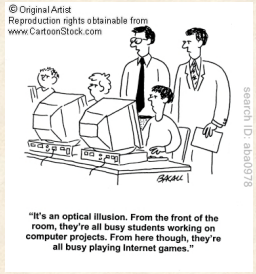
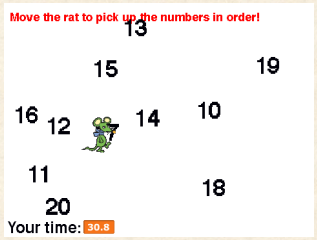
UNIVERSITY of WISCONSIN-MADISON
Computer Sciences Department

CS 202: Introduction to Computation — Professor Andrea Arpaci-Dusseau

How can computation… create games?

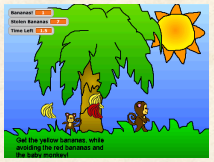


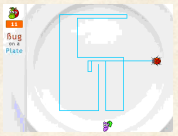


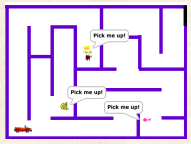
Homework 4: Points-Based Game

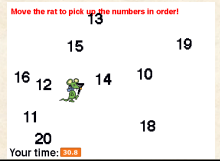
Scratch project: Open ended

- Must contain variables, instructions, Project Notes









Today's Lesson

How to create two different games with points?

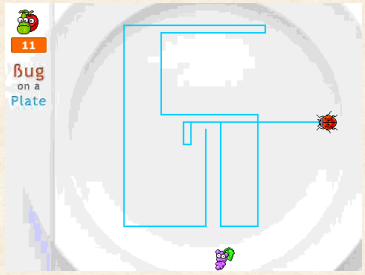
How to decompose high-level idea and specification into scripts?

- Many different ways to implement same idea

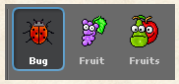
Get some intuition for:

- 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?

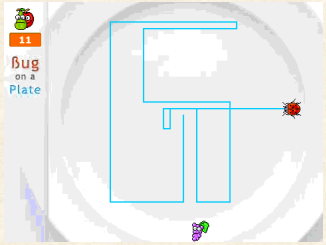
Simplified Bug on a Plate



What are the Sprites? (with scripts?)



Bug: Overview



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

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!

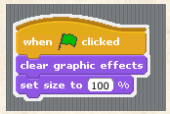
Fruit
- Gentle shifting movement
- If touched, move random
- If end of game, fade…

Implication: Ladybug broadcasts two messages which fruit receives

Initial State

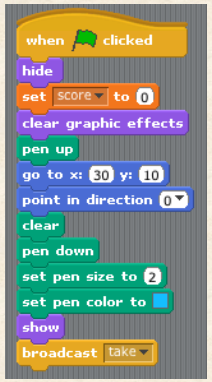
Initial State
- 0 points (variable!)
- Ladybug in center
- Empty stage (clear)
- Random fruit location
- Ladybug and fruit not faded

Fruit



What don't you see here?

Ladybug



Ladybug

Move with arrow keys
Leave pen trail behind

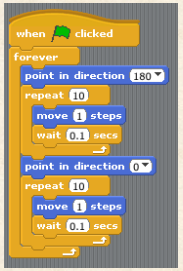
Put repeated blocks in one script and broadcast to activate (Abstraction!)

If touch pen, then end
Play sad sound
Fade
Fruit fades too!
(Broadcast!)

If touch fruit then take
Increment points
Play happy sound
Fruit moves!
(Broadcast!)

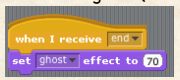
Fruit

Gentle shifting movement



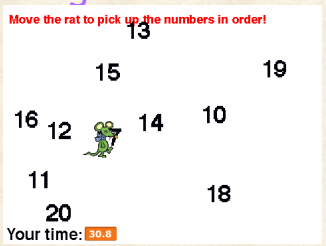
If touched by ladybug, move to random location

If end of game (due to ladybug), fade…



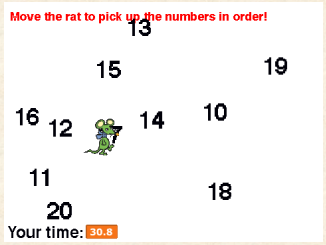
Abstraction: Ladybug doesn't know exactly how fruit handles "take" or "end" (e.g., costumes)

Counting Game: Overview



What are the Sprites?

Counting Game: Overview



Develop most scripts together!

Initial State?

- Numbers in random locs
- 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

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

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

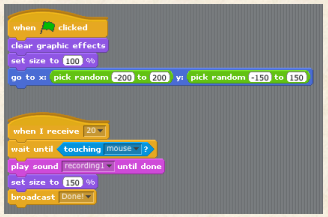
How to detect touched by rat?
- Wait until touching…

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

Number Scripts

Scripts for Sprite Eleven

Scripts for Sprite Twenty



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

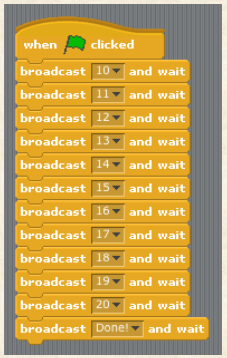
How to know game over?
- Receive message Done!
- How to stop loop?
- Stop all scripts

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:

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