

The Scratch logo is rendered in a stylized, bubbly font. The letters are orange with a white fill and a thick blue outline. The background is a gradient of blue, with a decorative circuit board pattern of white lines and circles on the left side.

SCRATCH

02 – MOVEMENT

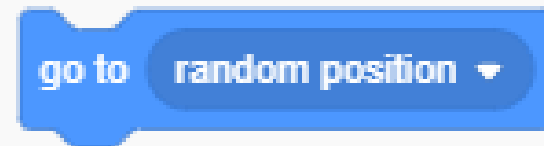
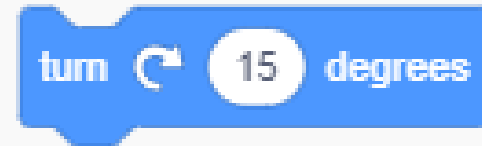
M1U1P2 COMPUTER SCIENCE

The image features a dark blue gradient background with white circuit-like lines in the corners. These lines consist of straight paths that branch out and terminate in small circles, resembling a stylized PCB or network diagram. The lines are positioned in the top-left, top-right, bottom-left, and bottom-right corners, framing the central text.

WHAT CATEGORY DO WE USE FOR MOVEMENT?

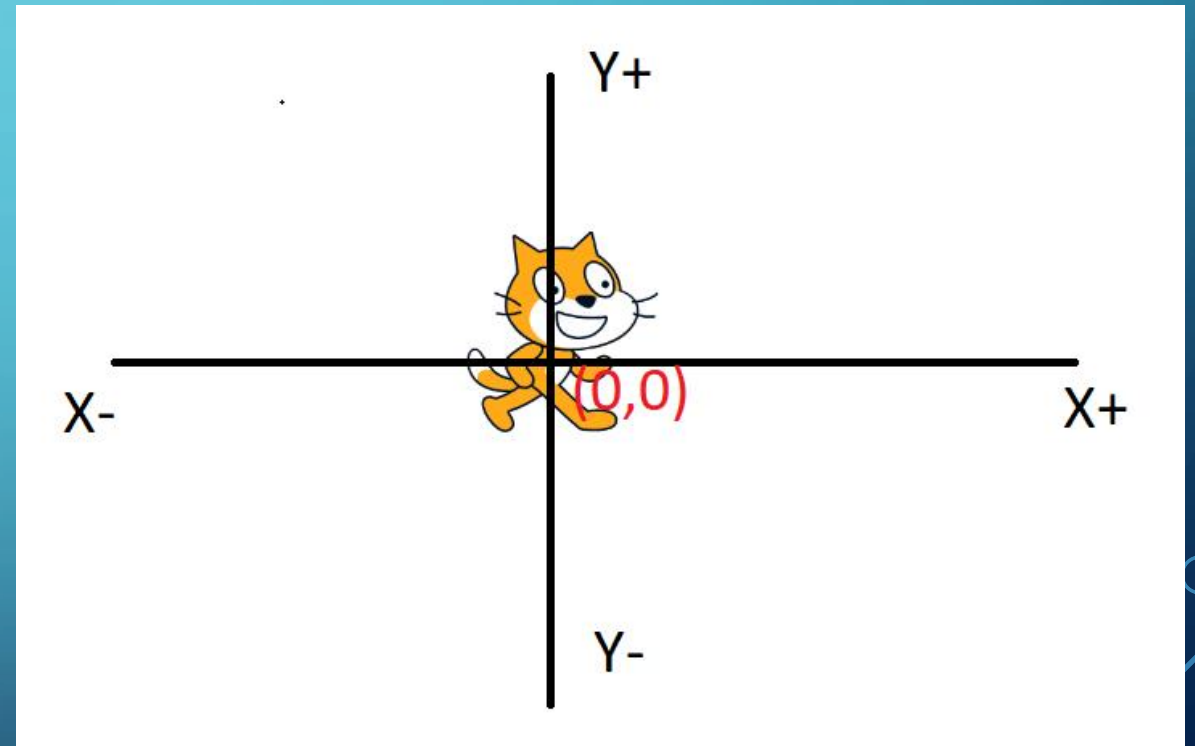
MOTION CATEGORY

- Motion category has blocks that control the movement of the Sprite or the character
- They are represented by a blue color
- There are 17 motion blocks



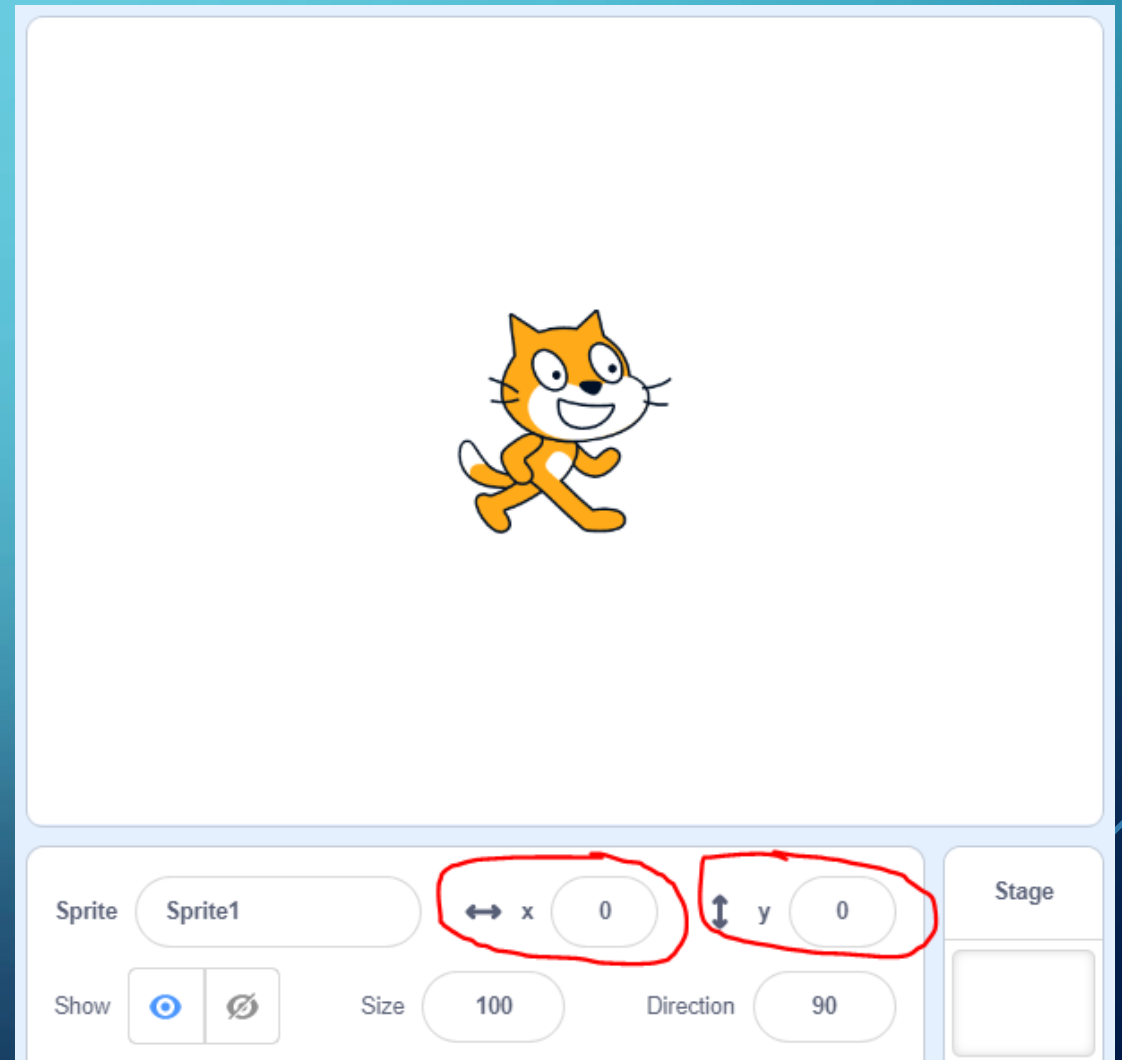
2D COORDINATIVE SYSTEM

- Scratch uses a 2D coordinative system
- 2 axis (x and y)
- X is for left and right
- Y is for up and down



2D COORDINATIVE SYSTEM

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- To move the character in the direction he is looking we can use move n steps block
- Depending on if we want to move forward or backward our number of steps will be either positive or negative

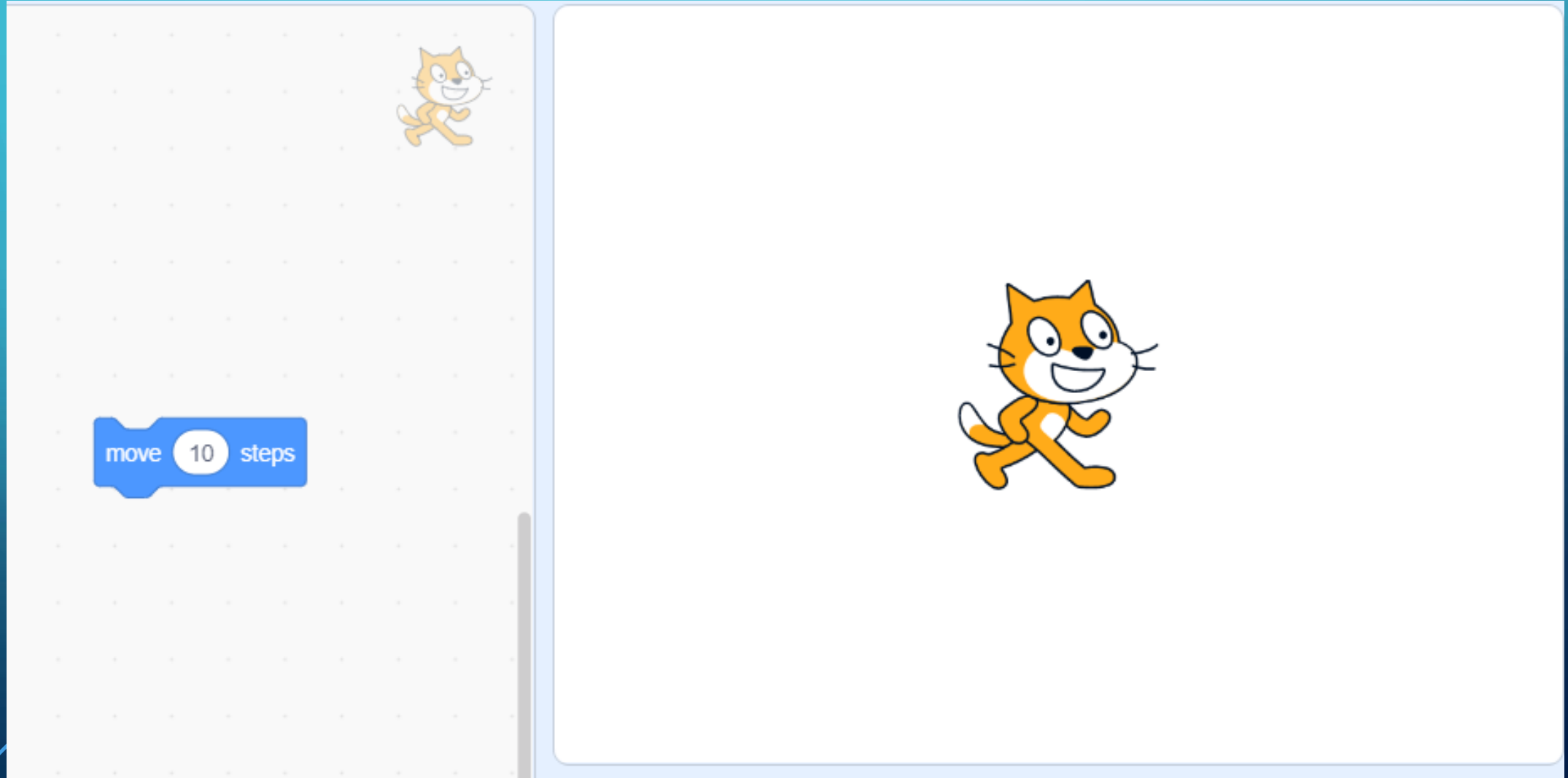
MAKE THE CAT MOVE 10 STEPS



move 10 steps

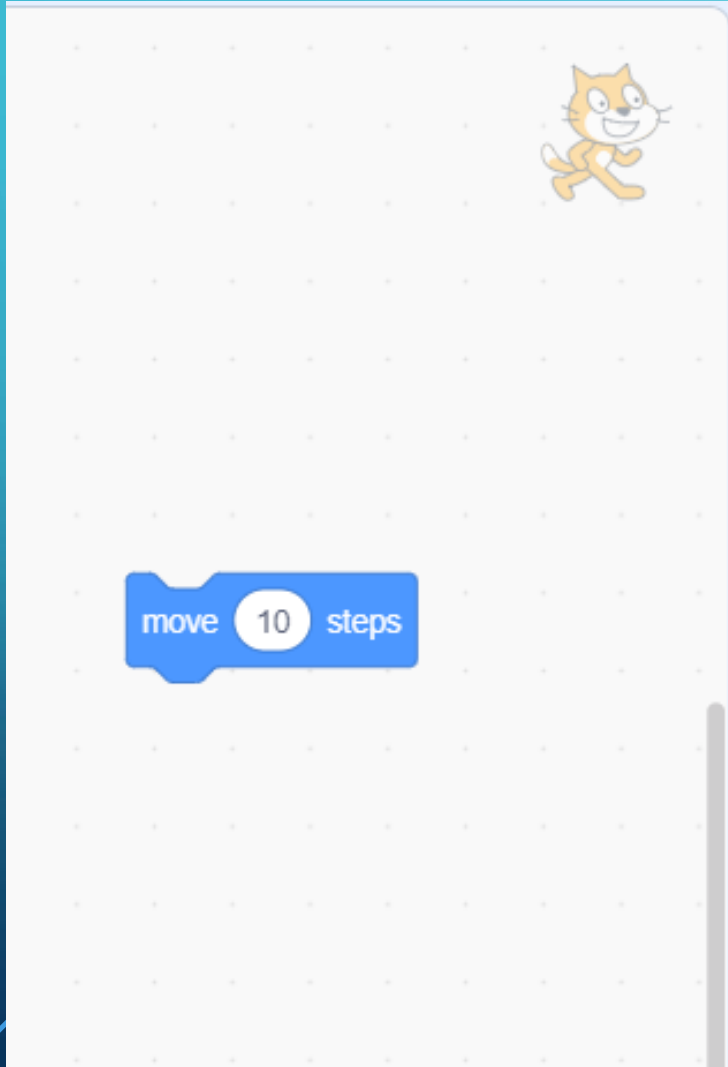


DOES THE CAT MOVE?

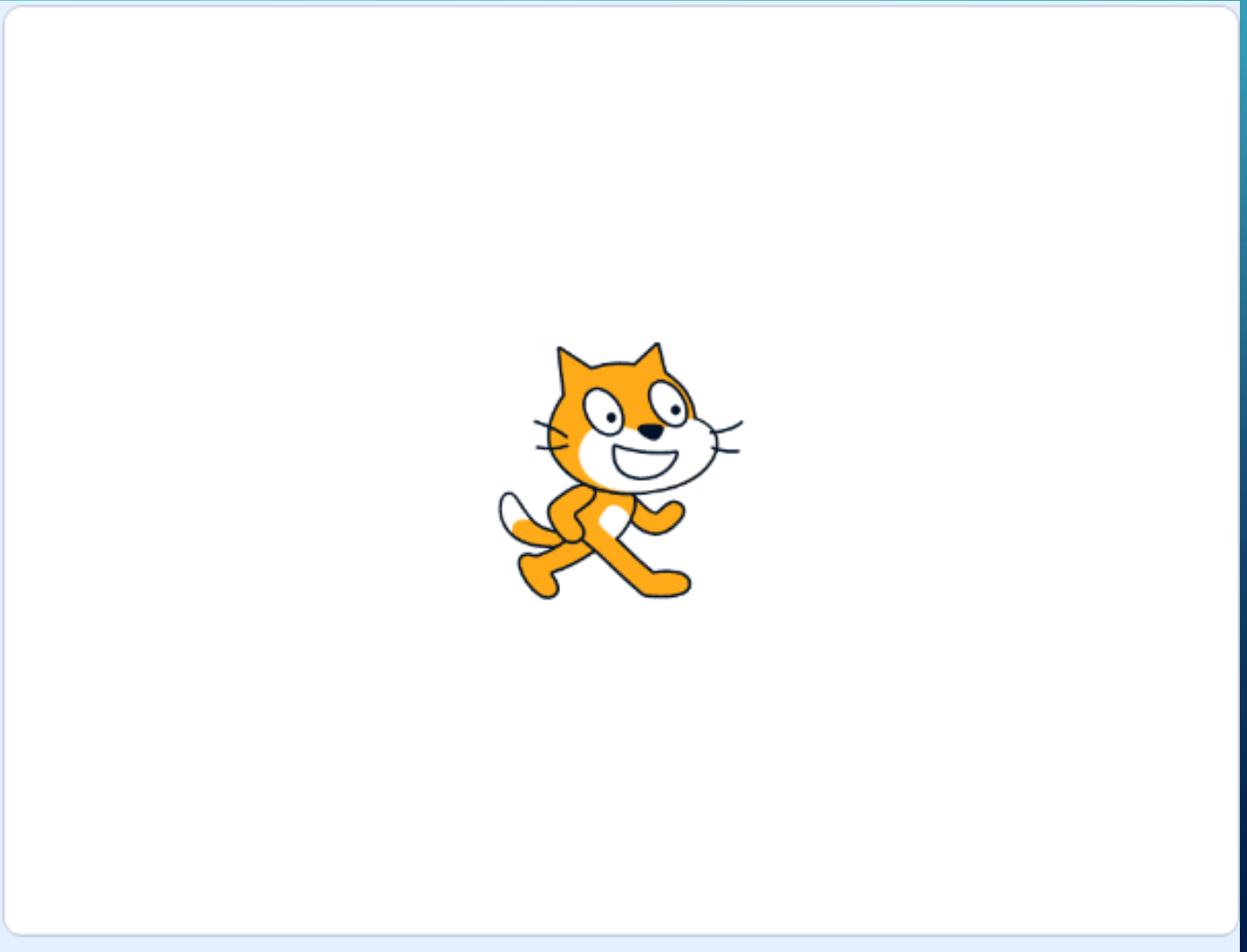


The image shows a Scratch workspace divided into two panels. The left panel is a grid with a small orange cat sprite in the top right corner. A blue 'move 10 steps' block is positioned in the lower-left area of the grid. The right panel is a plain white canvas with a larger orange cat sprite in the center.

WHY NOT?



The left side of the workspace shows a grid with a small Scratch cat icon in the top right corner. A blue 'move 10 steps' block is positioned on the grid.

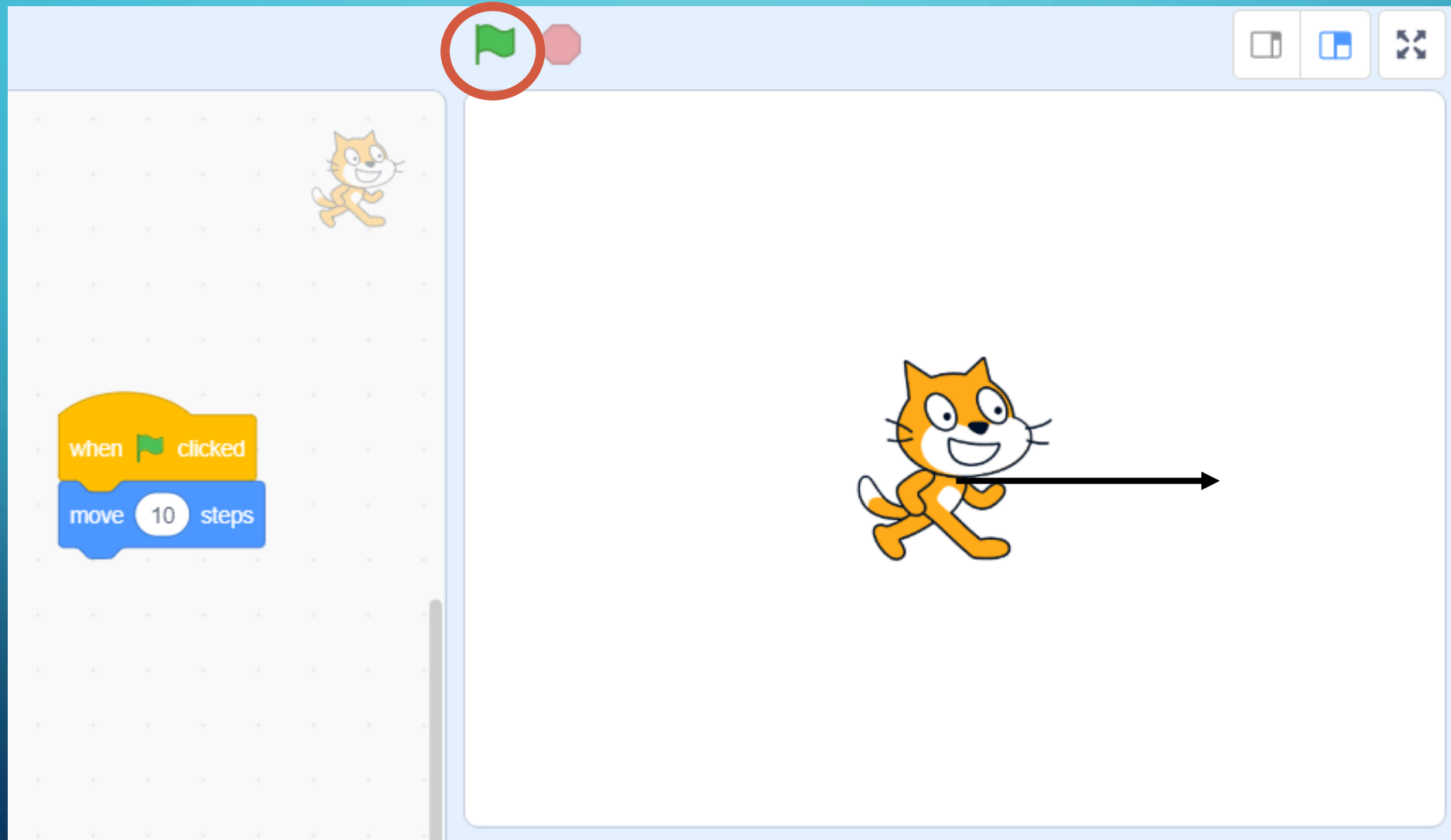


The right side of the workspace is a plain white area with a large Scratch cat icon centered on it.

WE ARE MISSING AN EVENT BLOCK

The image shows a Scratch IDE window with a light blue header. On the left is a palette with a grid background and a small Scratch cat icon. Two blocks are visible in the palette: a yellow 'when green flag clicked' block and a blue 'move 10 steps' block. The main stage area is white and contains a larger Scratch cat icon. In the top right corner of the stage area, there are three window control icons: a maximize icon, a close icon, and a refresh icon. The text 'WE ARE MISSING AN EVENT BLOCK' is displayed at the top of the image.

NOW WHEN WE PRESS THE GREEN FLAG THE CHARACTER MOVES

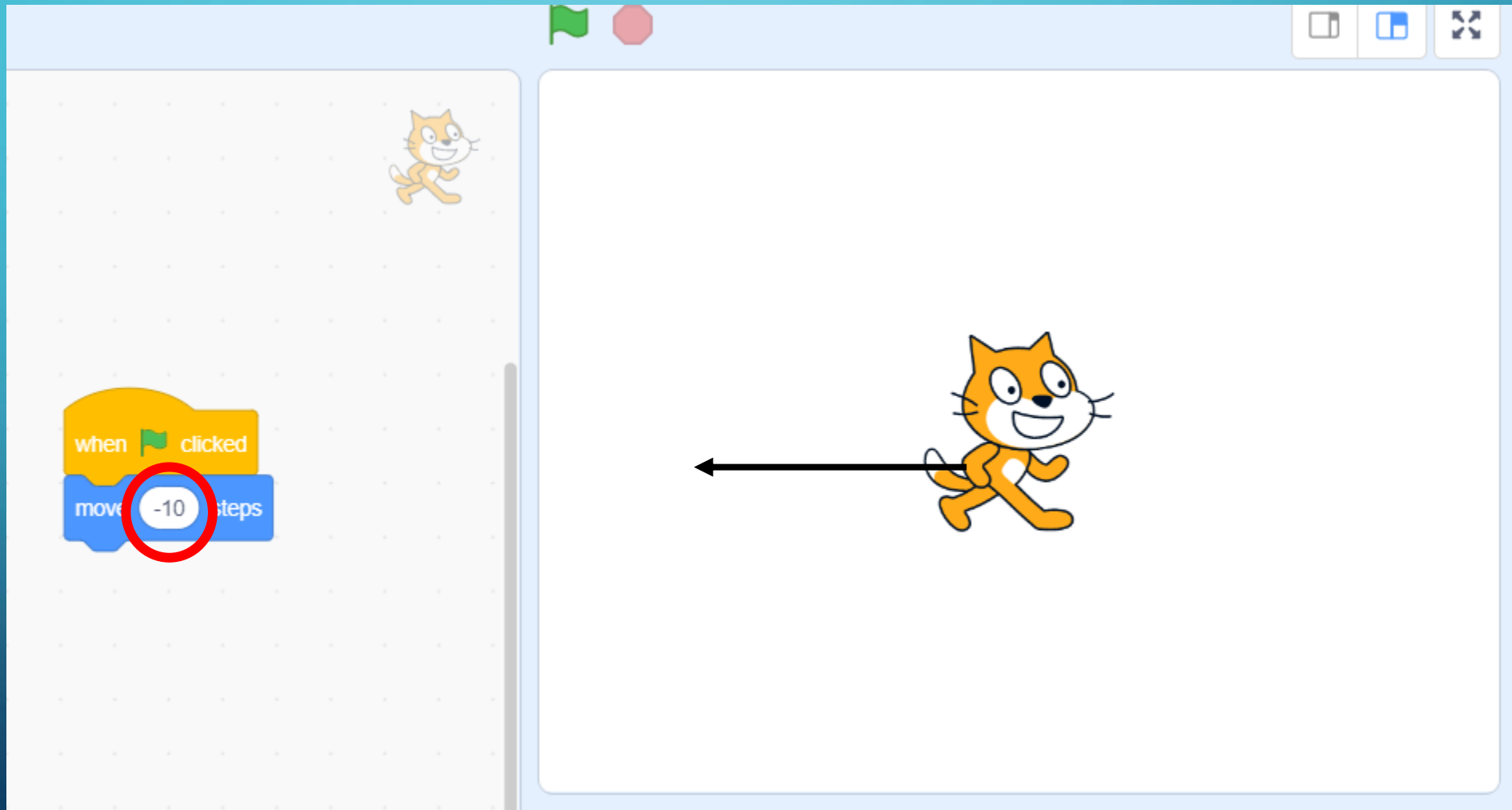


The image shows the Scratch code editor interface. On the left, the script area contains two blocks: a yellow 'when green flag clicked' block and a blue 'move 10 steps' block. On the right, the stage area shows the Scratch cat character with a black arrow pointing to the right, indicating movement. At the top of the stage, a green flag icon is circled in red, and a red stop sign icon is visible next to it. The top right corner of the stage has three window control icons: a maximize icon, a close icon, and a refresh icon.

HOW CAN WE MOVE TO THE LEFT SIDE?

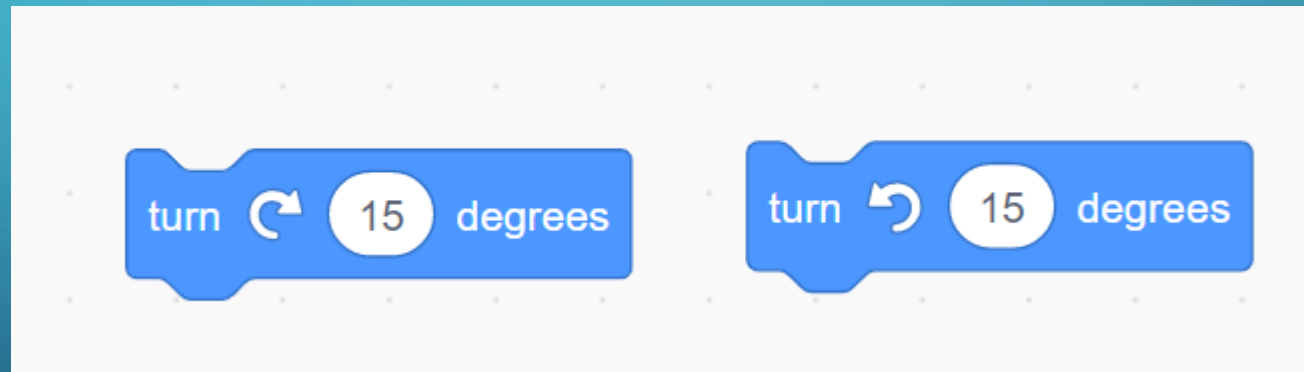
The image shows a Scratch code editor window. On the left is the script area with a grid background. It contains a small cat sprite icon at the top and two code blocks: a yellow 'when clicked' block and a blue 'move 10 steps' block. On the right is the stage area, which is a large white rectangle. In the center of the stage, there is a larger cat sprite icon with a black arrow pointing to its left and a large black question mark '?' next to it. The window has a light blue header with a green flag icon, a red stop icon, and three window control icons (minimize, maximize, close) on the right side.

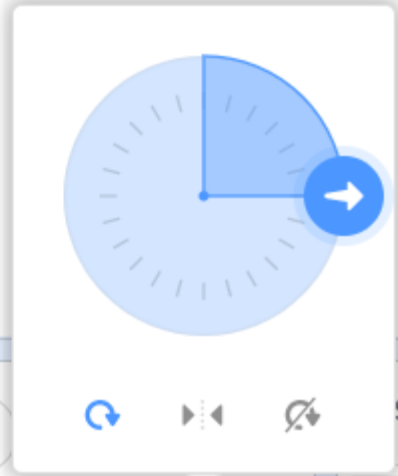
WE HAVE TO CHANGE THE STEPS TO BE NEGATIVE



ROTATING THE CHARACTER

- We can rotate a character in both clockwise and counterclockwise by using these two blocks

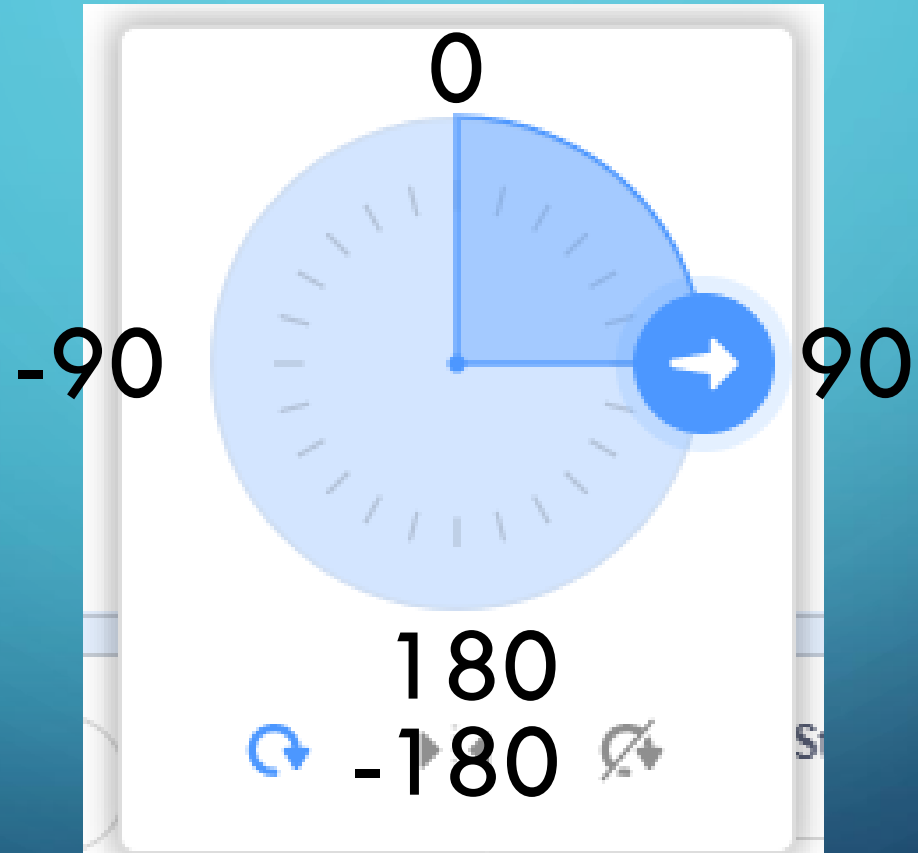




Sprite Stage

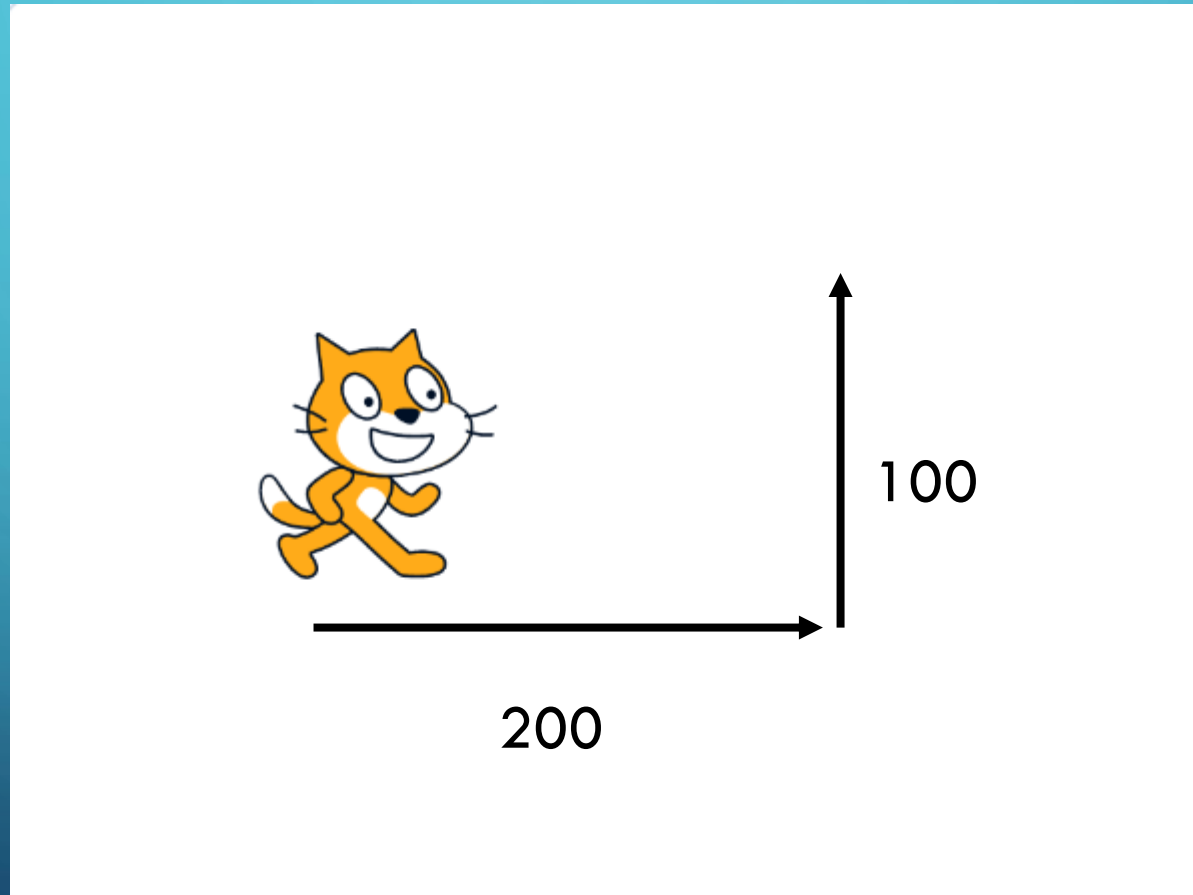
Show Size Direction

ROTATION

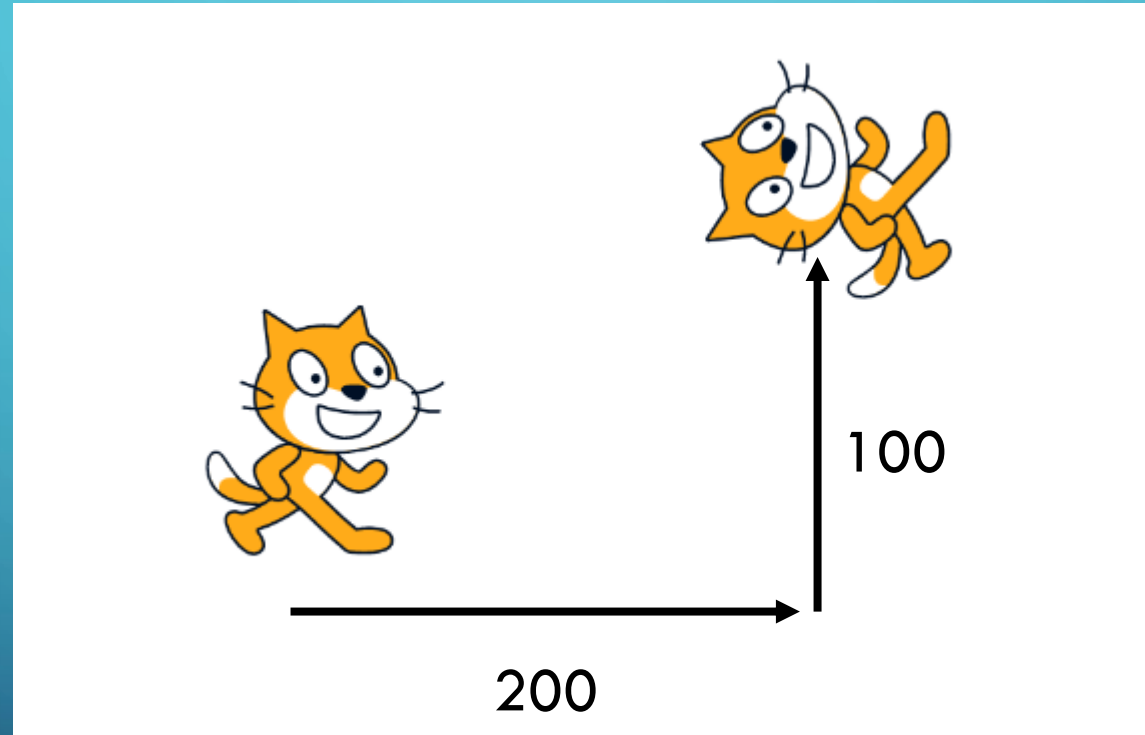


Direction 90

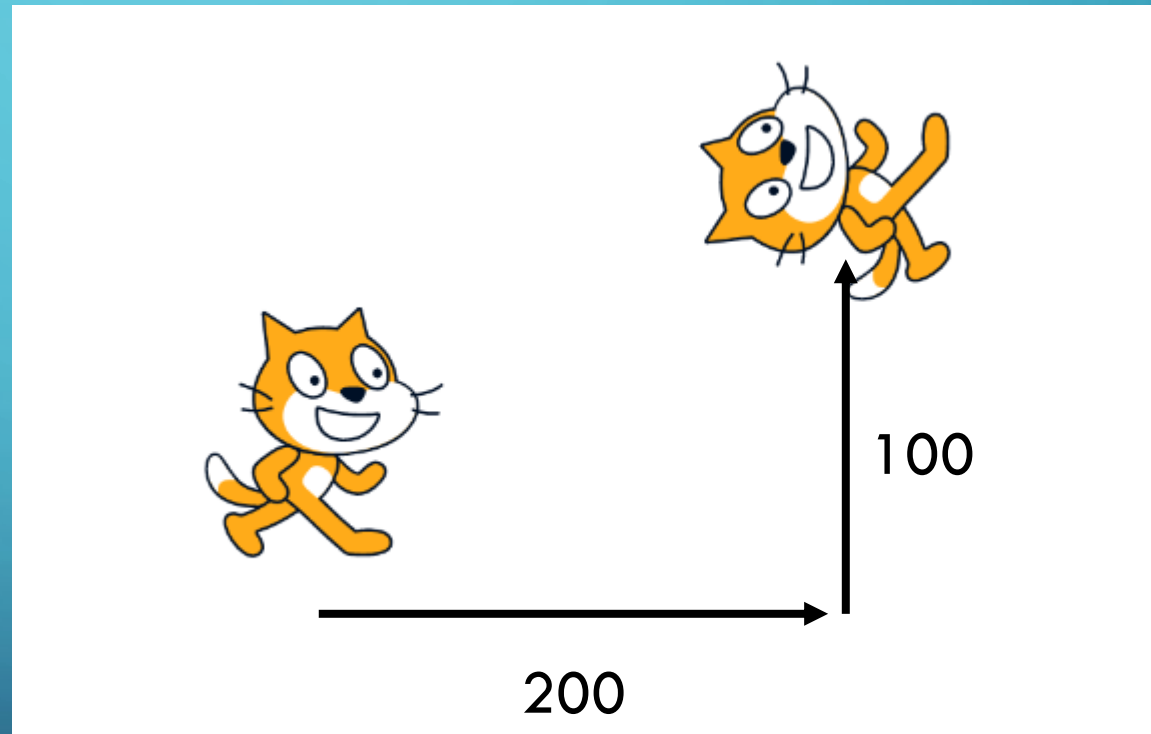
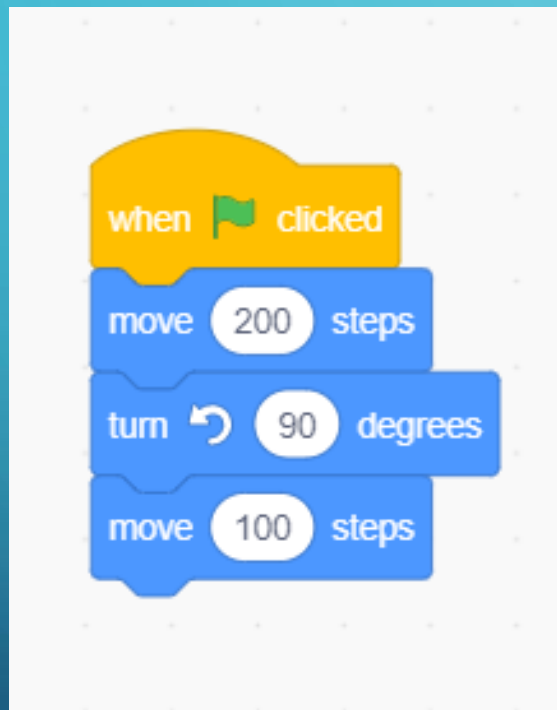
MAKE THE CAT MOVE INTO AN L SHAPE



MAKE THE CAT MOVE INTO AN L SHAPE

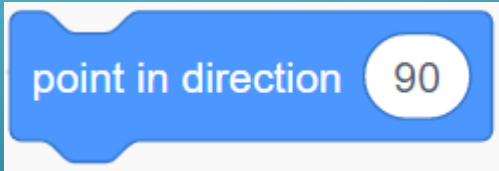


MAKE THE CAT MOVE INTO AN L SHAPE



POINTING IN SPECIFIC DIRECTION

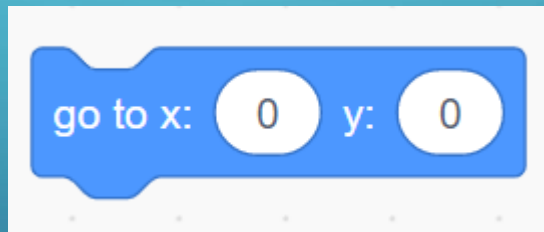
- Instead of rotating our character by a number of degrees we can choose to point him in a specific direction in which we want him to move

A Scratch 'point in direction' block, which is a blue rounded rectangle with a notch on the left side. It contains the text 'point in direction' and a white circular field containing the number '90'.

point in direction 90

MOVING A CHARACTER TO SPECIFIC POSITION

- With this block of code we can move the character to specified position in the work area. We just need to write the x and y coordinates



when green flag clicked

go to x: 150 y: 60

Sprite Sprite1 x: -150 y: -60

Show Size 100 Direction 90

Stage

when green flag clicked

go to x: 150 y: 60

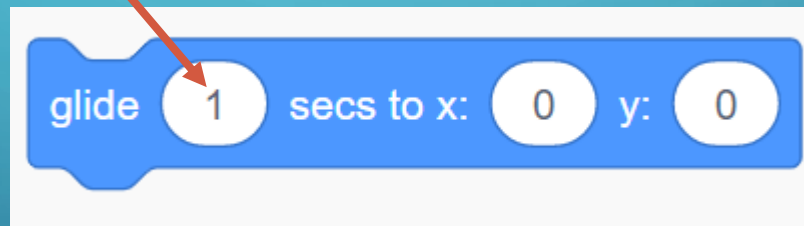
Sprite Sprite1 x: 150 y: 60

Show Size 100 Direction 90

Stage

GLIDING

- With this block the character will move to the specified position but in a slow way. It will take him **n** number of seconds to come to that position

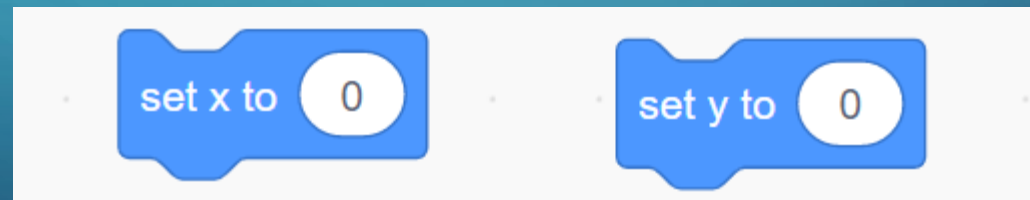


TRY OUT

The image shows a Scratch code editor interface. On the left, the script area contains two blocks: a yellow 'when green flag clicked' event block and a blue 'glide 5 secs to x: 150 y: 60' block. On the right, the stage area shows a cat sprite. At the bottom, the 'Sprite' panel shows 'Sprite1' selected. The 'x' and 'y' coordinates are set to -150 and -60, respectively, and these two input fields are circled in red. The 'Stage' panel is partially visible on the right.

SETTING X AND Y COORDINATES

- With these blocks we can set X and Y position to the desired position
- It means that no matter where the character is on the screen, he will move to the specified position





```
when green flag clicked
  set x to -150
  set y to -100
```



Sprite

Sprite1

↔ x

150

↕ y

100

Stage



```
when green flag clicked
  set x to -150
  set y to -100
```

Sprite

Sprite1

↔ x

~~150~~

↕ y

~~100~~

Stage

```
when clicked
  set x to -150
  set y to -100
```



Sprite Sprite1

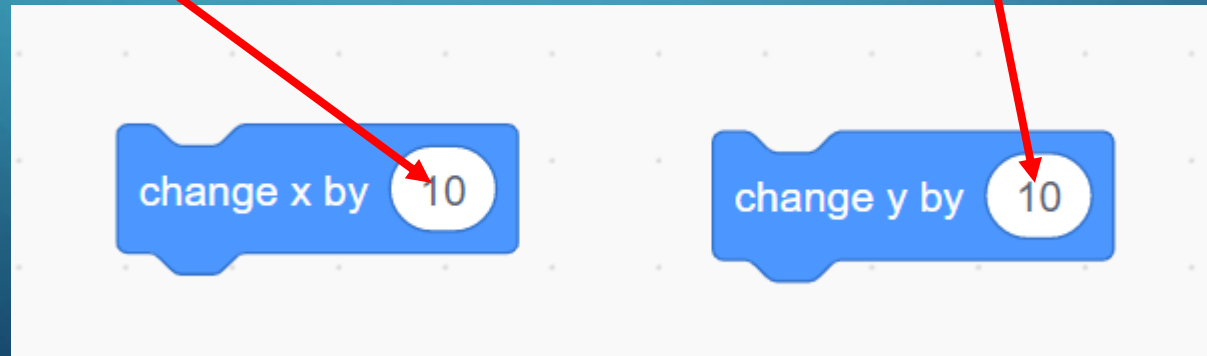
↔ x -150

↕ y -100

Stage

CHANGING X AND Y BY N

- With these blocks we can change X and Y by an **n** value
- The **n** value specifies for how much it will change



when  clicked

change x by

change y by



Sprite



x



y

Stage

when  clicked

change x by 10

change y by -5

New X = old x + n
New X = 50 + 10
New X = 60

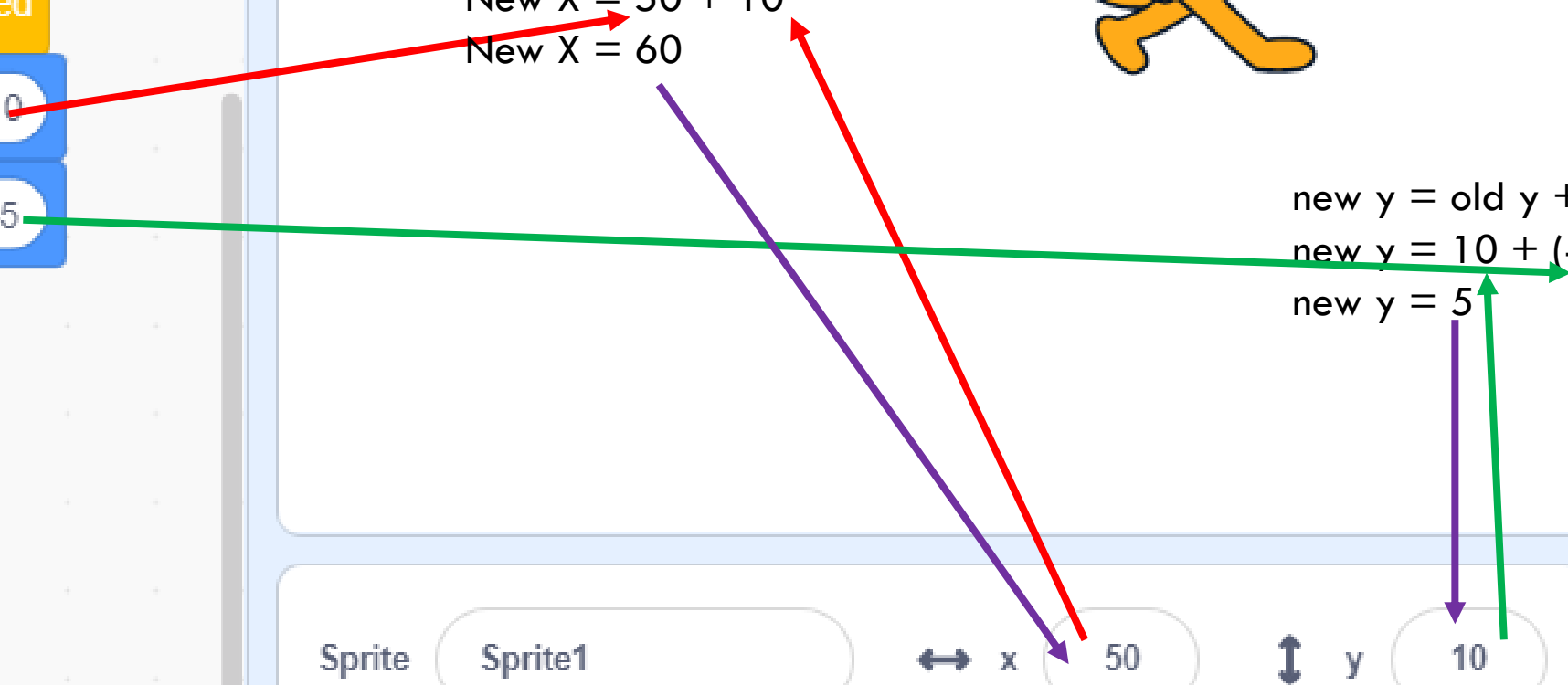


new y = old y + n
new y = 10 + (-5)
new y = 5

Sprite Sprite1 ↔ x 50

↕ y 10

Stage

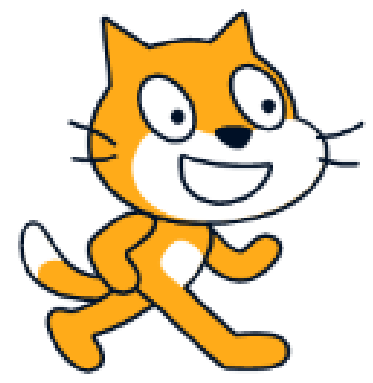


when  clicked

change x by 10

change y by -5

New X = old x + n
New X = 50 + 10
New X = 60



new y = old y + n
new y = 10 + (-5)
new y = 5

Sprite

Sprite1

x

60

y

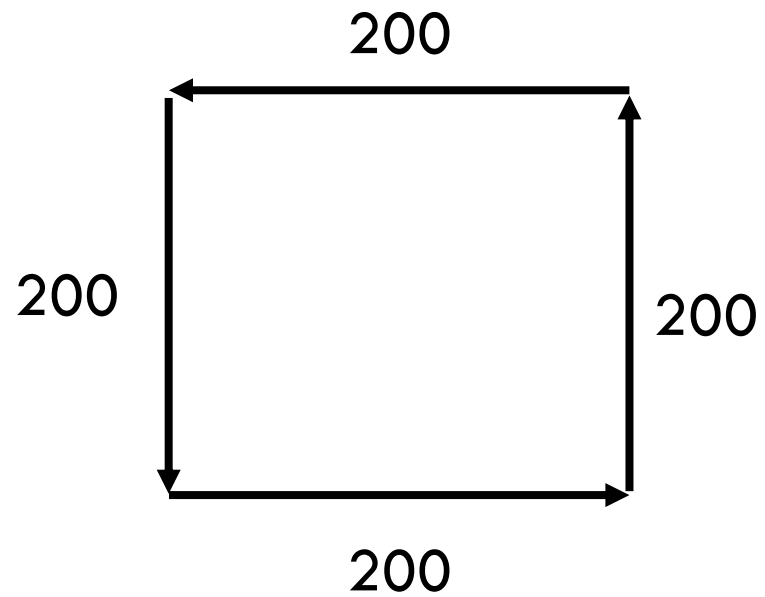
5

Stage

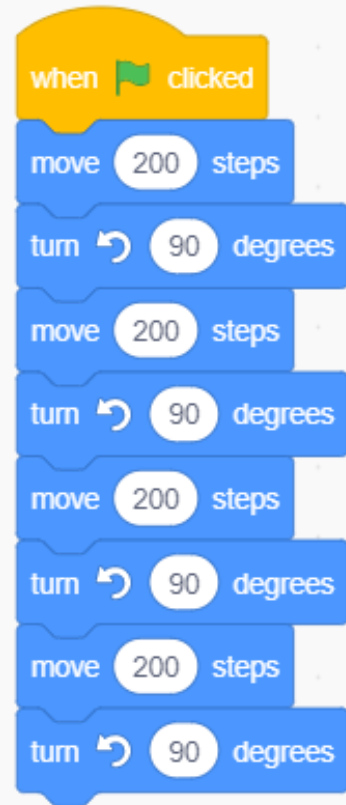


TASK 1:

- Make character move in a square



TASK 1:



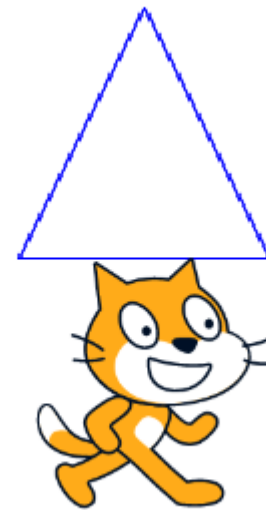
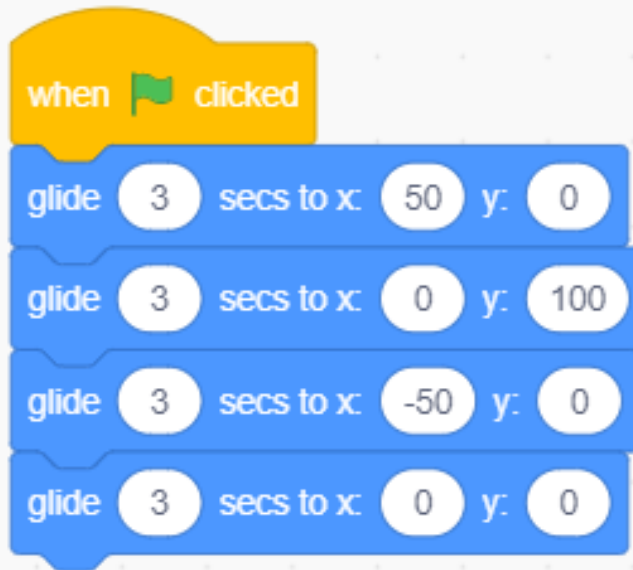
```
when green flag clicked
  move 200 steps
  turn 90 degrees
  move 200 steps
  turn 90 degrees
  move 200 steps
  turn 90 degrees
  move 200 steps
  turn 90 degrees
```

The image shows a Scratch script on a white grid background. It starts with a yellow 'when green flag clicked' block. This is followed by a sequence of eight blue blocks: four 'move 200 steps' blocks and four 'turn 90 degrees' blocks, alternating in order. The 'turn' blocks use the right-turn icon.

TASK 2:

- Make a program that will glide the cat for 3 sec in these positions
 - Starting position (0,0)
 - Glide to (50,0)
 - Glide to (0,100)
 - Glide to (-50,0)
 - Glide to (0,0)
- How did the cat move?

TASK 2:



The background is a gradient of blue, darker at the bottom. In the corners, there are white line-art graphics resembling circuit boards or neural networks, with lines connecting to small circles.

**ANY
QUESTIONS?**



THE END