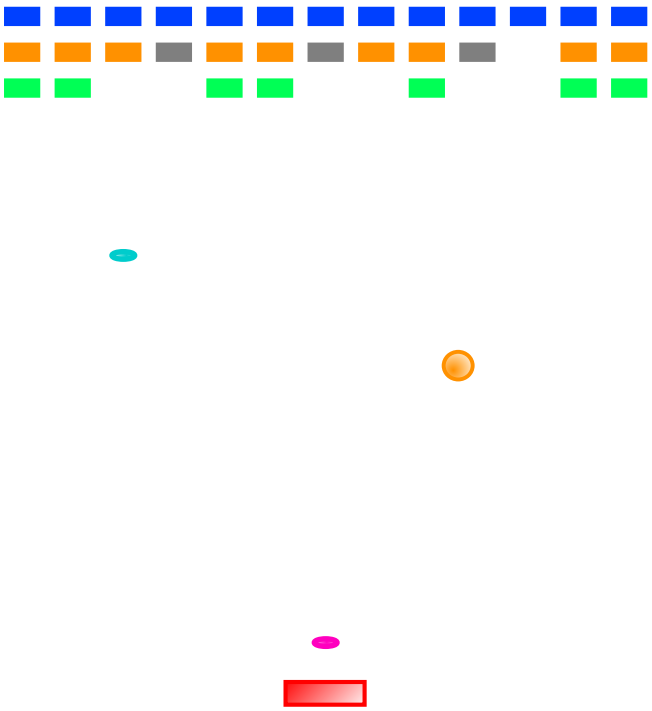
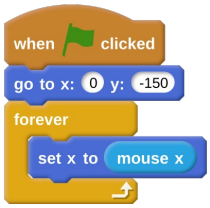
Breakout

Hit all the bricks with the bouncing ball.



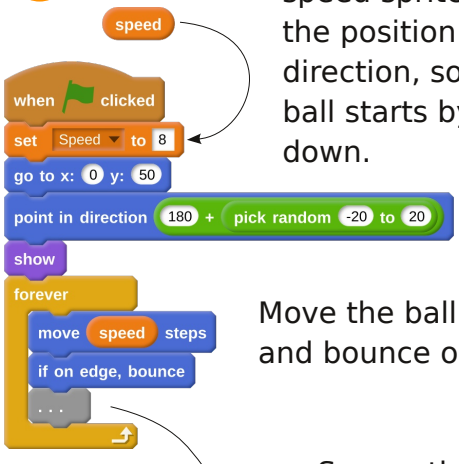
Move the paddle



Draw a paddle or pick it from the Scratch library. Place it towards the bottom of the screen.

A bouncing ball

First, initialize the speed sprite variable, the position and the direction, so that the ball starts by going down.



Move the ball at its speed and bounce on edges

See on the next page for the bouncing on the paddle...

Breakout

A ball bounces around.

With the paddle you make sure that it does not fall down to the ground.

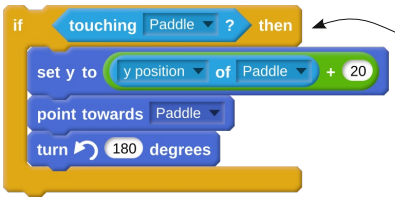
The goal is to hit all the bricks with the ball.

Preparation

You will need for the game:
- a ball,
- a paddle,
- a wide paddle costume,
- bricks of different colors, (one costume per color)
- pills with super powers.

Pick the sprites from the library or draw them yourself.

The ball und the paddle



... add to the Ball's "forever" loop.

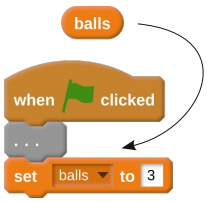
When the ball touches the paddle it will bounce to the left or to the right, depending on which part of the paddle is touched, more or less steep, depending on how close ball is to the center of the pad:
- First, move up by 20 px so that it does not touch the paddle anymore.
- Then point to the center of the paddle.
- Finally invert the direction (turn by 180°)

Try it out!

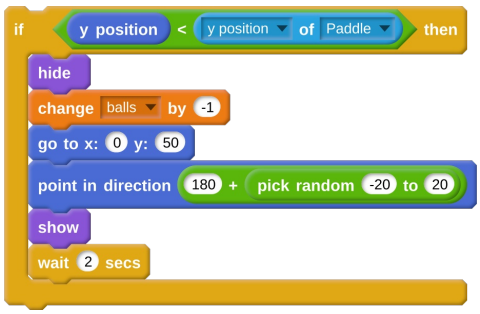
Click on the green flag: the ball will bounce around and the pad follow the mouse.

Losing a life

When the ball drops below the paddle, decrease the number of lives, then the ball goes back to its start position.



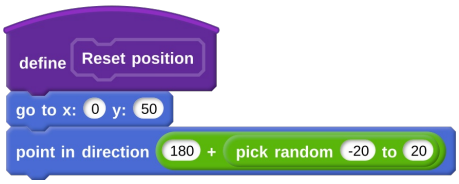
First create the "Ball" variable (for all sprites) and initialize it to the number of lifes.



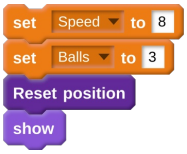
In the forever loop on page 2 we add a check for the ball position being below the paddle. If it's the case, we decrease the number of lifes and – after two seconds – move back to the start position.

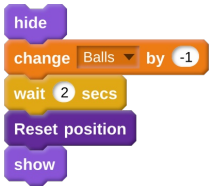
Refactoring

You might have noticed, that the code for the initialization is very similar to the one for resetting the position after the ball has been missed.
Let's refactor the code and create a "Reset position" block.



We can use "Reset position" for both the "initialization" and when moving back to the start position:

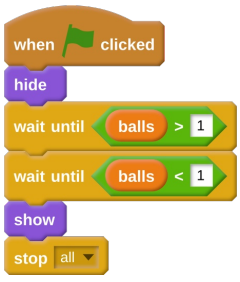




Game Over

Game Over

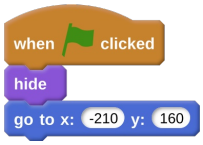
We keep an eye on the number of balls left and trigger a "Game over" when no we have lost all balls.



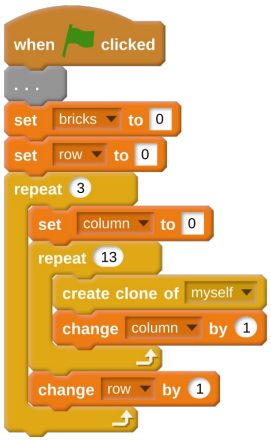
First, wait until at least one brick has being cloned: otherwise it might stop as soon it starts.

Draw the bricks

We are now drawing three rows of bricks. We draw the brick zero. We keep it hidden and place somewhere in the left top corner.

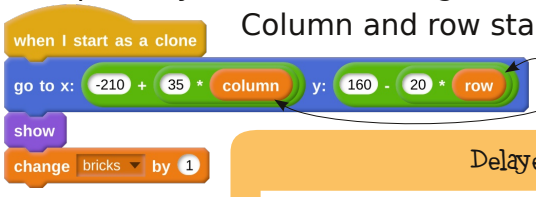


We have made some calculations and if our bricks are 30 by 15 pixels we can fit them in 13 columns and 3 rows.



We keep track of the number of bricks, the row and the column, and we create each brick as a clone of the brick 0.
Important notice: "row" and "column" must be for the sprite only. That way, each brick knows where it is.
"bricks" is a global variable.

Each column is 35 wide and the rows 20 high. Each clone position is calculated by adding to the origin the index (colum or row) multiplied by the width or height.



Column and row start at 0, not 1

Delayed start

Add a "wait" between the "reset" and the "bouncing"

Hit the brick

Add it to the "When I start as a clone "code.

When a brick is hit by the ball it disappears...

Hit the brick 2

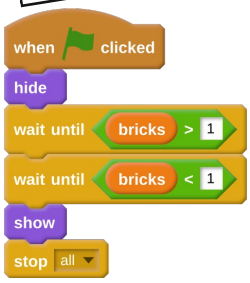
Add it to the "Forever" loop.

... And when the ball hits a brick, it inverts its direction.

(If the bricks do not disappear, wait 0.1 seconds before changing direction.)

The Winner

Winner

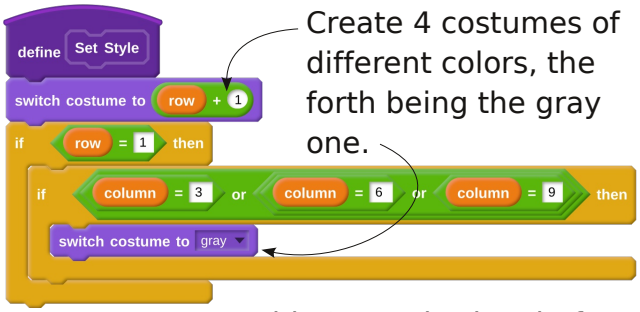


The "Winner" sprite is hidden and wait for the number of bricks being back down to 0 before showing.

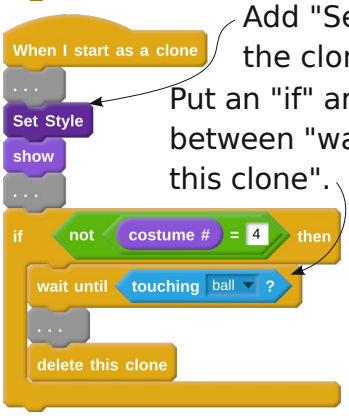
First, wait for at least one bricks being cloned: otherwise it might stop as soon it starts.

Colorful bricks

We set different colors for each row and on the second row add three gray bricks that cannot be destroyed.



Create 4 costumes of different colors, the forth being the gray one.



Add "Set style" just before the clone is shown...

Put an "if" around the blocks between "wait until" to "delete this clone".

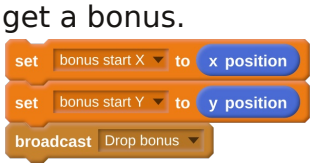
Wins e 3

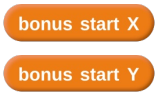
Winner

In the winner, wait until 3 bricks are left, not 0.

Drop the pills

When the ball hits a brick, there is one chance in four to have a falling pill. If the player catches the falling pill, she/he will get a bonus.





- Create the global variables "bonus start X" and "bonus Start Y"
- Towards the end of "When I start as a clone, just before deleting the clone...
- ... Set "bonus Start X" to the current "x position" and "bonus Start Y" to the "y position"
- Broadcast the "Drop bonus" Message.

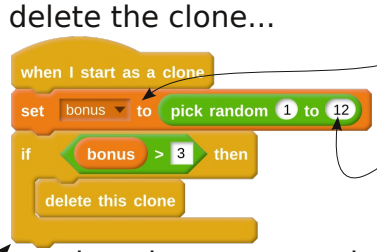
Drop the pills 2

Draw a pill. When the game starts it hides itself and when a brick broadcasts a "Drop bonus" it clones itself...

Drop the pills 3

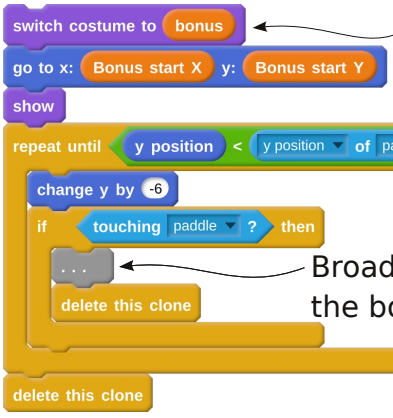
Create a "Bonus" sprite variable.

If the random value is bigger than 3 (3 chances out of 4) just do nothing and delete the clone...



1 to 12? We have three bonus and 1/4 chance:
3 * 4 = 12

... otherwise, move to the place where the brick was, appear there, and fall down until it gets past the paddle (or touches it).

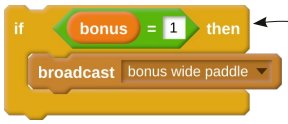


We need three costumes.

Broadcast from here the bonus messages...

Bonus: a wide paddle

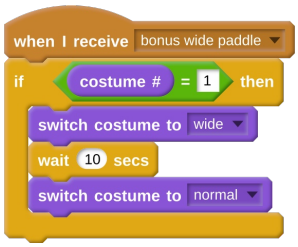
When the player catches a "Wide Paddle" bonus (the number 1), the paddle gets wider. It will return to the normal size after 10 seconds.

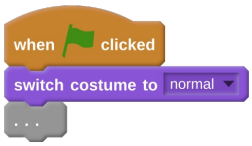


Add the broadcast to the "if touching paddle"

Bonus: a wide paddle

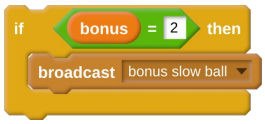
The paddle listens to the "Bonus Wide Paddle". It then switches to a costume with a wider paddle and waits for 10 second before switching back to the normal costume.





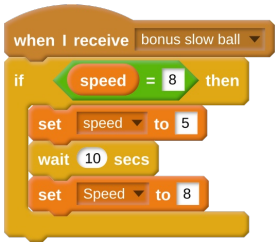
Bonus: a slow ball

When the player catches a "Slow ball" bonus (the number 2) the ball gets slower.



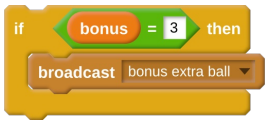
Bonus: a slow ball 2

The ball listens to the "bonus slow ball". Then, if the speed is currently the normal one, set the variable to the lower value, wait 10 seconds, before setting the speed value to its normal value.



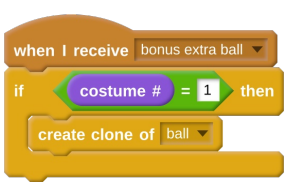
Bonus: extra balls

Each time the player catches an "Extra ball" bonus (the number 3) one more ball starts bouncing around.

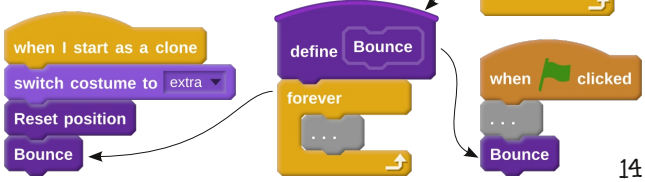


Bonus: extra balls 2

The ball listens to the "bonus extra ball". If costume is the normal one, create a clone. What does a clone do? It changes the costume to "extra", goes to the start position and starts bouncing.

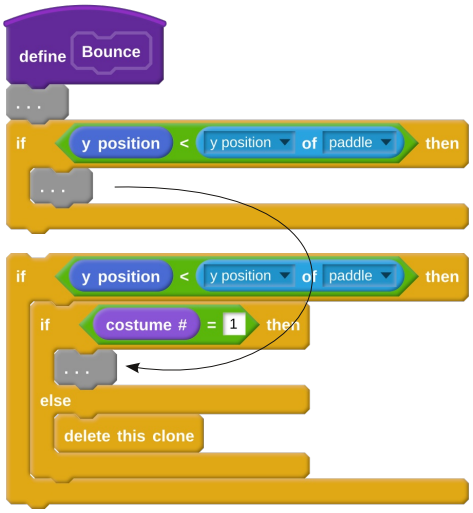


Refactoring: the ball and the clone bounce in the same way.



Bonus: extra balls 3

Finally, we only lose a life, when the original ball drops. The clones simply "disappear".



CoderDojo Zürich