Lecture 4:
How does computation ... create art

What are different approaches of “Computer Art”?

1. Human uses computer as drawing/painting tool

2. Human designed algorithm computer follows to create exact picture (e.g. drawing in Scratch)

3. Human designed algorithm w/ randomness – human examines results, picks appealing

4. Human designed algorithm w/ randomness – computer evaluates and shows best

5. Human interacts with computer (e.g., algorithm translates sounds to shapes; volumes to sizes; movement to color)
   - Golan Levin makes art that looks back at you

1) Computer as Paint Editor

2) Computer draws same picture by following algorithm
Program (Problem) Specification

- Describes problem to be solved
  - What should outputs be? (as function of inputs)
  - Does not say HOW to solve the problem (not the algorithm!)
- What is Output? Anything coming out off computer ...
  - Anything sent to display (Scratch: Stage)
  - Anything sent to printer
  - Messages sent over network
  - Data stored permanently in files
- What is Input? Anything going into computer ...
  - User typing on keyboard
  - Mouse actions
  - Messages arriving over network
  - Data read from files
  - Any other sensors (GPS location, motion)

What is the Specification?

Initial state:
- Starts with background

Draws:
- 1 house
- 5 trees on grass
- 3 stars in sky

How?
What steps? algorithm?

Watch screencast from course website for full details

Art in Scratch: Pen

- set pen color to
- start leaving a pen trail
- move
- move 20 steps
- move

Art in Scratch: Pen

- set pen color to blue
- set the pen color to blue
- move
- set the pen color to green
- move

To choose a color:
- Get the dropper by clicking in the square.
- Use the dropper to click on the color you want.
- Color appears in square.
Art in Scratch: Pen

- set pen size to 8
- pen down
- set pen color to light blue
- set pen thickness to 20
- move 60 steps
- start leaving a pen trail
- set the pen color to light blue
- set the pen thickness to 20
- move

-Activate script by clicking flag
- Code runs sequentially
- Set pen characteristics
- Make sure “pen up”
- Move to starting point
- Put “pen down”
- Move Sprite along desired path, using move and turn blocks

Note: If the pen shade is 0, then the pen color will be black. If the pen shade is 100, the pen color will be white.

Art in Scratch: Stamp

- clear
- repeat 6 times:
  - move 50 steps
  - turn 45 degrees
  - stamp a print of your costume on the stage

How to Draw a House?

- Activate script by clicking flag
- Code runs sequentially
- Set pen characteristics
- Make sure “pen up”
- Move to starting point
- Put “pen down”
- Move Sprite along desired path, using move and turn blocks
3) Algorithm with Randomness: Version A: Brownian Motion

Specification?
Initial state
- Stage is empty
- Pen begins in middle of stage
Repeat until reach edge
- Move randomly up/down and left/right
- Change to random (nearby) color

Brownian Motion
Initial state
- Stage is empty
- Pen begins in middle of stage
Repeat until reach edge
- Move randomly up/down and left/right
- Change to random (nearby) color

3) Algorithm with Randomness: Version B: Random Turns

Specification
Initial state
- Stage is empty
- Pen begins in middle
Repeat until reach edge
- Move in irregular arc of circle
- Change to random (nearby) color

Random Turns
Stage is empty
Pen begins in middle
Repeat until reach edge
- Move in irregular arc of circle
- Change to random (nearby) color
Programming Concepts

General
- Initial state must be specified
- Incrementally test code as you go
- Scripts must be activated to run (when flag clicked)
- Execution within script proceeds sequentially
- Control: forever, repeat <times>, repeat until

Blocks in Scratch
- Movement: X-Y coordinate system for Stage
- Pen and stamps
- Random numbers

Today's Summary

Today's Topics
- Can create art with pen and stamp tools

Reading: TED Talk
- Golan Levin makes art that looks back at you

Announcements
- Homework 2 due before class Friday
  - See web page for hw details (www.cs.wisc.edu/~cs202-1)
  - Any questions Send mail to cs202-tas@cs.wisc.edu
- Lab Hours in 1370 CS
  - Monday, Wednesday: 12-2pm
  - Tuesday, Thursday: 4-6pm
  - Text books available for use in room