  repeat until x position of Sprite3 > 230
    change x by 10
  hide
  stop script
  
```

The additions to this code tell the computer to keep increasing the x-coordinate of the bullet by 10 until its x-coordinate is greater than 230. Then the bullet will disappear again.

12. Test to see if the program works by clicking the green flag, then use the up and down arrows to move the gun, then press the space bar to shoot the bullet.



13. If the bullet hits the target we need the target to disappear. Select the target by clicking Sprite 2. You should be able to see the code you entered in step 7. Every time the target moves a step we need to check to see if it is touching the bullet. Change the previously entered code to the following:

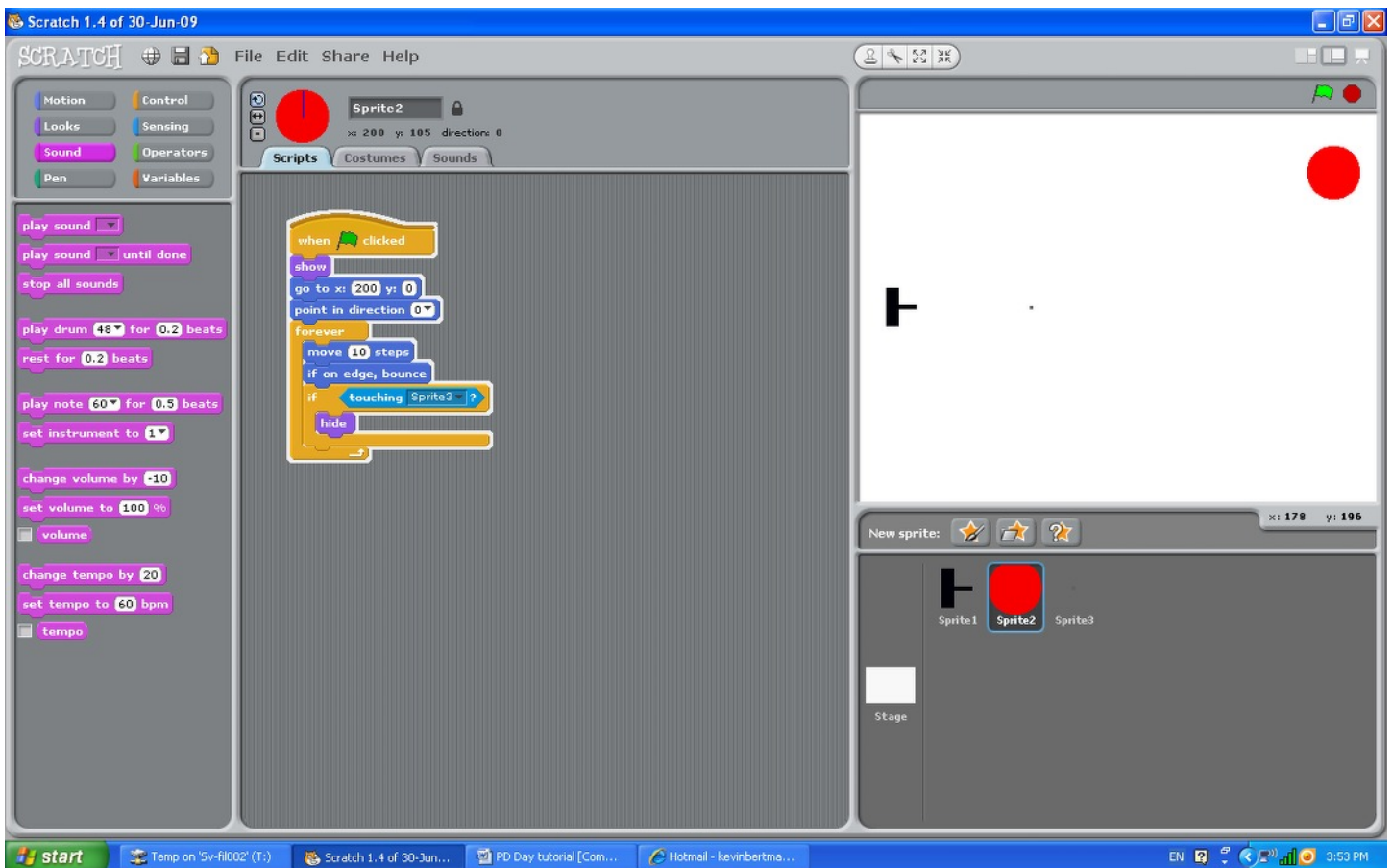


```
when green flag clicked
  show
  go to x: 200 y: 0
  point in direction 0
  forever loop
    move 10 steps
    if on edge, bounce
    if touching Sprite3
      hide
```

This tells the computer to keep checking whether the target is touching the bullet, and if it is it hides the target, signifying a hit.

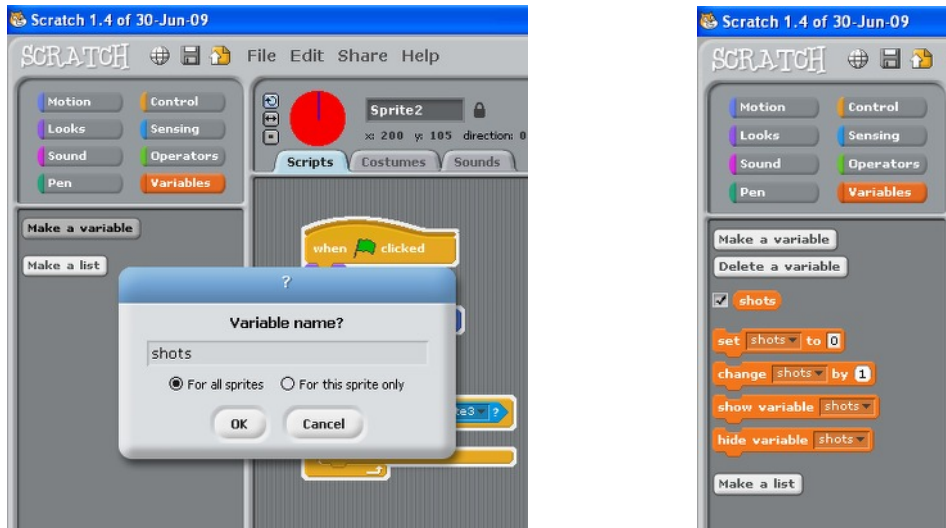
This is needed if we wish to restart the game after we have shot the target. The target disappears if it is shot so we need to make it reappear.

14. You have finished creating the basic game. Test to see if your program works!

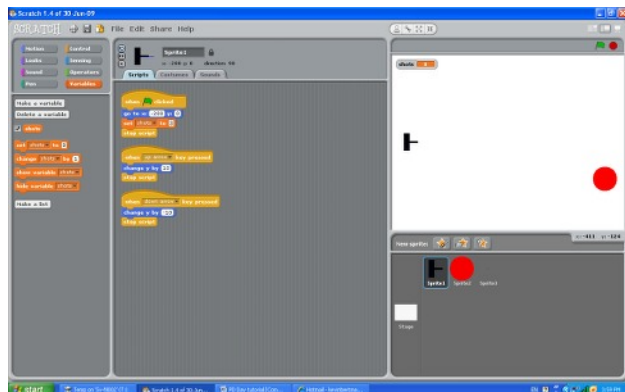


Making the Game More Challenging

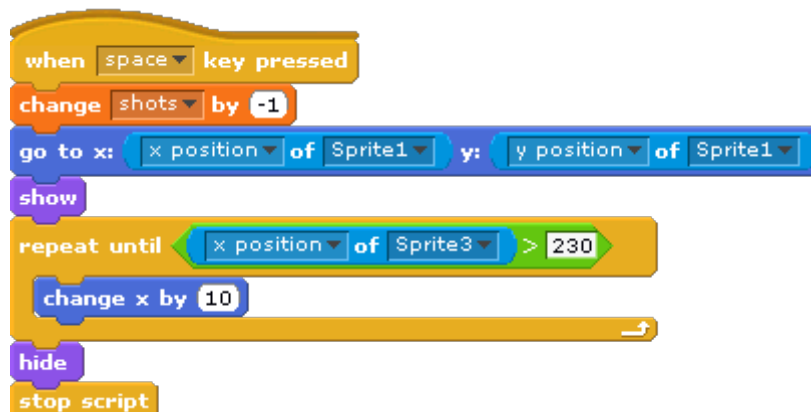
15. Let's make the game more challenging by introducing a limit to the number of times the gun can be fired. Click on *Variables* and create a variable called shots.



16. When the game first starts, we need to set the number of shots available. This can be done inside the code for any of the three sprites. Click on sprite 1 and change the code previously entered in step 3 to the following. This sets the number of shots available to 3. Click the green flag to see it work. Notice that the value of *shots* is displayed in the game window.



17. When we fire the gun we need to reduce the value of shots by 1. Click on the bullet and change the code entered in step 11 to:



18. When the value of *shots* is equal to zero we should display a game over message. After the bullet has been fired to the right and has disappeared, check the currently value of *shots*. If it is equal to zero, stop the game. Change the code entered in step 11 to:

```
when space key pressed
change shots by -1
go to x: x position of Sprite1 y: y position of Sprite1
show
repeat until x position of Sprite3 > 230
  change x by 10
hide
if shots = 0
  stop all
stop script
```

19. The game is now complete! Play it by clicking the green flag. Experiment with other Scratch functions and add more features to the game. You can add sounds, display messages etc...

