How can computation create games?

Homework 4: Points-Based Game

Scratch project: Open ended
- Must contain variables, instructions, Project Notes

Today’s Lesson

How to create two different games with points?
How to decompose high-level idea and specification into scripts?
- Many different ways to implement same idea

Get some intuition for:
- How to assign tasks across multiple Sprites?
- How to initialize?
- When to broadcast so another script runs?
- How to abstract duplicate functionality into a script?

Simplified Bug on a Plate

What are the Sprites? (with scripts?)
Bug: Overview

Ladybug?
- Move with arrow keys
- Leave pen trail behind
- If touch pen (end of game) then:
  - Play sad sound
  - Fade
  - Fruit fades too!
- If touch fruit (take) then:
  - Increment points
  - Play happy sound
  - Fruit moves!

Fruit
- Gentle shifting movement
- If touched, move random
- If end of game, fade...

Initial State
- 0 points (variable)
- Ladybug in center
- Empty stage (clear of pens)
- Random fruit location
- Ladybug and fruit not faded

Implication: Ladybug broadcasts two messages which fruit receives

What don't you see here?
- Put repeated blocks in one script and broadcast to activate (Abstraction!)

Initial State
- Ladybug
  - When clicked
    - Clear graphic effects
    - Set pen size to 1
    - Show
    - Broadcast

- Fruit
  - When clicked
    - Clear graphic effects
    - Set pen size to 1
    - Show
    - Broadcast

Ladybug
- Move with arrow keys
- Leave pen trail behind

Fruit
- Gentle shifting movement
- If touched, move random
- If end of game (due to ladybug), fade...

Abstraction: Ladybug doesn't know exactly how fruit handles "take" or "end" (e.g., costumes)
Counting Game: Overview

What are the Sprites?
- Numbers in random locations
- Regular size
- Timer at 0

Rat?
- Moves with arrow keys

Numbers?
- Must touch in order!
  - Number is said
  - Number becomes larger
- Ignores if not correct

Timer
- Counts up
- Stops when touch 20

Develop most scripts together!

Rat Scripts
Rat very simple!
- Moves in response to arrow keys
- Does nothing else!

(Set rotation to only face left-right)

Number Scripts: Initialization
What is Initial state for each Number?
- Go to random location
- Regular size

Scripts for Sprite Ten

(Relatively) Easy to duplicate identical scripts across multiple Sprites
- Get script correct for one Sprite
- Copy script to all of the others
**Number Scripts: Main Action**

Scripts for Sprite Ten

- **Stage**
  - When I receive 10
  - Wait until touching mouse
  - Play sound
  - Get size to 150
  - Broadcast 11

How to know it is our turn?
- 10 is first (let Stage control)
- After 10 is touched, 11 is next...
- Previous number is done

How to detect touched by rat?
- Wait until touching...

What to do after touched by rat?
- Say number
- Increase size

**Scripts for Sprite Eleven**

- Wait until touching rat
- Play sound and increase size
- Broadcast next number in sequence

**Goal: Simple code, similar across all**

- Receive msg when next in sequence
- Wait until touching rat
- Play sound and increase size
- Broadcast next number in sequence

**Timer Scripts**

- Timer continuously shows elapsed time

How to know game over?
- Receive message Done!
- How to stop loop?
- Stop all scripts

Other ways to remember how many seconds have passed???

**Check-Up (Not Easy!)**

In current version, Stage broadcasts to 10, then each Number broadcasts to next to indicate its turn:

- When I receive Done
  - Stop all scripts

Is there a different way the control flow could be structured?

Could the Stage just broadcast instead of broadcast and wait?

No – need to wait until rat has touched one number before ready for next
Announcements

Homework 2 graded (Learn@UW)
Homework 3 was due today
Homework 4 available (due 1 week) – Two Parts
  • Game with variables
  • Explore Natural Language Processing
    – Have conversations with two chatbots
    – See how good free translation services are
Back to high-level topics for next two lectures
  • Natural language processing (NLP)
  • Social robotics