How can computation... create animated stories?

Help Organize Program: 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 Example:

Old Checkup

What happens if you don’t specify the initial state of your program?
Which are likely to be used for initialization?
Flowchart for Animated Story

Animated Story: Behaves the same every time
  • No decisions!
  • Flowchart is summary of 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

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

*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
How to Transform Flowchart to Scripts?

**Approach**
- For each scene in flowchart, specify a script
  - Blocks in script show individual actions to be performed
  - Specify script for each character that does something

**How to determine when script can run?**
- **When should “Initial state” run?**
  - When GreenFlag is clicked
- **When should dog say “I don’t know” in “Intro”?**
  - After cat says “What should we do today?”
- **How will dog know cat has finished saying that??**
- Need to coordinate actions ACROSS cat and dog!
How to Tell Another Script to Run?

Broadcast: sends the message “jump” to all sprites

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?

Wait for Scripts to Complete!

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

Send message to all sprites

You can use broadcast and wait to send a message to all sprites to tell them to do something, and wait until they all finish before continuing.

How to Run Desired Script?

When I receive, waits for the message

Whenever the message “jump” is broadcast do this

Beauty of Abstraction

Abstraction: Separation of high-level view of entity from low-level details of implementation

When sender broadcasts “jump”, doesn’t know how “jump” is implemented by different Sprites

Why is this good?

• Simplifies concerns of sender (don’t need to know everything)
• Can change implementation of “jump” Of course, receiver might not implement “jump”!
Naming Convention for Messages

Use good descriptive names
- Purpose of names = help others understand your code
- Suggestion: Name matches name of scene
  - Intro, Color, Whirl, Fly, Tiny, Eat, Fadeout

Problem:
Hard to follow flow of messages across Sprites

Solution:
1. Use Stage to control action as much as possible
2. Use naming convention to help understanding
   - SceneName : Receiver
   - e.g., "Eat : Dog"

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

Develop Code Now

Check-Up

- In your animated story all the scripts are running at the same time. What did you do wrong?
- Can a Sprite receive a message it broadcast?
- When will this code work correctly? when not?