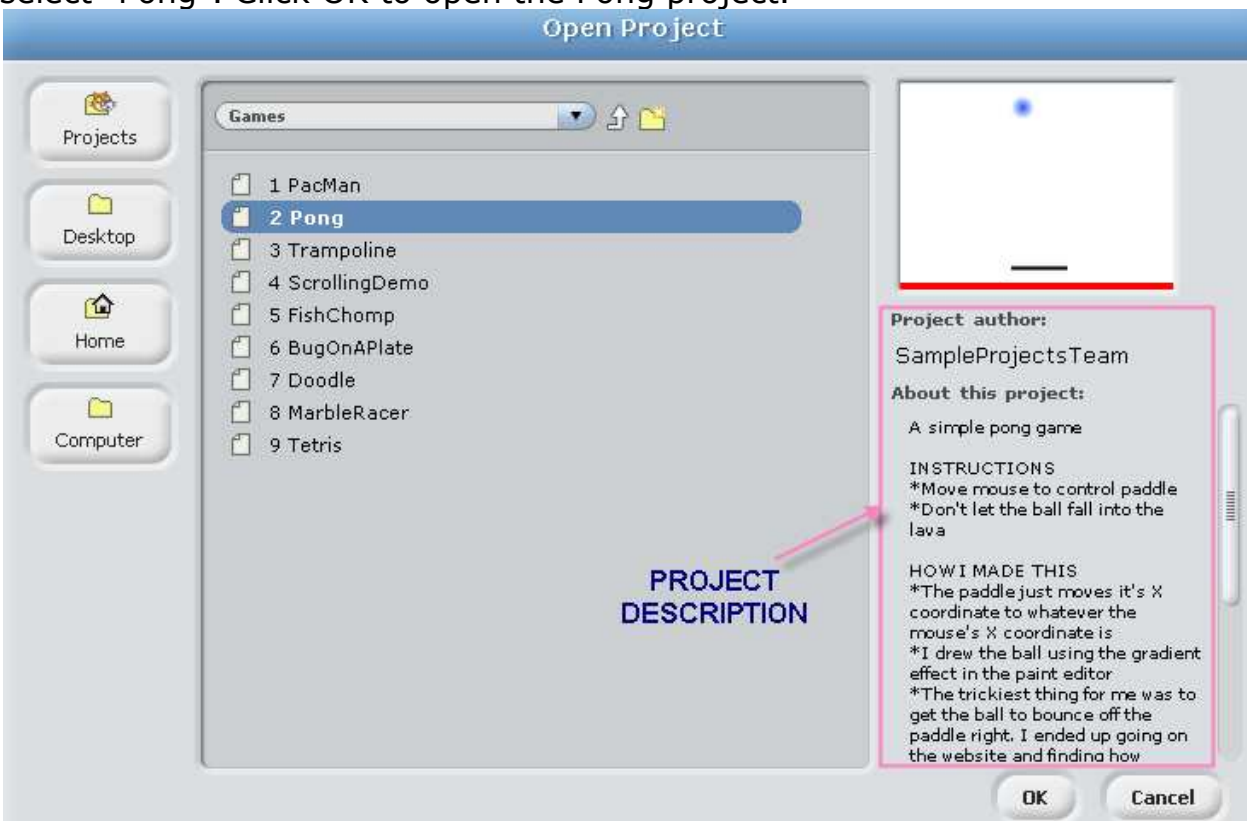


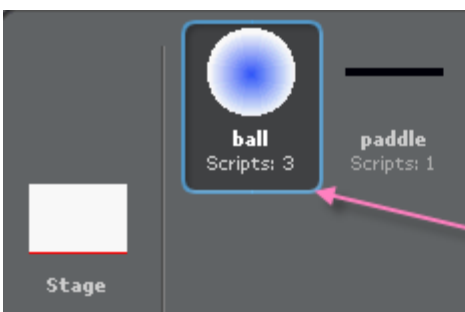
# Scratch Programming

## Lesson 7: The Pong Game

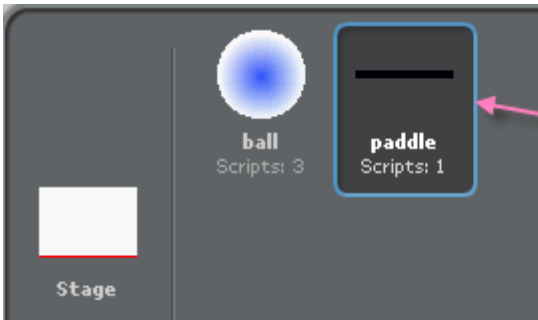
In this lesson, we will explore a sample game named "Pong". This game is simple so it's a good place to start learning how to create a game. To open the "Pong" game, click "Open" and browse to Projects->Games, and then select "Pong". Click OK to open the Pong project.



There are two sprites: ball and paddle. The ball sprite moves randomly by its own, whereas the paddle sprite is moved by user moving the mouse.



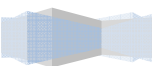
The ball sprite will move randomly.



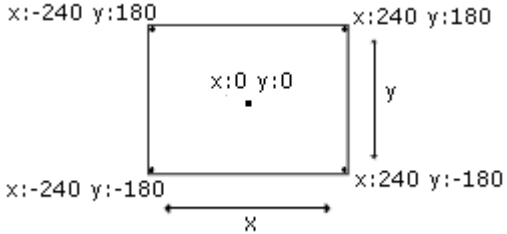
The paddle sprite is controlled by a human user.

Click the green flag to try the game. Use the paddle to hit the ball as it falls down. You should soon find that if the ball hits the bottom of the Stage, the game would end.

	<p>The ball sprite has three combo blocks. You can think of a sprite as a <b>robot</b> and each combo block as a <b>separate motor</b>. Just like a robot is controlled by many motors, a sprite can be controlled by many combo blocks. In Computer Science language, each combo block is a <b>thread of execution</b>, working independently of the other threads.</p> <p>In the picture shown left, first combo block controls how the game would end - if ball touches red, then game ends.</p> <p>The middle combo block checks whether the ball has touched the paddle and takes action when it does.</p> <p>The last combo block checks whether the ball has hit the edge and takes action when it does.</p>
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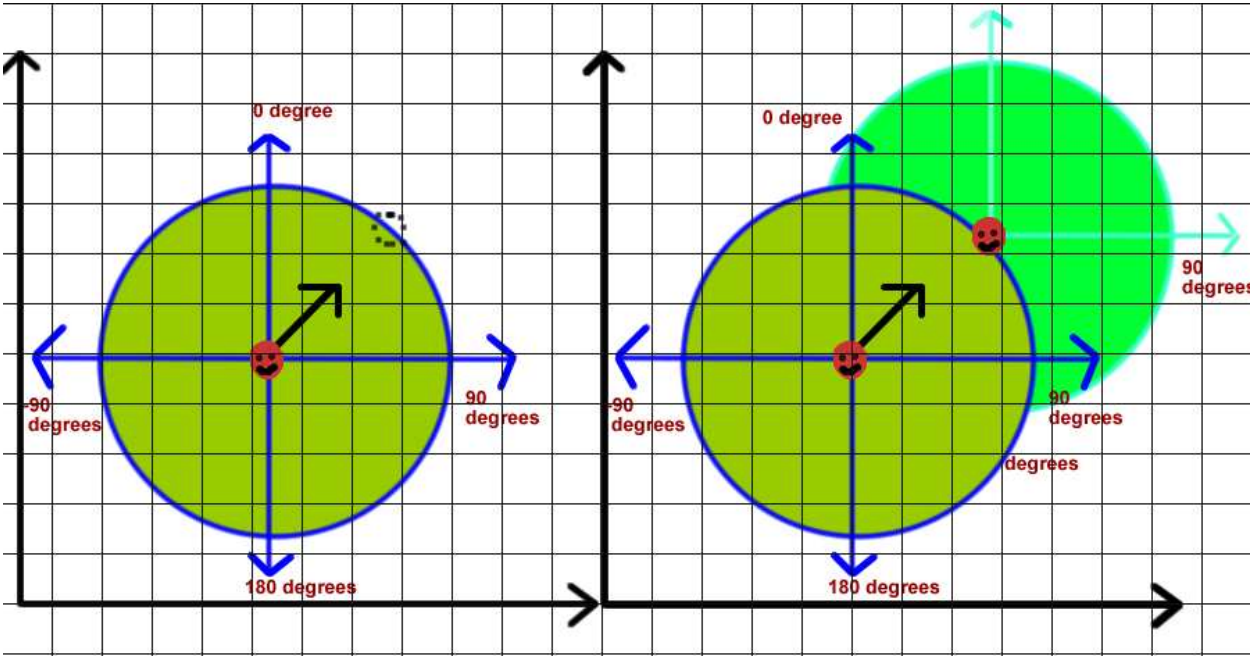


The image below shows how a sprite moves in the Scratch stage which is based on the X-Y coordinate system.



This sprite moves according to this script:

```
point in direction 45
move 50 steps
```

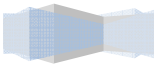


BEFORE

```
point in direction 45
move 50 steps
```

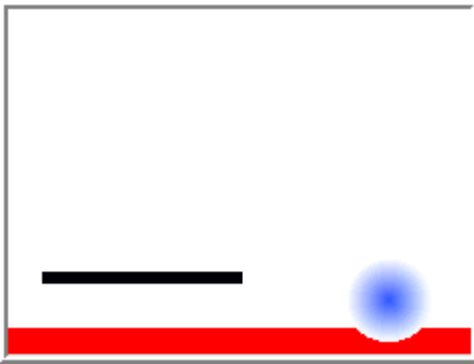
AFTER

```
point in direction 45
move 50 steps
```



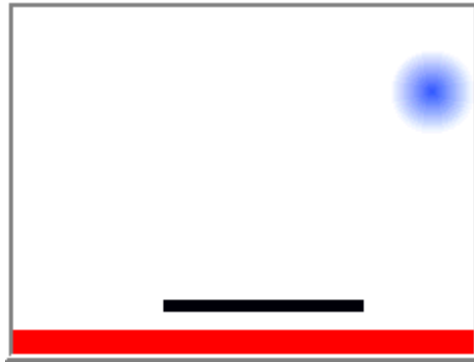
The Combo block shown is activated when the ball hits Stage's red bottom.

```
when clicked
  go to x: 13 y: 157
  wait until touching color red
  stop all
```



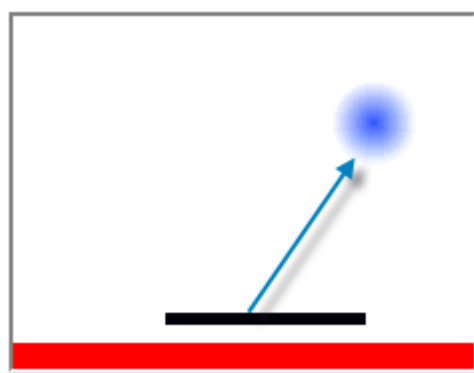
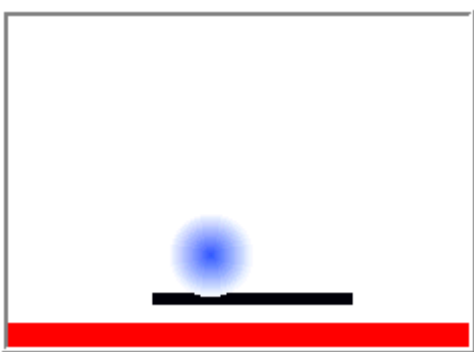
The combo block shown is activated when the ball hits the edges of the Stage.

```
when clicked
  forever
    if on edge, bounce
    move 4 steps
```



The combo block shown is activated when the ball hits the paddle.

```
when clicked
  forever if touching paddle
    play sound water_drop
    point in direction 180 - direction
    move 5 steps
    turn pick random -20 to 20 degrees
```



**TRY THIS:** Try changing the randomness by changing the value in “pick random ? to ?” block. To make it more random and the game more difficult, increase the range of the degree change.

```

when clicked
  forever if touching paddle ?
    play sound water_drop
    point in direction 180 - direction
    move 5 steps
    turn pick random -20 to 20 degrees
  
```

```

when clicked
  forever if touching paddle ?
    play sound water_drop
    point in direction 180 - direction
    move 5 steps
    turn pick random -100 to 100 degrees
  
```

Also, you can make the ball leave trace of its movement by using the Pen Tool Kit.

```

when clicked
  clear
  go to x: 13 y: 157
  wait until touching color red ?
  stop all

when clicked
  forever if touching paddle ?
    pen down
    play sound water_drop
    point in direction 180 - direction
    move 5 steps
    turn pick random -100 to 100 degrees
  
```

