Lecture 4: Programming Concepts

Divide high-level functionality into logical units

Descriptive naming is important

Initial state must be specified

Parameters (to blocks) specify behavior

Goal is to make “non-fragile” code

Lecture 4: Scratch Features

Execution within script proceeds sequentially

Tour of many Motion and Looks blocks
  • X-Y coordinate system for Stage

Two ways to activate scripts
  • When Green Flag is Clicked (initial state)
  • When I receive <message>
    – Corresponding block: broadcast <message>

Control Blocks
  • repeat <number of times>
  • repeat until <condition is true>

Lecture 4: 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:
  • ”Specializing in Problems that Only Seem Impossible to Solve” [NyTimes, Dec 16 2008]
  • Scratch User’s Guide

Announcements
  • Assignment 1 should be turned in now
  • Assignment 2 available
    – Create animated story like today’s example
    – Any questions: Contact me or TAs – We are here to help!
TV Series Recommendation

Imagine: You’re bored and need a recommendation for a TV series to start watching

You could ask your friends, do lots of research and make a decision for yourself

… or …

You could try my TV Series Recommendation program…

What is a decision tree?

Nodes: Ask different questions
Each “edge” represents a different answer
Root node: Initial state
Arrive at later “internal” nodes depending upon previous answers
Leaf nodes: Final decision or result
Different branches can have different depths, # possible answers

Can we recreate TV decision tree?

Essential Control Constructs
Decision Tree Example

Choose Your Own Adventure

Decision trees represent many activities

Traditional paperback book:

- Pages in book represent different states
- Turn to different page for different decisions
Decision Trees: Straight-forward to Specify

Easy to implement decision trees in many frameworks

Basic format:
- State X:
  - if (decision A) goto state Y
  - if (decision B) goto state Z

Structure web pages to form tree
- Click on different link to bring you to different page

Example: http://editthis.info/choose_your_own_adventure/Paladin

Programming Concepts

Divide high-level functionality into logical units
Descriptive naming is important
Initial state must be specified
Parameters (to blocks) specify behavior
Goal is to make “non-fragile” code
Incrementally test code as you go
Decision trees: states plus transitions
Responding to user input
Data Types: Strings (list of characters)

Scratch Features

Execution within script proceeds sequentially

Basic blocks
- Tour of many Motion and Looks blocks
- X-Y coordinate system for Stage
- Importing images

Activating scripts
- When Green Flag is Clicked (initial state)
- When I receive <message>
  - Corresponding block: broadcast <message>

Data Types
- Ask questions: User types string “answer”
- String manipulation: “letter <x> of <string>

Control Blocks
- repeat <number of times>
- repeat until <condition is true>
- if <condition then <action 1> else <action 2>

Today’s Summary

Today’s Topics
- What is a decision tree?
- How to implement decision trees in Scratch?
  - if (condition) broadcast <message 1>; else broadcast <message 2>

Reading:
- “If you Liked This, You’re Sure to Love That” (NYTimes 11/08)
  Netflix recommendation system

Announcements
- Homework 2 available from web page
  - Create animated story
  - Any questions: Contact me or TAs – We are here to help
- TA Hours in Computer Lab
  - MW: 11:00–12:00
  - TR: 2:30–3:30
How will this code behave?

What is output if user enters:
- 95?
  - Excellent
- 100?
  - Perfect
- 105?
  - How did you do that?
- 63?
  - Better luck next time?

What must user enter to see output “Great”?
- 71, 72, … 79, 80

Draw Corresponding Decision Tree?