Lecture 4:
How can computation... create animated stories?

Flowcharts

Flowchart:
- Visual representation of steps of algorithm
- Summarizes how algorithm behaves given specific answers

Symbols
- Boxes: Represent states (or actions or actions)
- Arrows (or edges): Show transitions (or decisions) between states

Flowchart for Animated Story

Animated Story: Behaves the same every time
- No decisions!
- Flowchart is summary of sequential action of story

How to create flowchart?
- Identify Initial State or Scene
- Group individual actions into higher-level “scenes”
  - Somewhat subjective (no right answer)
  - Label with descriptive name
- Identify characters of story
  - Specify actions of each character in scene
- Connect scenes sequentially
Animated Story

See Scratch code posted on web site!

Flowchart of Animated Story

*Initial state*

Background: Railroad
Cat: Left side
Dog: Right side

*Introductions*

Cat: What should we do?
Dog says: I don’t know
Flowchart of Animated Story

*Initial state*
- Background: Railroad
- Cat: Left side
- Dog: Right side

*Introductions*
- Cat: What should we do?
- Dog says: I don't know

*Color*
- Cat says: Let's do tricks!
- Cat: I can change colors!
- Cat changes to 5 colors
- Cat changes back

*Whirl*
- Cat says: I can whirl
- Cat whirls 5 times
- Cat changes back

*Fly*
- Cat moves 5 times
- Cat goes back

*Tiny*
- Cat becomes tiny
- Dog says: I like that!
- Cat says: why?
Flowchart of Animated Story

*Initial state*
Background: Railroad
Cat: Left side
Dog: Right side

*Introductions*
Cat: What should we do?
Dog says: I don't know

*Color*
Cat says: Let's do Tricks!
Cat: I can change colors!
Cat changes to 5 colors
Cat changes back

*Whirl*
Cat says: I can whirr
Cat whirls 5 times
Cat changes back

*Fly*
Cat moves 5 times
Cat goes back

*Tiny*
Cat becomes tiny
Dog says: I like that!
Cat says: Why?

*Eat*
Dog says: No reason
Dog walks until reaches cat
Cat meows and disappears
Dog says: Yummy

*End*
Background and Dog fade out
Background shows: The End

How to Transform Flowchart to Scripts?

Approach

• For each scene in flowchart, specify a script
  – May need to specify script for each character
  – Blocks in script show individual actions to be performed

• How to determine when script can run?
  – When should "Initial state" run?
  – When should "Introductions" scene run?
  – When should "Color" scene run?

How to Tell Another Script to Run?

Broadcast: sends the message "jump" to all sprites

Broadcast: sends a message to all the sprites (and the background)

This is useful if you want to tell other sprites when to do something

What do you want them to do when they receive the message?
How to Run Desired Script?

**Cat Scripts**

See Scratch code posted on web site!

**Dog Scripts**

**Stage Scripts**
Programming Concepts

General
- Divide high-level functionality into logical units
- Descriptive naming is important
- Initial state must be specified
- Incrementally test code as you go
- Scripts must be activated to run
  - When flag clicked; When receive message
- Execution within script proceeds sequentially
- Control: forever, repeat <times>, repeat until
- Parameters (to blocks) specify behavior
- Goal is to make “non-fragile” code

Today’s Summary

Today’s Topics
- How to create animated stories in Scratch
- How to outline a sequential flowchart of steps
- How to broadcast and receive messages in Scratch

Reading:
- Scratch User’s Guide

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