

# Sprite wants to broadcast ...

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# In this lesson, we will learn ...

- \* The very important feature of 'BROADCAST' in SCRATCH.
- \* We will see how 'BROADCAST' can be used to synchronize actions between different sprites.
- \* In this process, we will build a simple 'Spot the Hero' game which will test your alertness and speed.



# Ok, what is BROADCAST?

- \* BROADCAST is a way for SPRITE to ‘secretly’ pass messages to each other ...
- \* There are two key blocks (In the EVENTS section) ...

Most of the time we will be using this one ...



You can re-name the message by using ‘Dropdown’ and ‘NEW Message’

# Alright, what does BROADCAST do?

- \* The  block 'quietly' sends a message to ALL the other participants of the code. These are
  - \* Different sprites
  - \* Backdrop
  - \* Different pieces of code in the same sprite.
- \* By 'quietly', we mean without displaying on the stage or letting us know.

# When should I use BROADCAST?

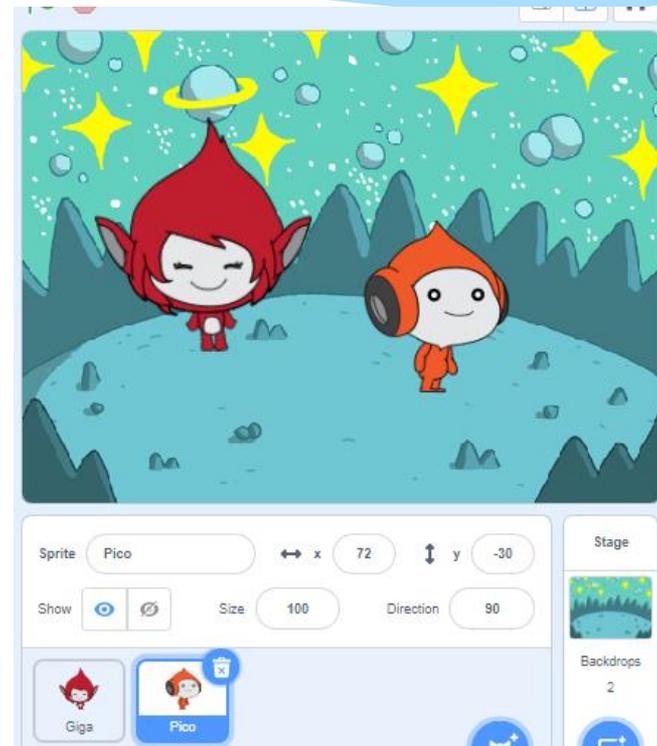
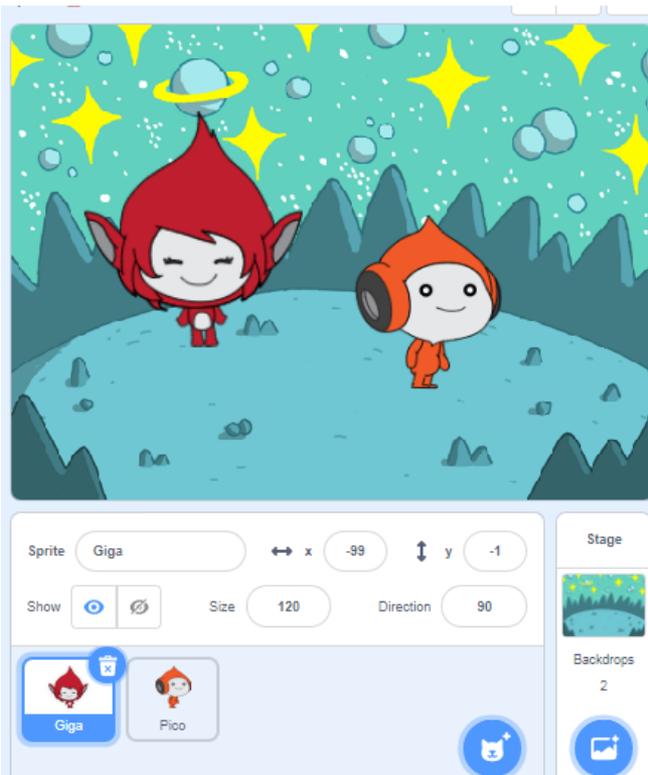
- \* Three main scenarios:
  - \* ACTION on one sprite causes an effect on another sprite.
  - \* Multiple events lead to the same action.
  - \* We want to 'CONTROL' when certain things happen and cannot predict in advance.

# Our version of the SPOT-THE-HERO game

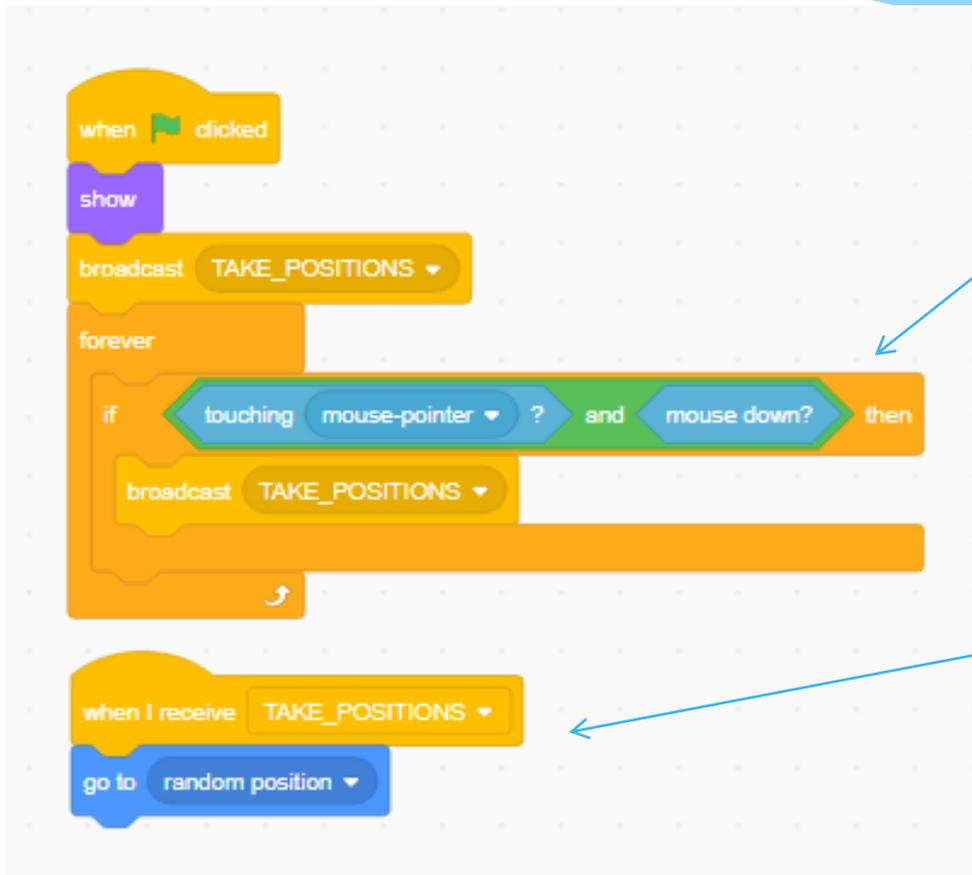
- \* We have to locate and 'click' a favorite sprite – GIGA -- from a bunch of sprites.
- \* Sprites appear at random positions.
- \* If we 'click' our favorite sprite within a certain time, we get a point and all the sprites take on a new position.
- \* If we do not click the favorite sprite in the given time, all the sprites take on a new position.
- \* Game lasts for a given amount of time, after which we display the score and end the game.

# As always, start small

- \* Let's for now, get rid of the NANO. And make GIGA a bit bigger. (GIGA is out HERO)



# GIGA Code for POSITION



```
when clicked
show
broadcast TAKE_POSITIONS
forever
  if touching mouse-pointer and mouse down? then
    broadcast TAKE_POSITIONS
when I receive TAKE_POSITIONS
  go to random position
```

The image shows a Scratch script on a grid background. The script starts with a yellow 'when clicked' block, followed by a purple 'show' block, and a yellow 'broadcast TAKE\_POSITIONS' block. Below these is an orange 'forever' loop containing an 'if' block. The 'if' block has two conditions: 'touching mouse-pointer?' and 'mouse down?'. If both are true, it triggers a yellow 'broadcast TAKE\_POSITIONS' block. At the bottom of the script is a yellow 'when I receive TAKE\_POSITIONS' block followed by a blue 'go to random position' block. Two blue arrows point from the text on the right to the 'if' block and the 'when I receive' block.

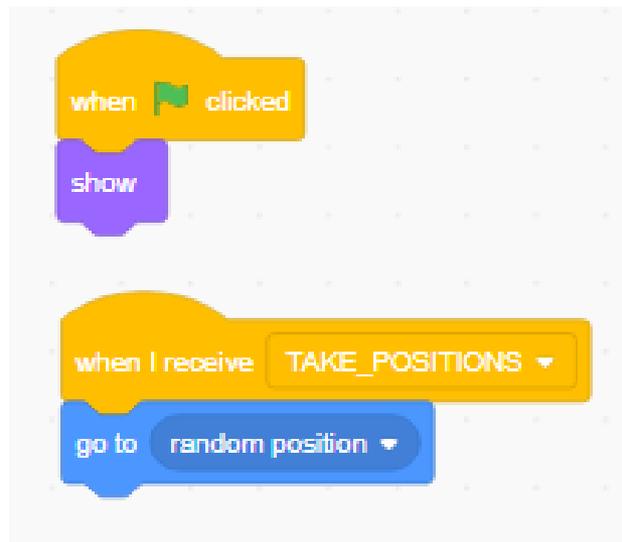
NOTICE: This will detect the event when the SPRITE has been clicked.

Why this, and not 'WHEN THIS SPRITE IS CLICKED?'. The simple answer is – This allows us to stop the game in the end.

NOTE: If there were only 1 sprite, we did not NEED to use BROADCAST, but we could still have used. But with multiple sprites, BROADCAST is (almost) a must.

# PICO codes for POSITION

- \* Notice how PICO ALSO take a new position when GIGA is clicked.



# Creating a TIMEOUT

- \* We want ALL the sprites to take on a NEW position if GIGA is NOT clicked for a certain duration.
- \* For this purpose, we will use a block called TIMER (in SENSING).
- \* This is like a ‘free running clock’.
  - \* Just tick the box next to it to see it on the screen.

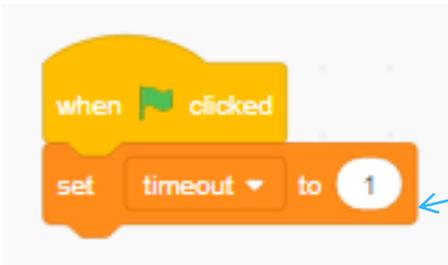
# Using the timer

- \* Scratch has a BLOCK called TIMER in the sensing portion.
- \* This is like a ‘free running clock’.
- \* We can use it for several purposes.
- \* For example, here we will use it for creating the ‘TIMEOUT Feature’
  - \* *If we do not click the favorite sprite in the given time, all the sprites take on a new position.*

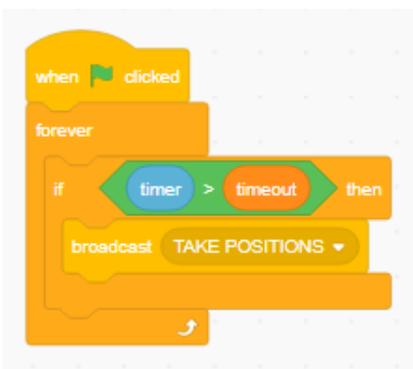
# Creating a TIMEOUT



Whenever a new position is taken, RESET the timer – This is equivalent to RESTARTING the timer.



Create a variable called 'Timeout'

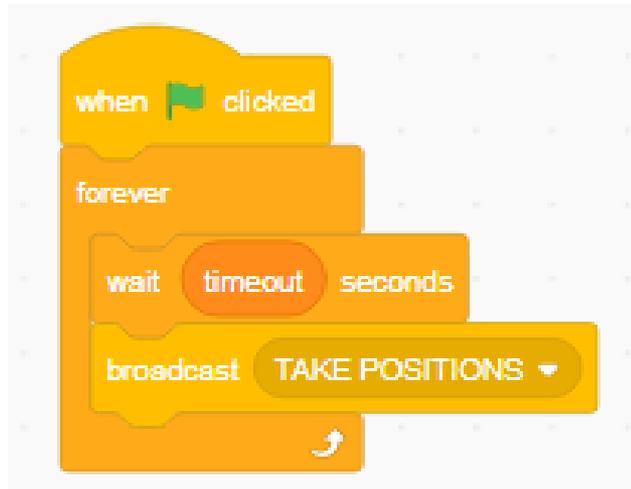


If timer exceeds Timeout, TAKE positions again.

# Food for thought!

## WARNING: SKIP IF CONFUSING

- \* Why can't I do this? What is the problem with this code? Think carefully, or just try it.

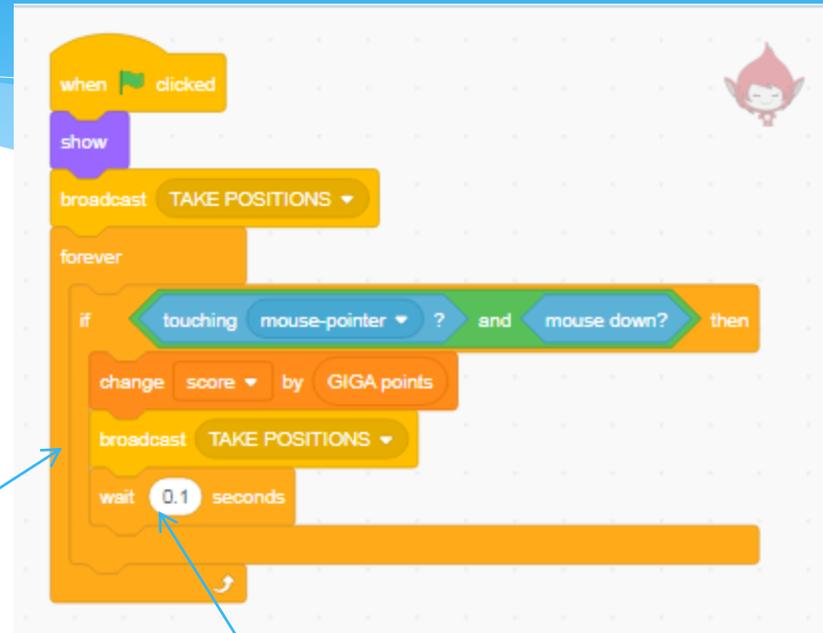
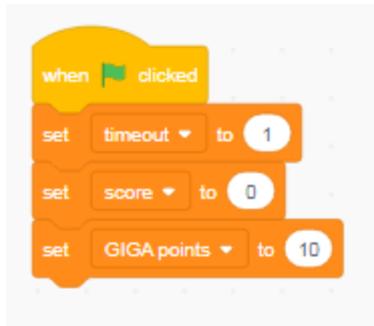


HINT:

Will this code change position 'timeout' seconds *after* the sprite has been clicked? Or will it change 'every' timeout second?

# Add score for GIGA ...

Add a variable  
GIGA points



Add these two lines, same like  
our 'CATCH' game.

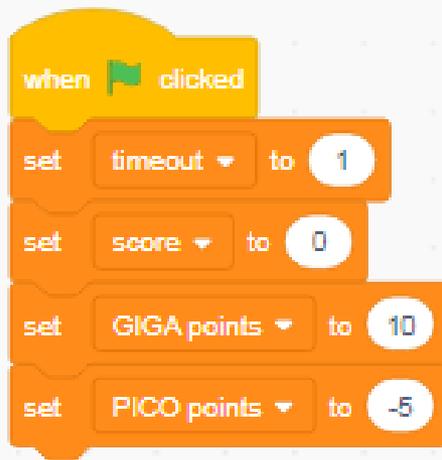
A short wait to prevent  
'multiple clicks from getting  
registered

NOTE: These new lines of code are added to the 'earlier' loop itself. A new loop is not created. Please refer to the project page in scratch.

# Add a (negative) score for PICO

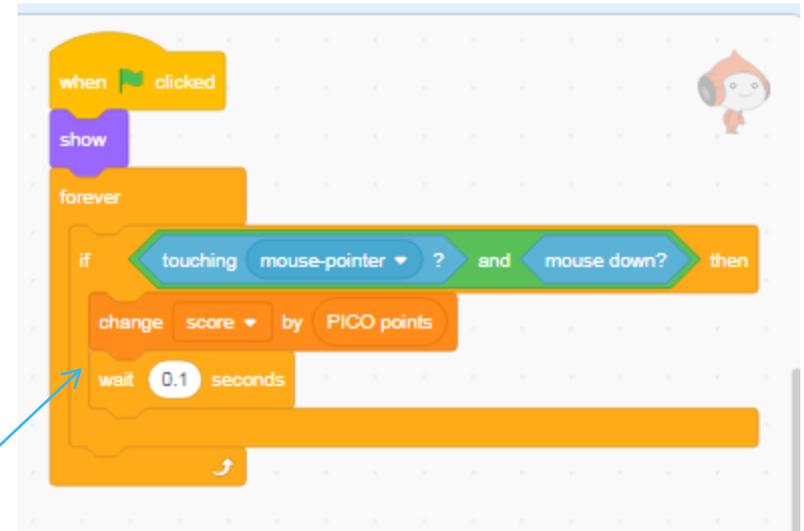
Add a variable  
PICO points

Update score when PICO is  
clicked



```
when green flag clicked
  set timeout to 1
  set score to 0
  set GIGA points to 10
  set PICO points to -5
```

Notice, -5 for  
clicking PICO

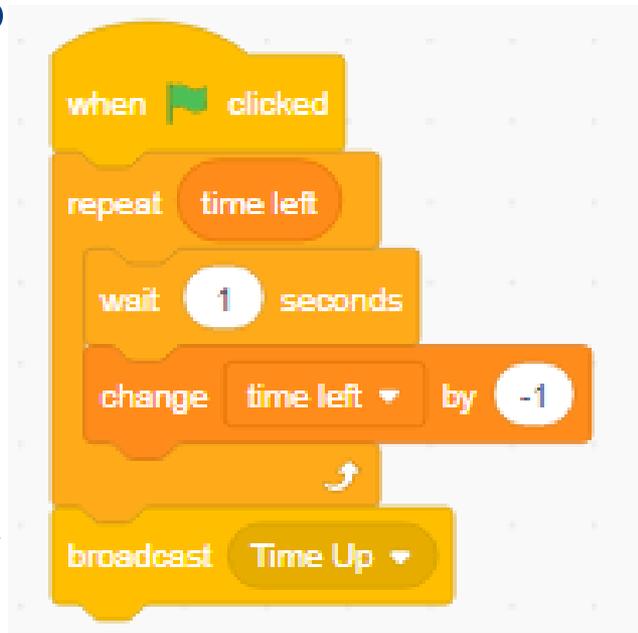


```
when green flag clicked
  show
  forever
    if touching mouse-pointer and mouse down then
      change score by PICO points
      wait 0.1 seconds
```

Notice: No broadcast here, only SCORE addition, since clicking PICO need not trigger search for new positions.

# ADDING PLAYING DURATION

- \* Same as in the CATCH game.
  - \* Use a variable called time left.
  - \* Notice, if timer was not being used elsewhere, we could have used TIMER too

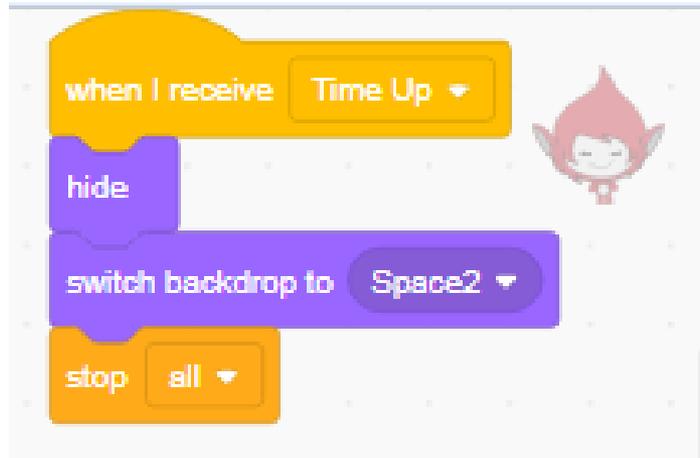


Keep reducing time left by 1 every second

When TIME is up, BROADCAST Time Up

# And, then, on BOTH sprites

GIGA

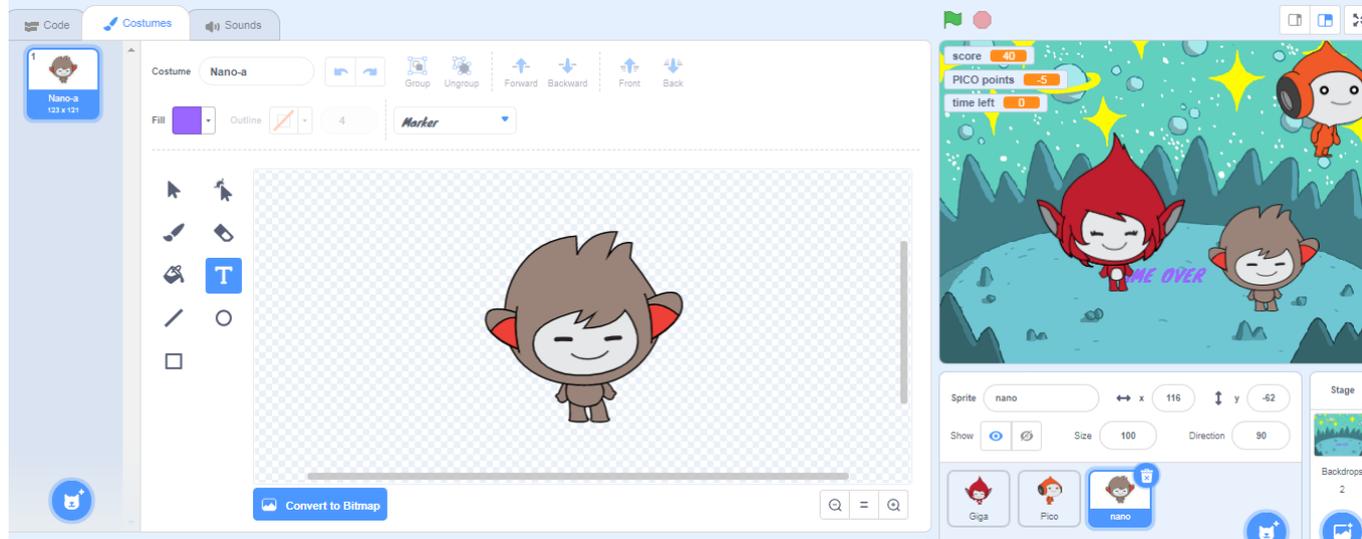


PICO



# Now Add more sprites, e.g. NANO

- \* Right click PICO and DUPLICATE.
- \* CHANGE COSTUME (Same like what we did in the CATCH Game). – and rename.



# Update for scoring ...

Add a variable  
NANO points

Code for NANO

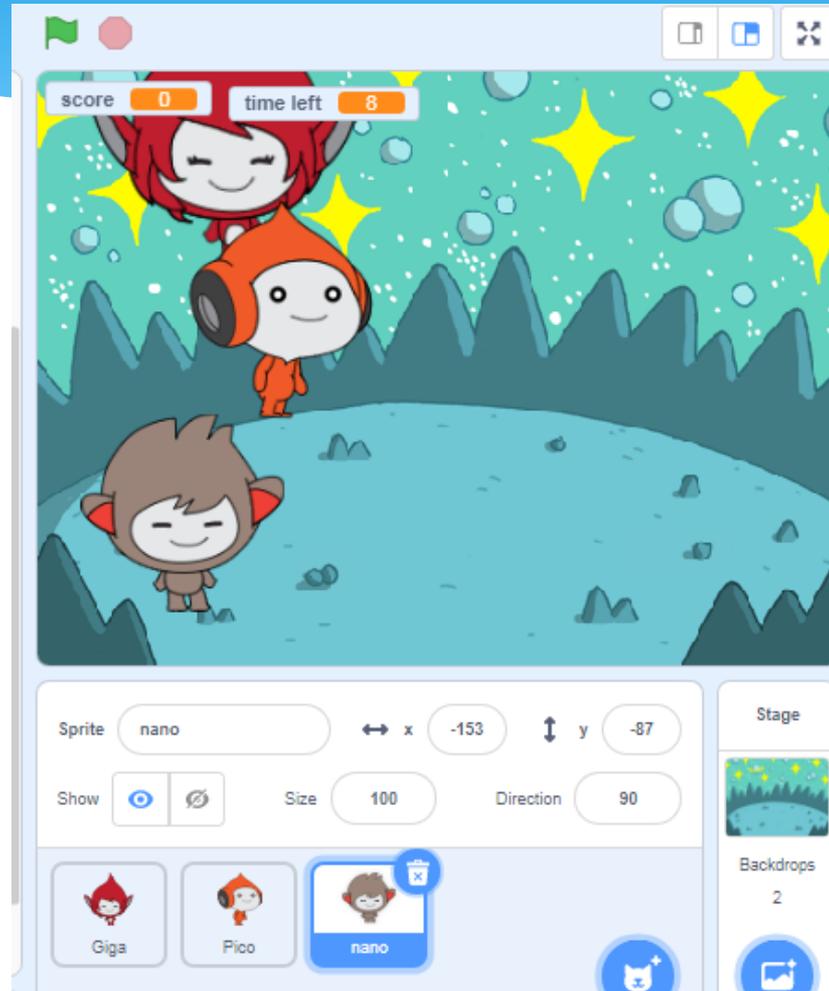
The image shows two Scratch code editors side-by-side. The left editor shows a sequence of 'set' blocks: 'timeout' to 1, 'score' to 0, 'GIGA points' to 10, 'PICO points' to -5, 'Nano points' to -10 (circled in red), and 'time left' to 10. A blue arrow points from the text 'NOTICE' to this 'Nano points' block. The right editor shows a 'when clicked' block followed by a 'show' block, a 'forever' loop containing an 'if' block. The 'if' block has two conditions: 'touching mouse-pointer?' and 'mouse down?'. The 'then' part of the 'if' block contains a 'change score by' block with 'Nano points' selected (circled in red) and a 'wait 0.1 seconds' block. A blue arrow points from the text 'Code for NANO' to the 'change score by' block. A small cartoon monkey character is visible in the top right of the right editor.

NOTICE

# Food for thought?

- \* Remember, we did not use the event ‘WHEN this sprite is clicked’.
- \* If we had done that, it will look like OUR game is still ACTIVE after the time is over. (especially if we did not HIDE).
- \* STOP all will not stop the WHEN this sprite is clicked’ event.

# And now we have a 3 sprite game!



# You are all set ...

- \* BROADCAST is a very powerful and important feature in SCRATCH.
- \* Use it carefully in your projects and you will see the value yourself.
- \* For now, though, you are all set for your independent activity – 7: A ‘Spot the Hero’ game.
- \* Enjoy!