Teacher's Guide for: Simple Studio for Character Design & Animation

Purpose of Project:
This project aims to explore concepts related to "Lists" in a hands-on and fun manner. Most students enjoy drawing and almost all are fascinated by the animated works of studios like Pixar. This projects hopes to bring home the idea of using lists to store and transform data. It also hopes to be a first stepping stone to more advanced character design and animation techniques students may pursue in the future.

Time Commitment:
About 4 days.
First day: Watching the introduction video, playing with the Snap! program provided and starting the project design in partner groups.
Second day: Coding. Using the hint questions, and Hints video as needed.
Third day: Finishing the project, exploring some extensions. If stuck, watching the step-by-step videos of the Drawing and Animation phases.
Fourth day: Exploring more extensions and bonus opportunities. Catch up day for those really behind. Classroom sharing.

Tips:
Be sure to do this lab and some of its extensions on your own prior to introducing it to the students.
Make sure that, while playing with the Snap! code to understand the project, students are not accessing the code. (Hopefully UC Berkeley folks will soon create such a capability: to use a program without access to the code.)
Make sure that, students spend a good amount of time coming up with their own design ideas prior to reading the hints questions and watching the Hints video.
Make the step-by-step solution videos on the Drawing and Animation phases available only to students who are really stuck.
Encourage the students who are ahead of schedule to come up with their own extensions prior to reading suggested extensions.

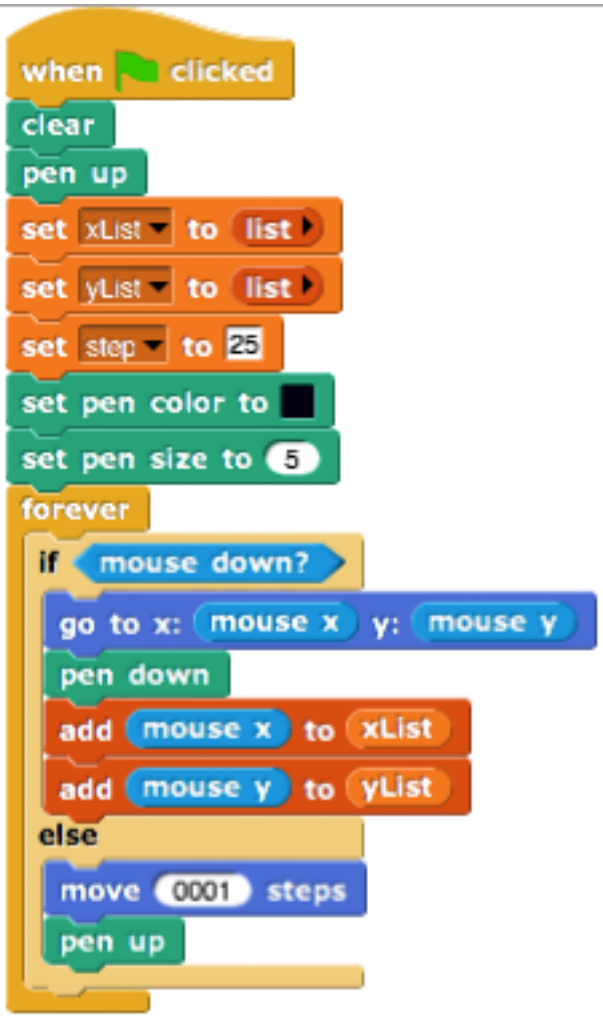
Correlation with AP CS Principles Framework:
EU 5.1 Programs can be developed for creative expression, to satisfy personal curiosity, to create new knowledge, or to solve problems (to help people, organizations, or society).

LO 1.2.2 Create a computational artifact using computing tools and techniques to solve a problem.

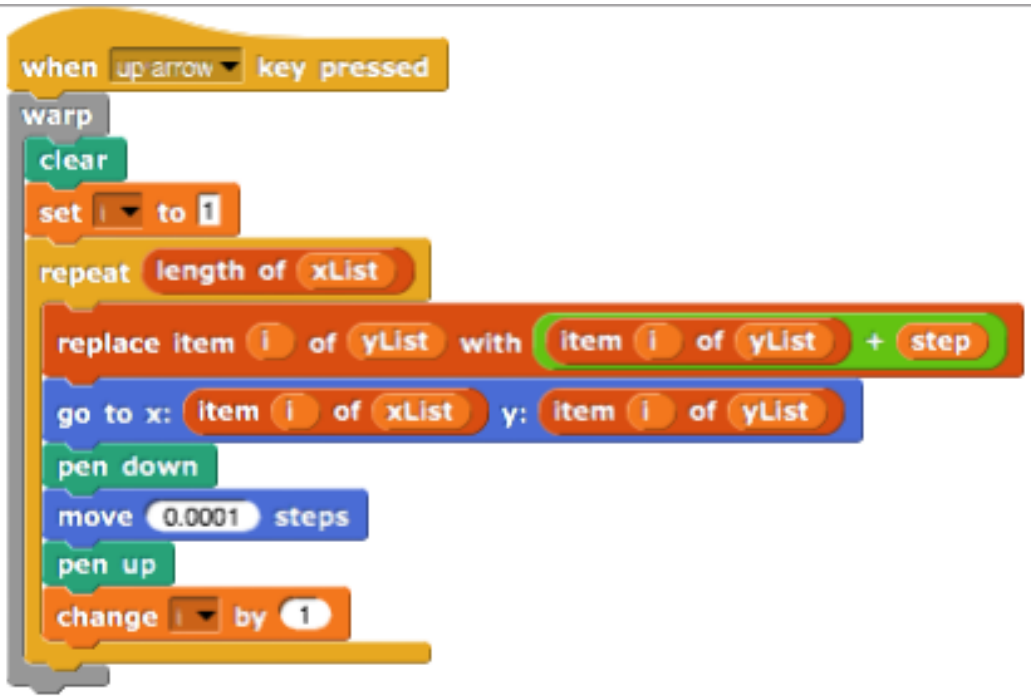
EK 5.1.3B Collaboration facilitates multiple perspectives in developing ideas for solving problems by programming.

EK 5.3.1L Using lists and procedures as abstractions in programming can result in programs that are easier to develop and maintain.

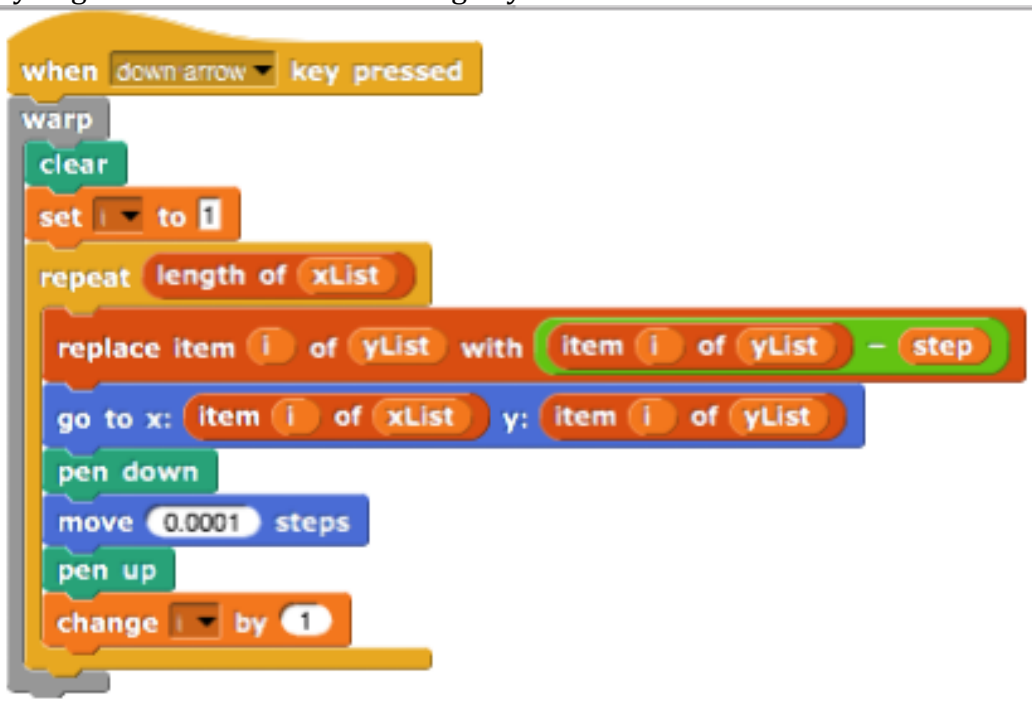
Possible Code Solutions:
Code for Initialization & Drawing

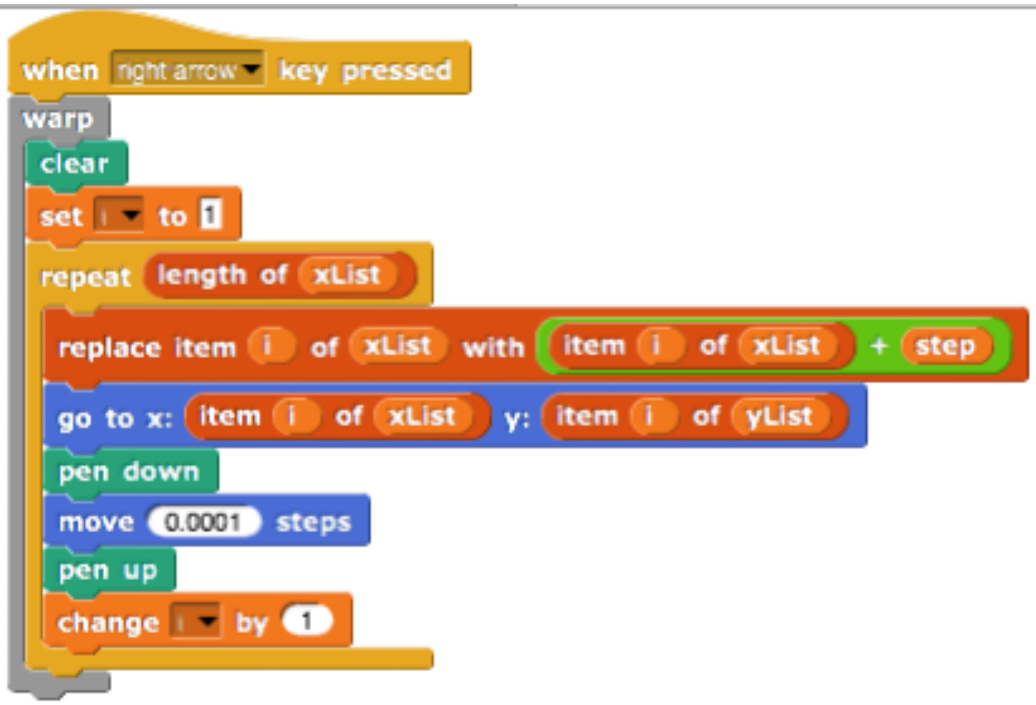


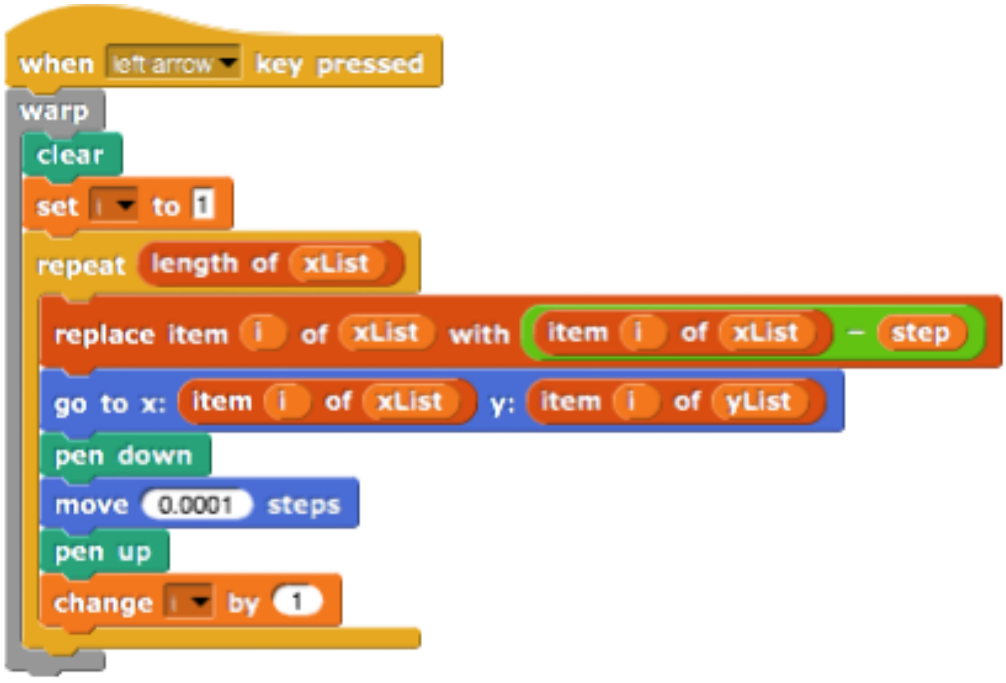
Possible Code for Movement with UP arrow:



Can you guess how can the remaining key movements be coded?




when right arrow key pressed
warp
clear
set i to 1
repeat length of xList
replace item i of xList with item i of xList + step
go to x: item i of xList y: item i of yList
pen down
move 0.0001 steps
pen up
change i by 1


when left arrow key pressed
warp
clear
set i to 1
repeat length of xList
replace item i of xList with item i of xList - step
go to x: item i of xList y: item i of yList
pen down
move 0.0001 steps
pen up
change i by 1

Possible single block of to unify behavior from the up/down right/left keys:

Hint for the possible use of a single list of lists to keep track of mouse positions: