Learning Computer Science Concepts in Scratch

Department of Science Teaching

Weizmann Institute of Science

Posttest

Question 1

Here is a diagram of the stage with four sprites (giraffe, elephant, mouse, ball), together with scripts for each of the sprites:
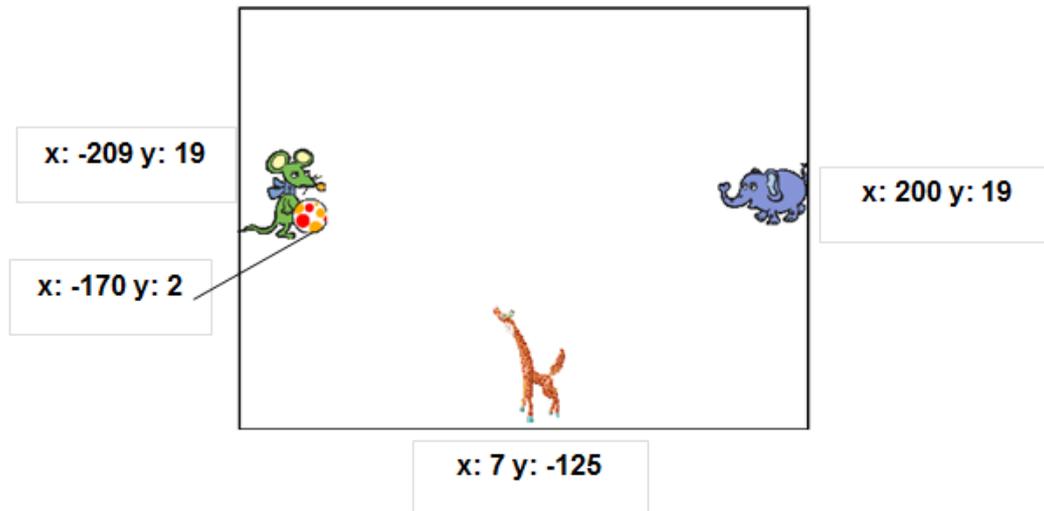
Mouse script	Elephant Script	Giraffe Script	Ball Script
when 🏴 clicked go to x: -209 y: 19 point in direction 90 when I receive start say Kick for 1 secs	when 🏴 clicked go to x: 200 y: 19 point in direction -90 when I receive start say Ready for 1 secs wait until touching ball next costume wait 1 secs next costume	when 🏴 clicked go to x: 7 y: -125 point in direction 90 broadcast start say Start for 1 secs wait until touching ball wait 3.5 secs point in direction -90 wait 1 secs point in direction 90	when 🏴 clicked go to x: -170 y: 2 point in direction 90 when I receive start wait until touching mouse ? glide 1 secs to x: 167 y: 19 wait until touching elephant glide 1 secs to x: 8 y: -157 wait until touching giraffe ? wait 1 secs glide 1 secs to x: -175 y: 0

1. (Multi Applying) What operations take place concurrently until the instruction `broadcast start▾` in the script for the giraffe is run?

2. (Multi Understanding) What is the difference between the instructions `say [    ]` and `broadcast [▾]`?

3. (Relational Applying) Describe the behavior of the animals and the ball when (all) the scripts are run after clicking on the green flag.

4. (Multi Creating) We wish the animation to be repeated indefinitely without clicking again on the green flag. What instruction or instructions must be added? (Add instructions only to scripts that actually need additional instructions for this to happen.)

5. (Multi Creating) Add a variable "counter" to the animation. It will count the number of times that the ball is passed from one animal to another.

Question 2

1. (Relational Creating) Create an animation for two sprites that will initially be placed at two corners of the stage. One sprite will send a message `broadcast exchange` to the other. When the second sprite receives the message `when I receive exchange`, the two sprites will exchange places by gliding `glide ◯ secs to x: ◯ y: ◯`.

2. (Relational Creating) Modify the animation so that when the two sprites touch each other, they will exchange greetings.

3. (Multi Creating) Add instructions so that the sprites exchange places five times.

Question 3

(Multi Understanding) Explain the following concepts. Your explanations may contain examples that are Scratch instructions.

- Initialization

- bounded repeated run

- conditional repeated run

- conditional run

- sending and receiving a message

- variable

- concurrent run