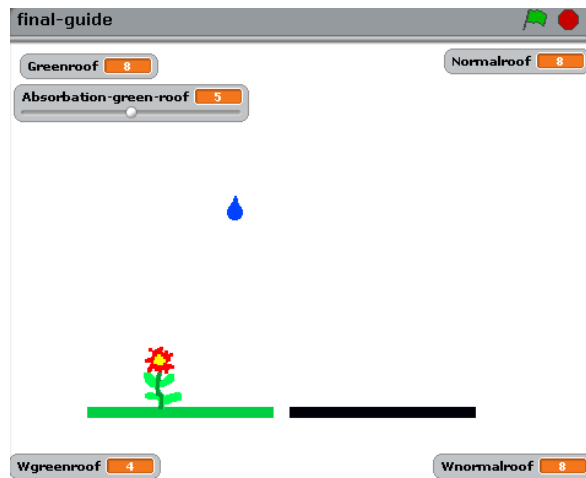


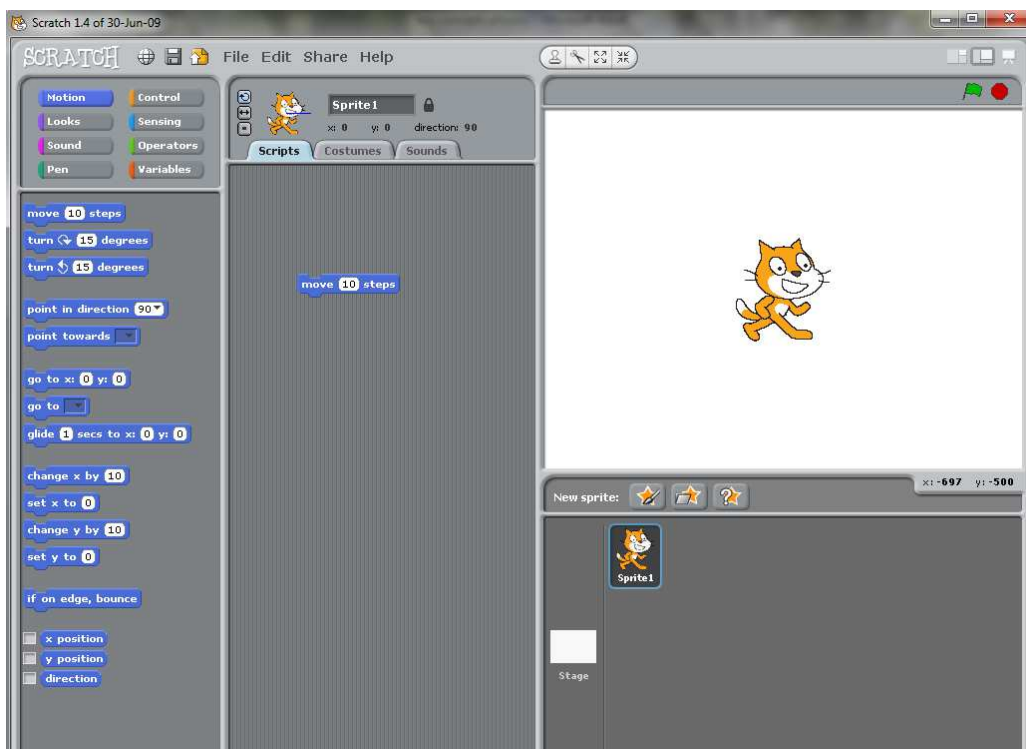
# Guide for making the green roof simulation

– A step by step tutorial for new beginners.

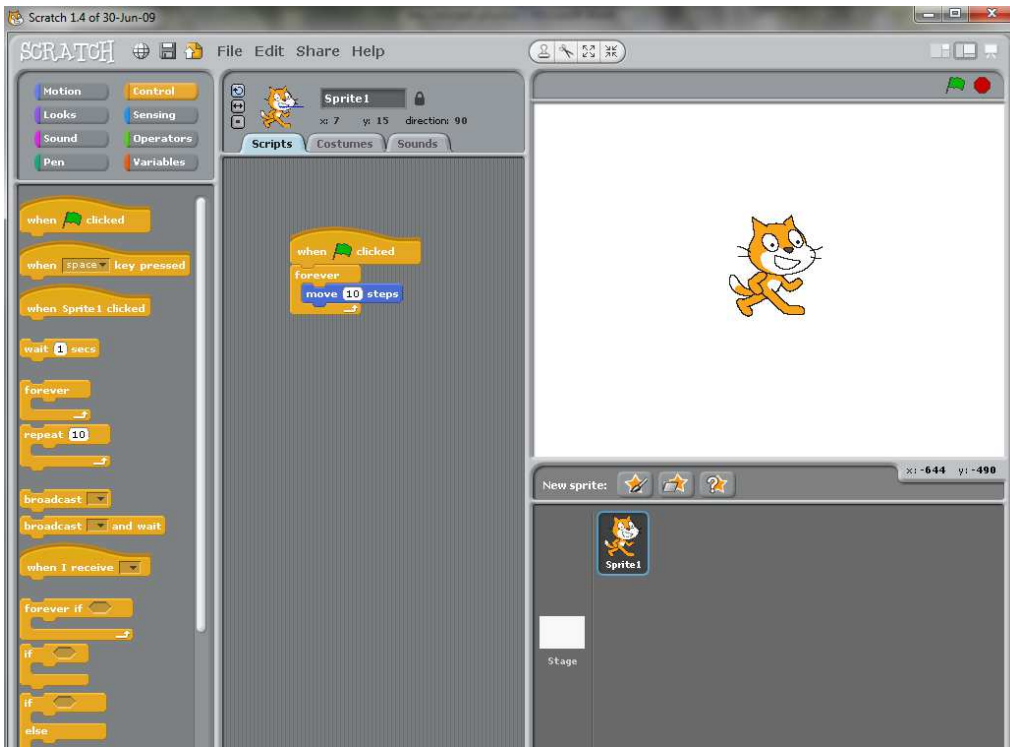


1) Download and install Scratch from [http://infoscratch.media.mit.edu/Scratch\\_1.4\\_Download](http://infoscratch.media.mit.edu/Scratch_1.4_Download). It works on Windows, Mac and Linux computers.

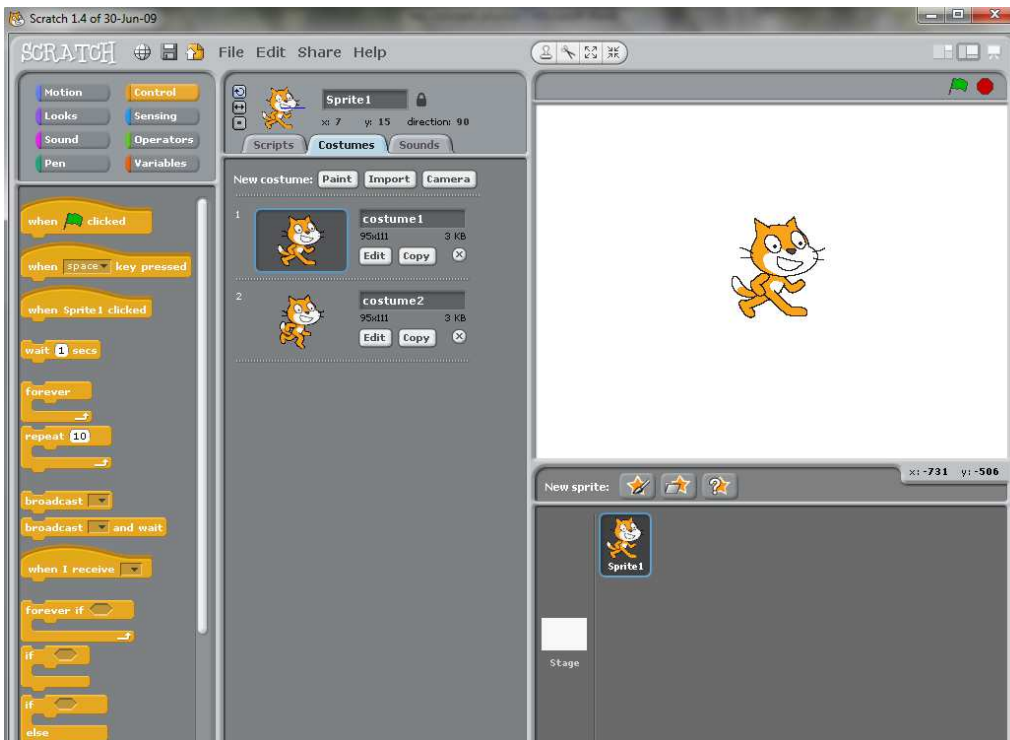
2) When you open Scratch, take a look at the different windows. Notice the cat in the upper right window. Now click on “Motion” and drag and drop the command “move 10 steps”.



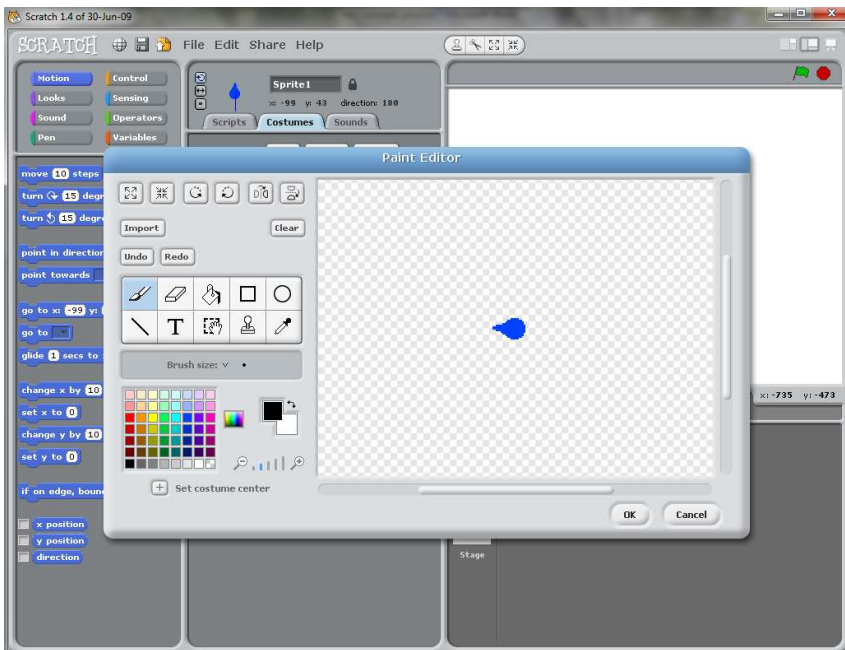
3) Go to “Control” and drag and drop a “when green flag clicked”. Make the cat move forever by drag and drop the command “move 10 steps” into a “forever”-loop. If you click the green flag, the cat will move. In the animation window you can drag and drop the cat to a desired position.



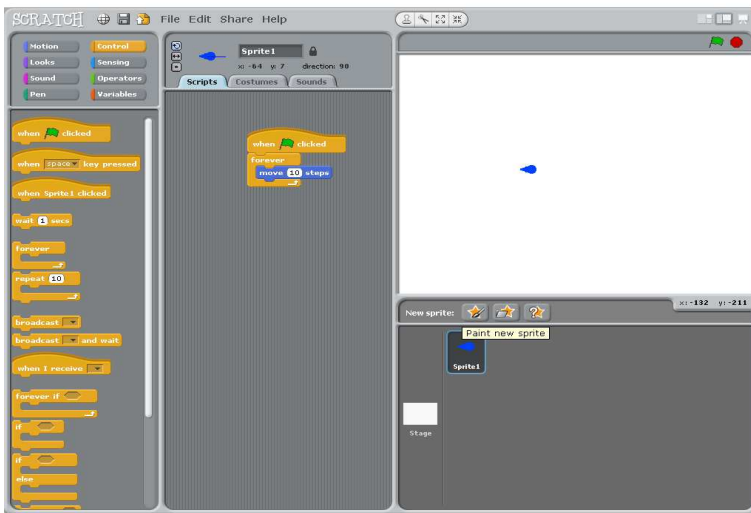
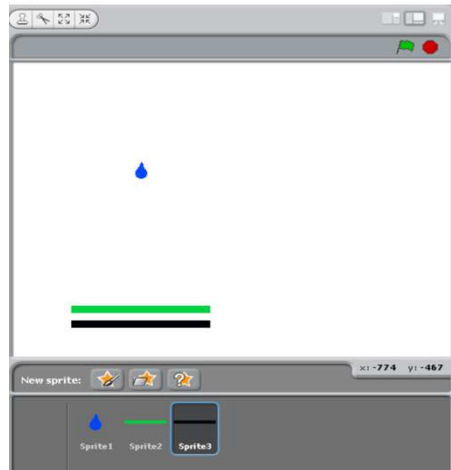
4) Change the picture of the cat by clicking on “Costumes” and then click on “Edit” to draw or import an image of a raindrop.



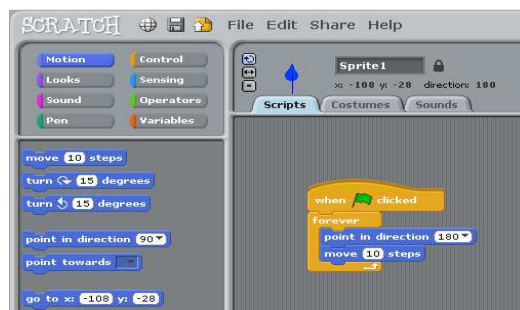
5) Draw a raindrop by using the brush and color palette.



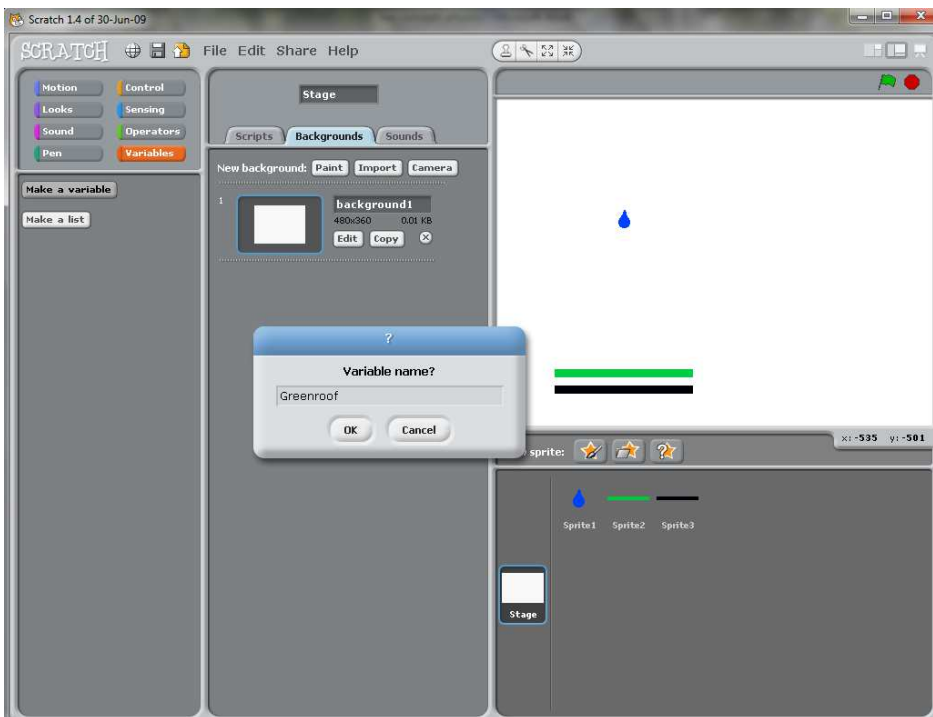
6) Now click on the Draw the two roofs and make sure they are equal in length.



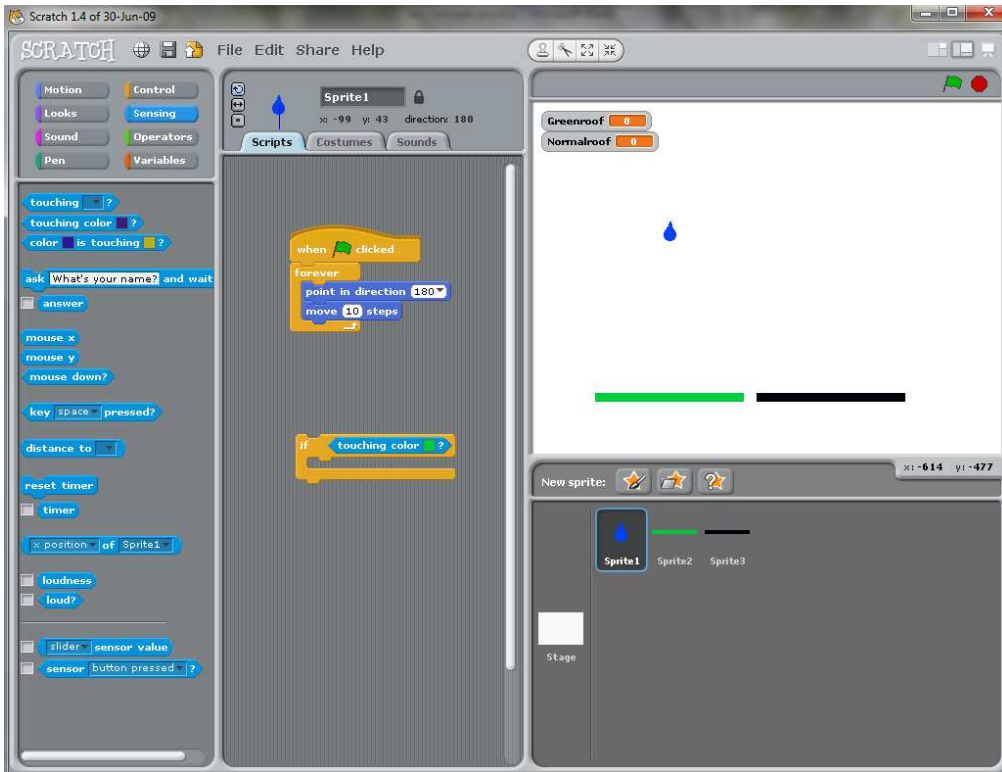
7) Make the drop move downwards by using the command “point in direction 180” under “Motion”.



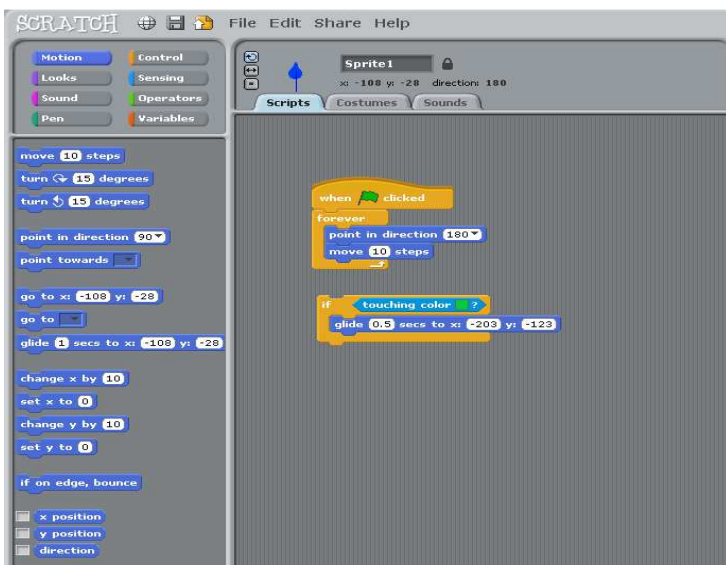
8) Go to “Stage” and create variables, which are being used for counting the number of drops hitting the roofs. In this example they are called “Greenroof” and “Normalroof”.

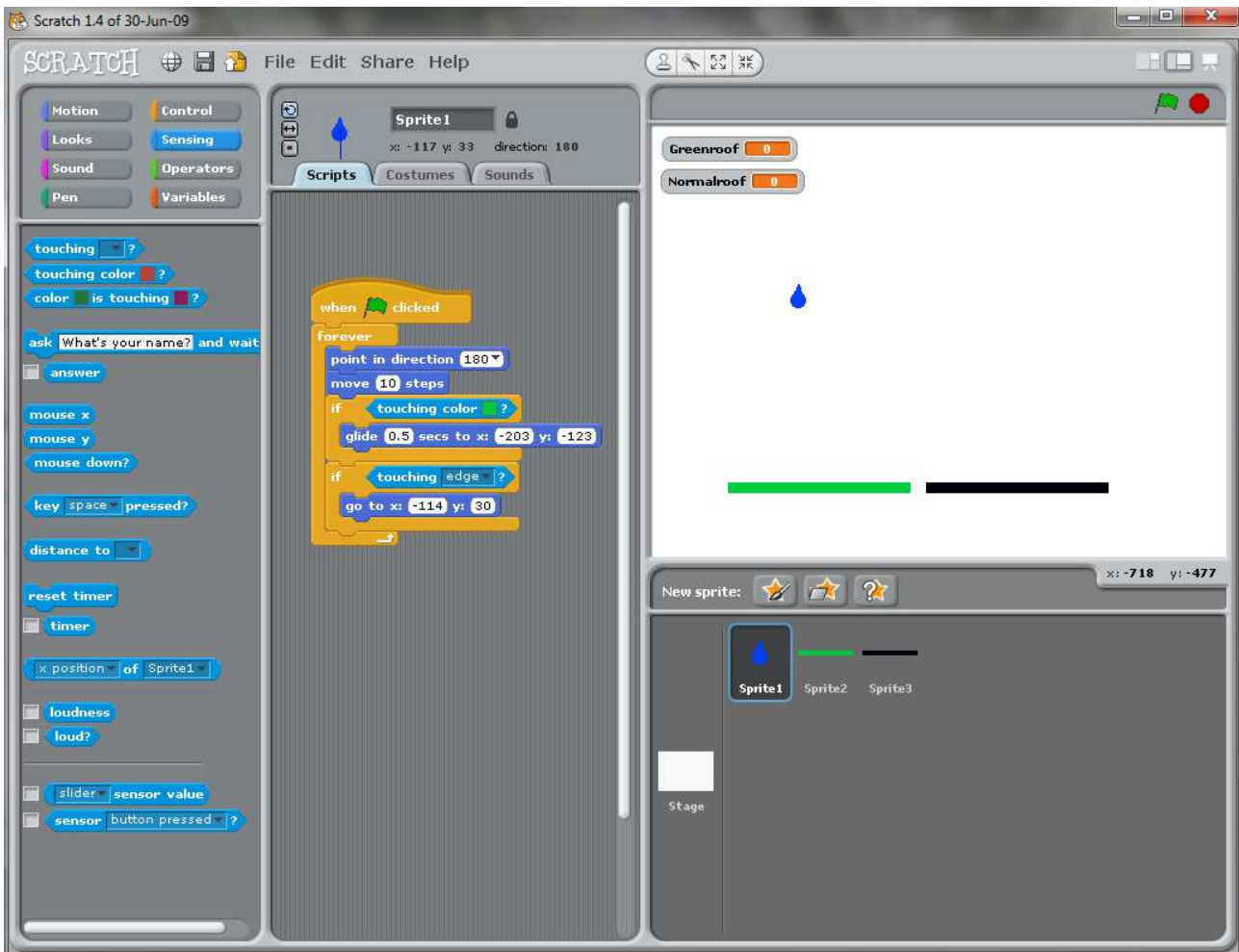


9) Go to Sprite1 -> Scripts and make an “if”-loop to be able to count the drops hitting the rooftops. Click the color square to be able to click on the desired color in the animation window.



9) Drag the command “glide 0.5 secs to x: y.” and set the desired coordinate found by hovering the mouse in the animation window.





Now you have a loop where the drop moves continually when you press the green flag.

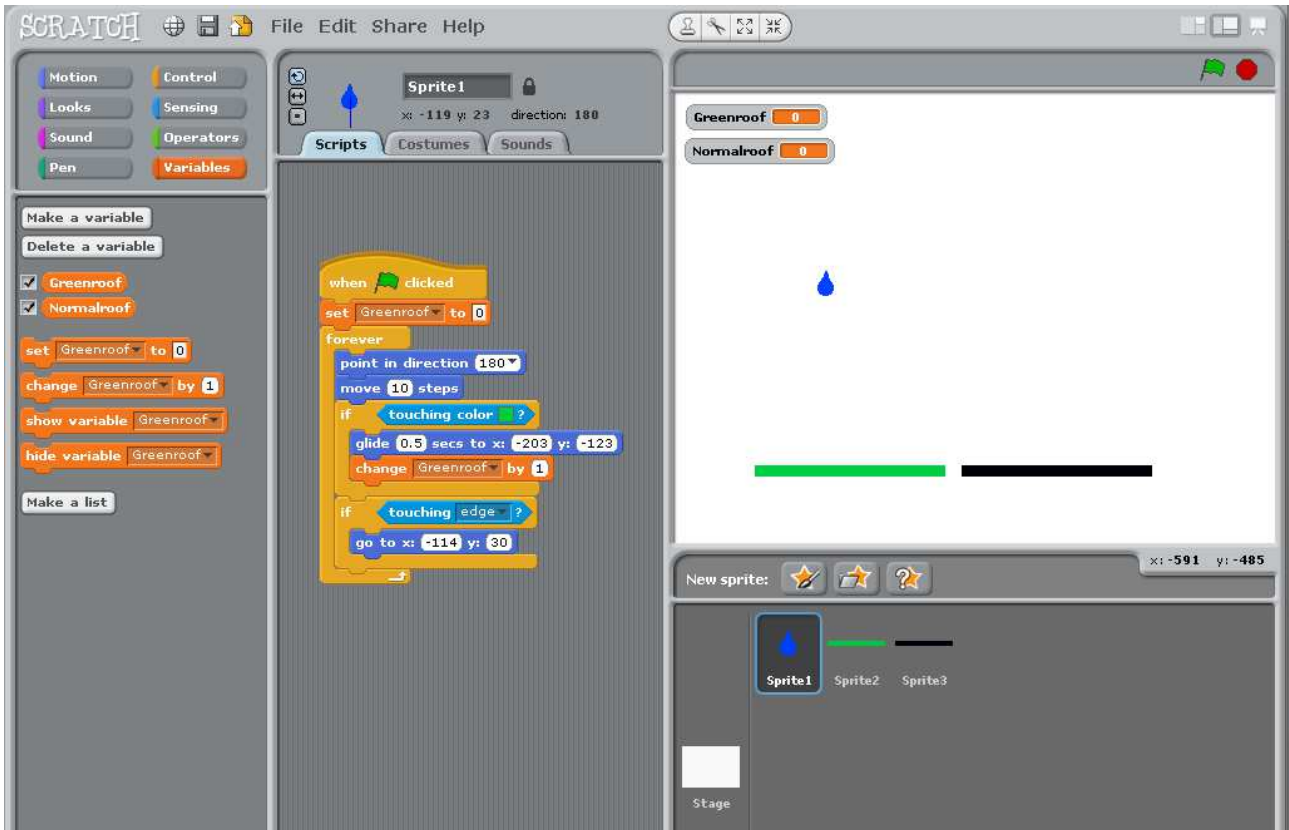
9) Count the number of drops hitting the green roof by doing:

a) Go to “variables” and drag a “set greenroof to 0” below the “when green flag clicked”.

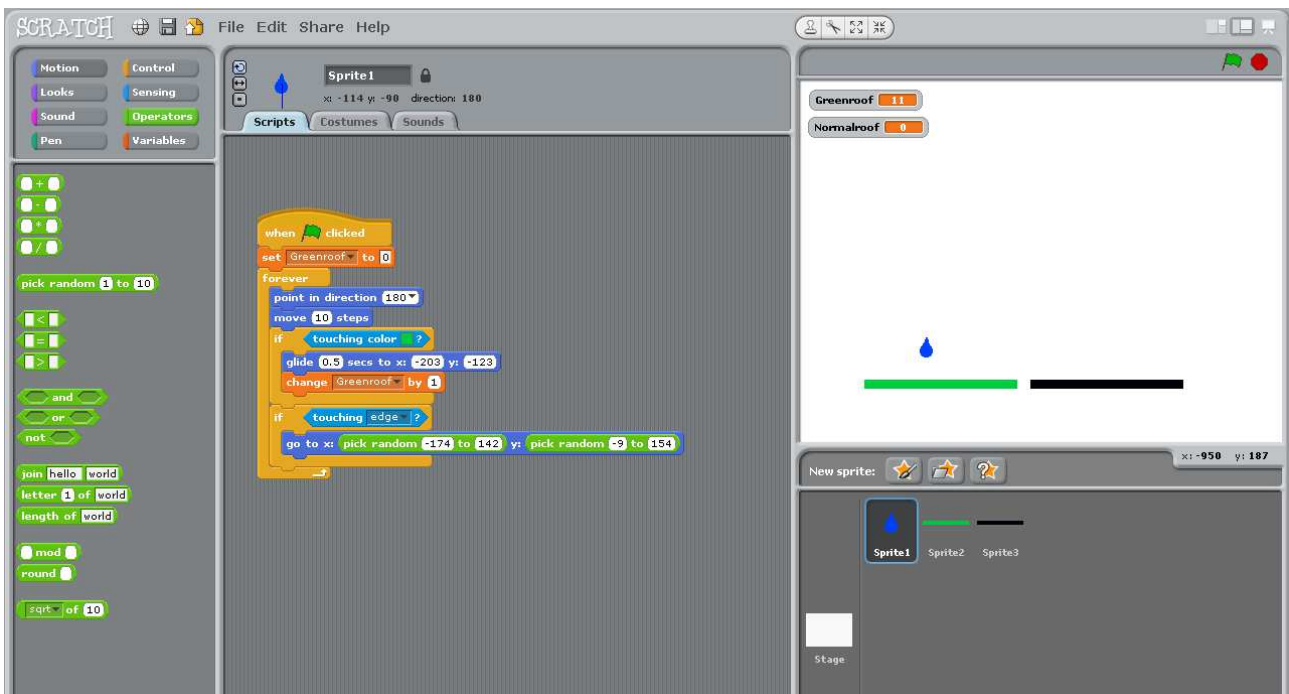
b) Drag a “change greenroof by 1” below the “glide 0.5 secs to x:-203 y:-123” inside the “if touching color green?” loop.

c) See now that when the green flag is clicked, then the green roof counter is increased by 1 when the drop has touched the green roof and glided.





10) Make the drops come from random positions by using the operator “pick random 1 to 10” by changing 1 and 10 to the minimum and maximum desired value in x and y. You can see the x and y position in the right corner below the animation window.



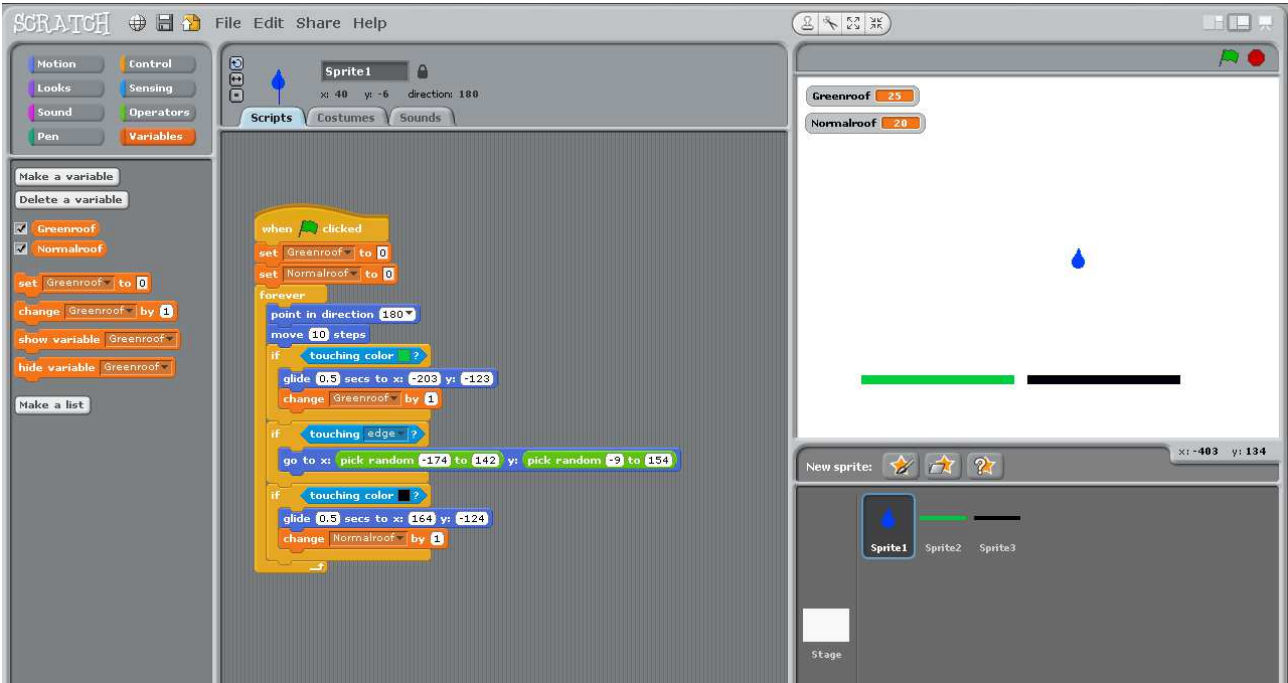
11) Make the same if-loop for the drop touching the normal roof with the color black.



```

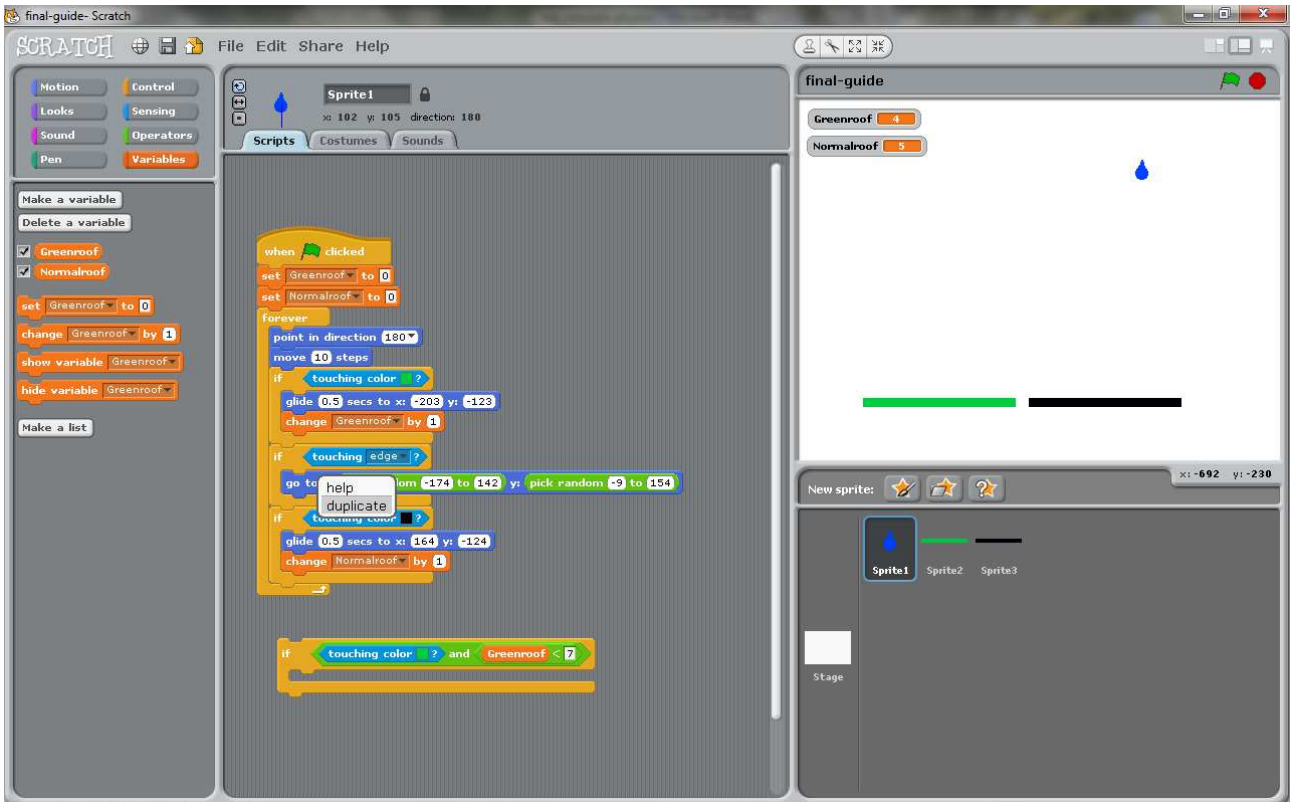
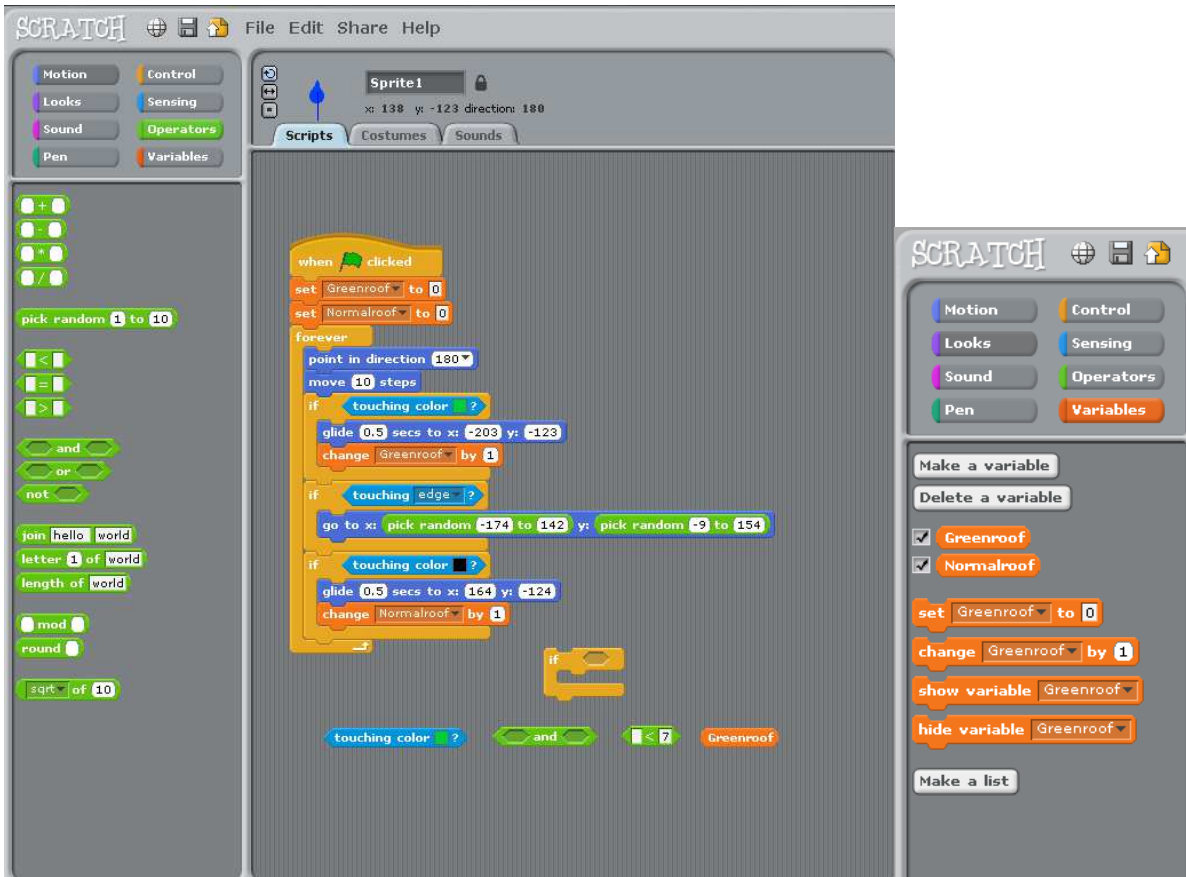
if touching color ?
  glide 0.5 secs to x: 164 y: -124
  change Normalroof by 1

```



Remember to "set normalroof to 0" when the green flag is clicked.

11) Make some of the drops hitting the green roof to disappear!



```

when clicked
  set Greenroof to 0
  set Normalroof to 0
  forever
    point in direction 180
    move 10 steps
    if touching color ?
      glide 0.5 secs to x: -203 y: -123
      change Greenroof by 1
    if touching edge ?
      go to x: pick random -174 to 142 y: pick random -9 to 154
    if touching color ?
      glide 0.5 secs to x: 164 y: -124
      change Normalroof by 1
    if touching color ?
      change Greenroof by 1
  if touching color ? and Greenroof < 7
    go to x: pick random -174 to 142 y: pick random -9 to 154

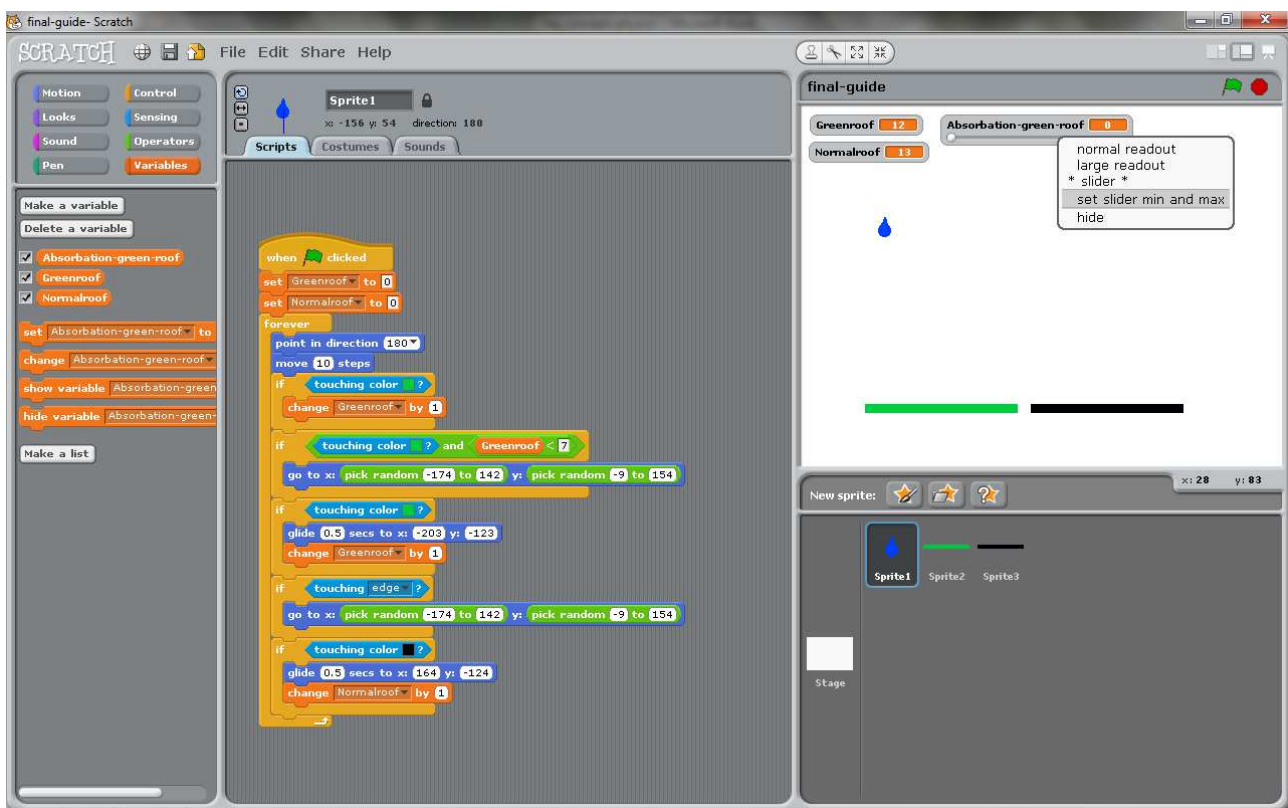
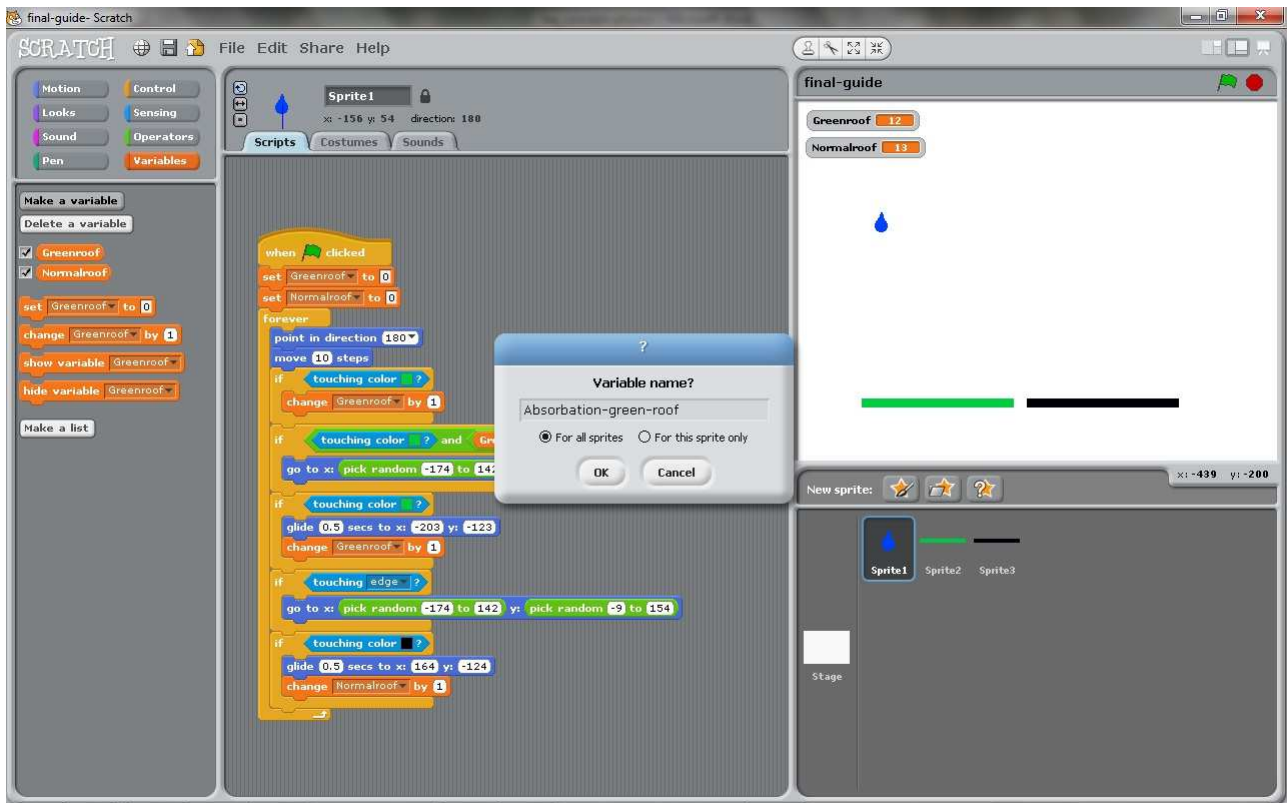
```

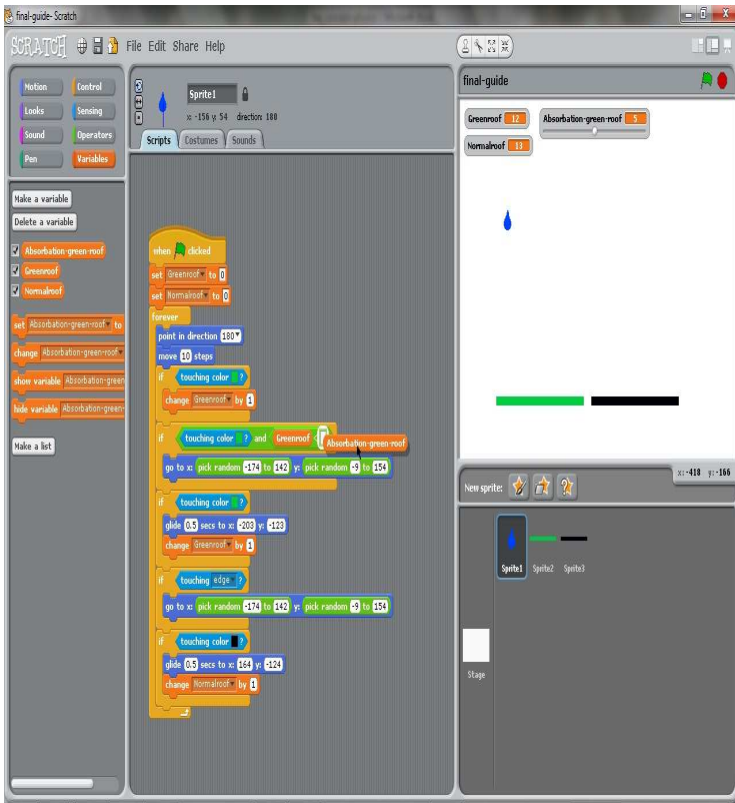
```

when clicked
  set Greenroof to 0
  set Normalroof to 0
  forever
    point in direction 180
    move 10 steps
    if touching color ?
      change Greenroof by 1
    if touching color ? and Greenroof < 7
      go to x: pick random -174 to 142 y: pick random -9 to 154
    if touching color ?
      glide 0.5 secs to x: -203 y: -123
      change Greenroof by 1
    if touching edge ?
      go to x: pick random -174 to 142 y: pick random -9 to 154
    if touching color ?
      glide 0.5 secs to x: 164 y: -124
      change Normalroof by 1

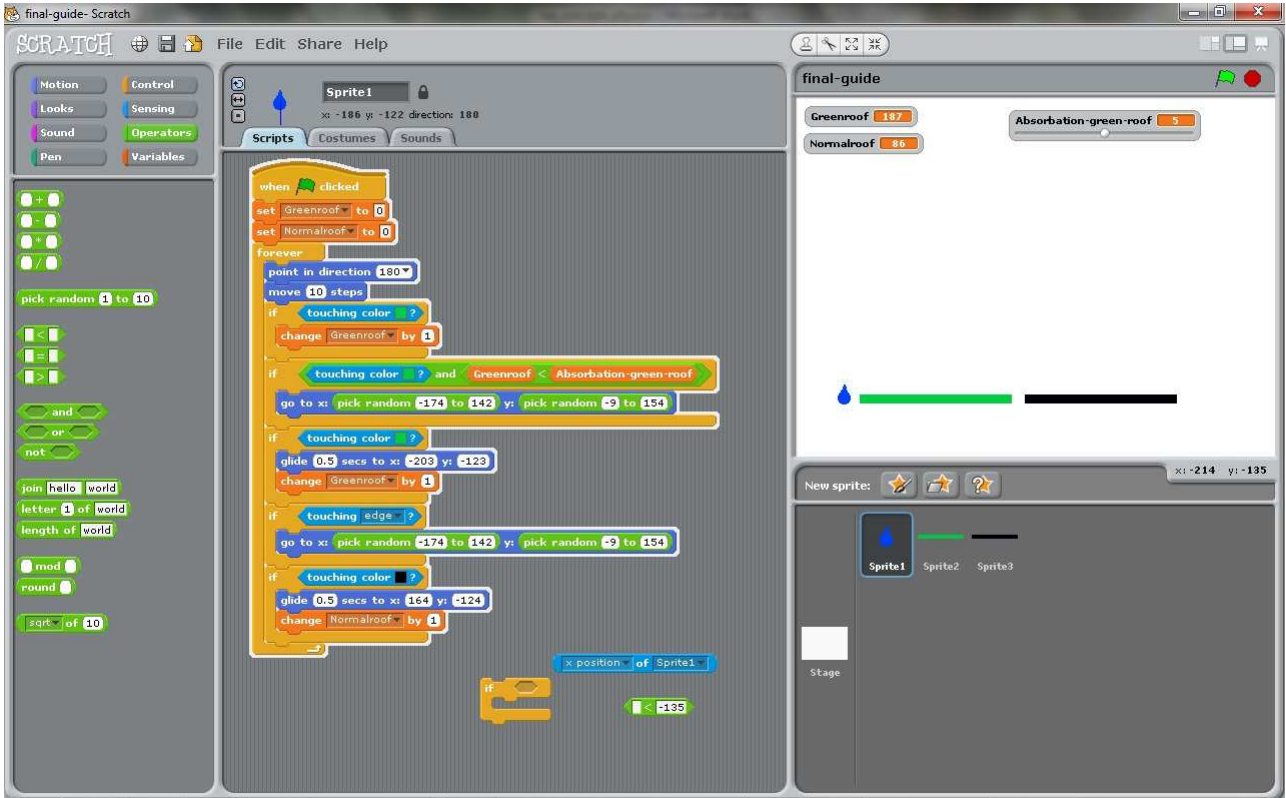
```

12) Adjustable variable for the number of drops to disappear.

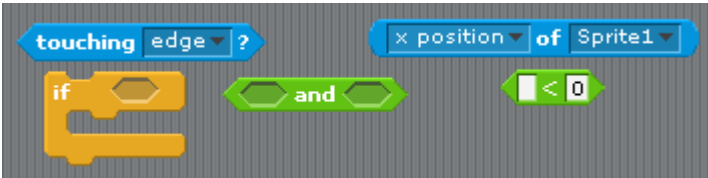




13) Count the number of drops coming off the two different rooftops and compare.



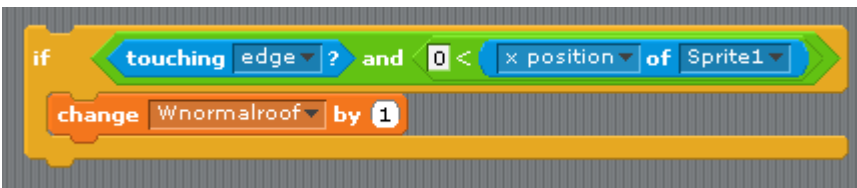
Find the following and make the logical statement: if touching edge and x position of Sprite1 is negative, then the drop must have hit the green roof.



Create a variable called Wgreenroof – and set it to change by 1, inside the if-loop.



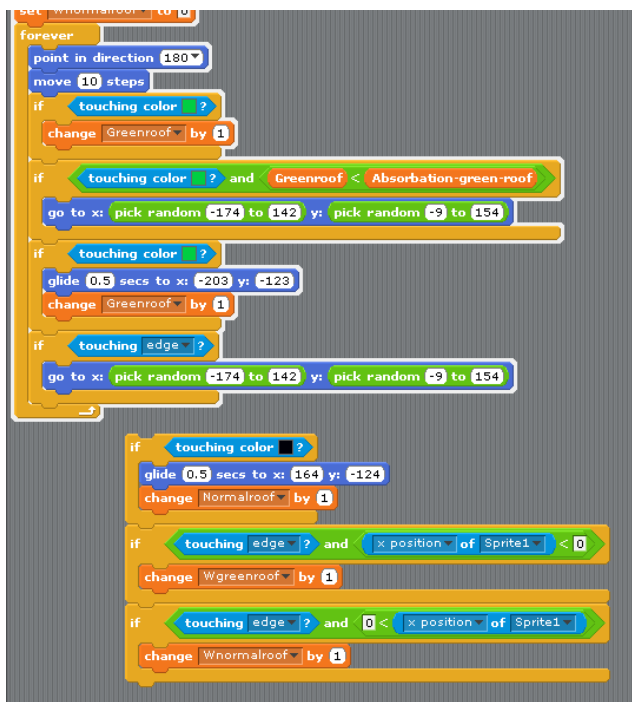
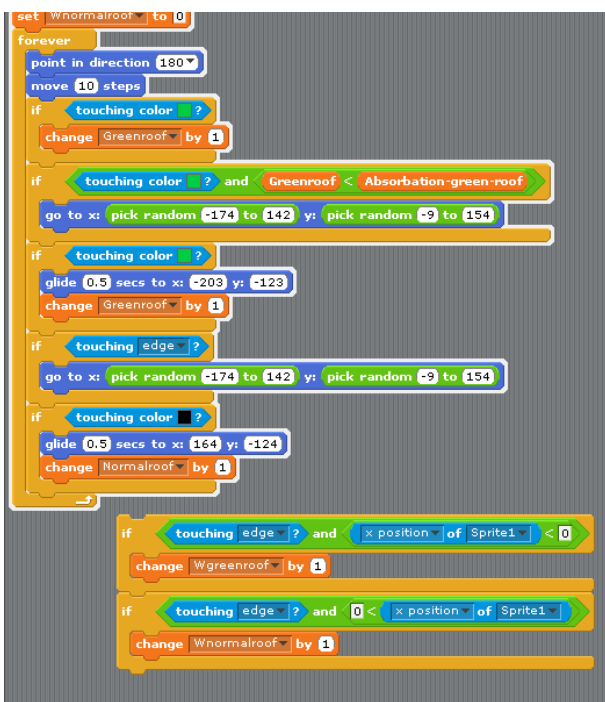
On the other hand we also conclude if touching edge and x position of Sprite1 is positive, then the drop must have hit the reference roof. We can duplicate the above and change the x-position to be positive.



Create a variable named Wnormalroof – and change it by 1 in the if-loop.

Remember to set the new variables equal to 0 when the program is started



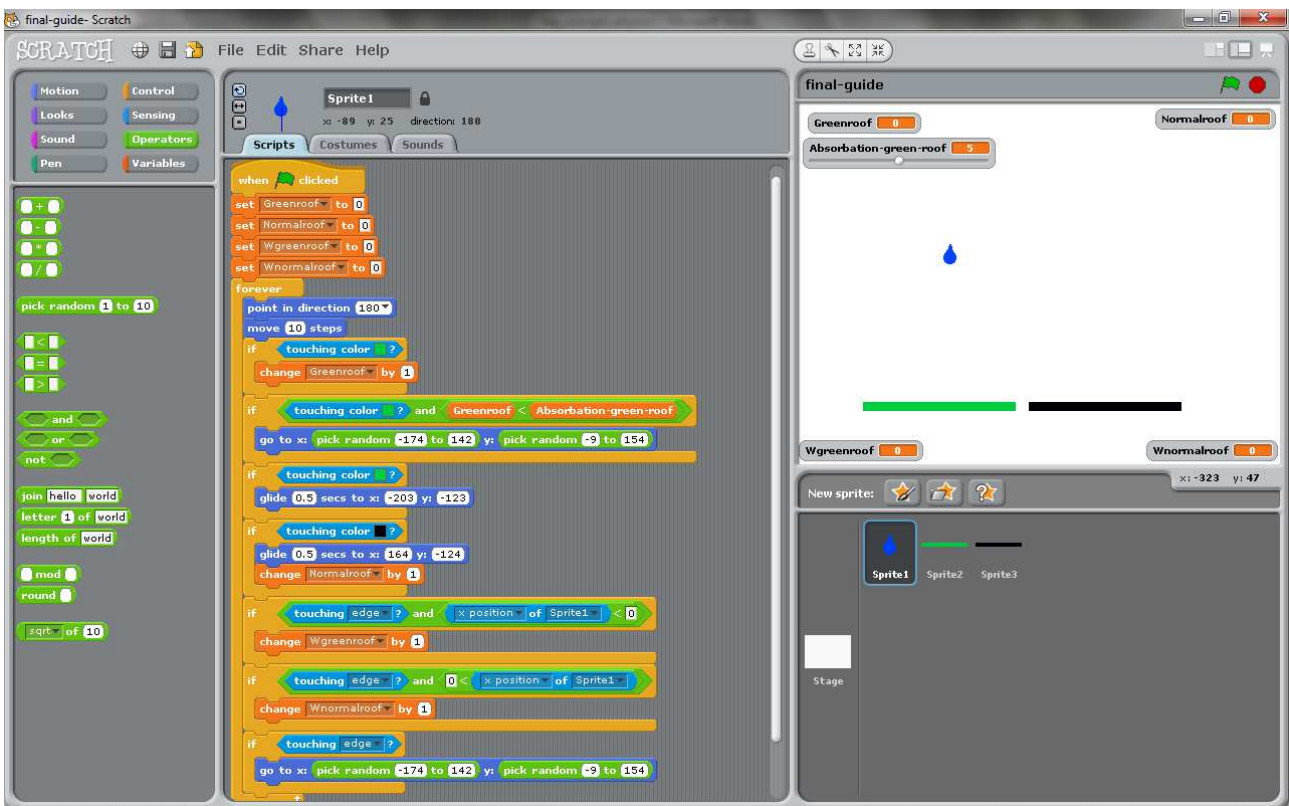




```

forever
  point in direction 180
  move 10 steps
  if touching color ?
    change Greenroof by 1
  if touching color ? and Greenroof < Absorbation-green-roof
    go to x: pick random -174 to 142 y: pick random -9 to 154
  if touching color ?
    glide 0.5 secs to x: -203 y: -123
    change Greenroof by 1
  if touching color ?
    glide 0.5 secs to x: 164 y: -124
    change Normalroof by 1
  if touching edge ? and x position of Sprite1 < 0
    change Wgreenroof by 1
  if touching edge ? and 0 < x position of Sprite1
    change Wnormalroof by 1
  if touching edge ?
    go to x: pick random -174 to 142 y: pick random -9 to 154

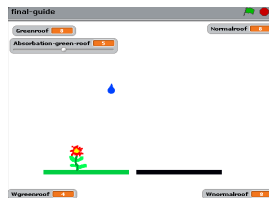
```



This is the final code.

## Guide for making a flower grow on the greenroof!

*- Let the creativity begin!*



- 1) Click on the greenroof-drawing in the window below the animation area - and go to Costumes.
- 2) Click "copy" under costume1.
- 3) Click "edit" on the new costume2- and draw the first part of the flower.
- 4) Click "copy" on the image just made, costume2, - and draw the next part of the flower in costume3.
- 5) Use the "IF-loop" and logical operators and a variable to determine when to change the image costume at how many drops have hit the green roof to adjust.

