

Beauty and Joy of Computing



Project: Simple Studio for Character Design & Animation

Curriculum Topic: Lists and simple list operations

Recap: Lists are data structures which are very useful if you have many items in some order that you wish to keep track of. Lists come in especially handy when you don't know ahead of time how many items you will have to keep track of.

Project Summary: In this project we will use the Snap! coding environment to create a simple studio for designing and animating a character. When all coding is done:

- The user will be able to use the mouse to draw a character.
- The mouse locations (X and Y) visited during the drawing will be stored in lists.
- The user will be able to move the character drawn using the up/down right/left arrow keys.

1. Watch the introduction video. Discuss with your partner the purpose and details of the project.

2. Play with the Snap! program given to get a feel how the "Simple Studio" program works and how the character is moved around. Be sure to move the mouse slowly in the drawing phase to make sure that all the mouse locations are captured. Please do not look at the code.

3. Discuss with your partner how would you design such a project. Be sure to explore what data needs to be tracked and how lists can be employed to keep track of this data.

4. If you need hints to get started try to answer the following questions:

What initiates the drawing of the character?

How can you access the location of the mouse as it is moved around? (Hint: Sensing menu)

How can you make a drawing based on the mouse positions? (Hint: Pen menu)

How can you store the x and y positions of the mouse as the drawing is created?

Do we know ahead of time how many locations the user's mouse will visit while drawing?

Why is remembering the order of these locations important?

What data structure is called for?

How many of these would be handy? Why?

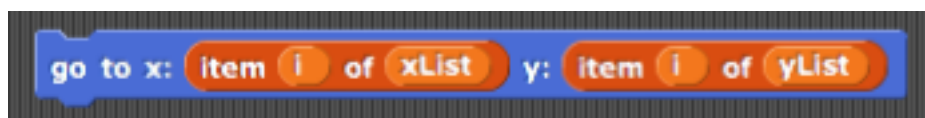
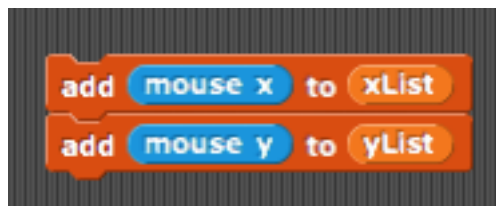
What ends the drawing phase?

What should happen when each of the following keys are pressed: up, down, right, left?

How should the location information stored in the lists be updated to accomplish these movements?

How should the revised drawings be created based on updated locations?

If you need more hints, here are some code blocks that may be handy:



5. If you get stuck watch the video discussing the hints.
6. Start coding in Snap! Many things will clear up when you actually get to work.
7. If you get stuck, watch the videos on the drawing phase and the animation phase.
8. Submit your project to your teacher by the given deadline.
9. Discuss with other groups how they went about the project.
10. Brainstorm with your partner about some possible extensions and bonus explorations of the project.

Here are some possible suggested extensions:

Can you revise your code so that a single list (a list of lists) keeps track of the mouse x & y location information?

Can you revise your code so that all the arrow key inputs (up/down/right/left) are processed together in a single procedure?

Can you add background image(s) to your character animation? Can you add music to your character animation?

Can you give the user options (such as color, pen thickness, etc.) in the drawing phase?

Can you allow for other types of character animations: rotate, flip, shrink/enlarge?

Create a series of animations on your Simple Studio. Capture, combine and edit them with a software like Camtasia and then upload your work to YouTube.

Research about advanced character design and animation studio software in the market, such as Maya 3D, Unity 3D etc.

Research about Pixar Animation Studios. How did they start? How do they work? Learn about the internship opportunities they offer.