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Note: thanks to Wanda Dann and Steve Cooper for slide ideas
Announcements

- Read Chapter 6 Tips and tech for next time
- Assignment 5
  - Part 1, due today
  - Part 2, due next week
What we will do today

• Lecture on Chap 5, Sec 2
  – Event-handlers with parameters

• Classwork
Mouse Clicks

• Interactive programs – allow user to mouse click an object
  – Buttons in an interface
  – Targets in a game
  – Checklist of items on a form

• Will see how to pass information about a mouse clicked object to an event handler
Example

- People are trapped in a burning building
- Select which person will be rescued
Storyboard

- Three people are to be rescued
- Could write 3 different methods

**Event**: click on guy1

**Responding Method**:
Save guy on first floor

**Event**: click on girl2

**Responding Method**:
Save girl on second floor

**Event**: click on girl3

**Responding Method**:
Save girl on third floor
A Better Solution

• Write one event handler
• Send in information needed for action

firetruck.savePerson:

parameters: whichFloor, whichPerson, howFar

Do in order
  point ladder at whichFloor
  extend ladder howFar meters
  whichPerson slides down ladder to fire truck
  pull ladder back howFar meters

What type are the parameters?
Demo

• Demonstration of the code for

firetruck.savePerson
Three Events

- The argument sent to parameters depends on which person is mouse clicked.

- Note - we positioned fire truck so distance from floor $X$ is $X$ meters (to floor 3 is 3 meters).
Example 2 – put events in

- Zeus was a powerful god in Greek mythology. When Zeus was angry, he would shoot a thunderbolt out of the heavens to strike anyone who got in the way.
- The user will choose the philosopher who will be the next target of Zeus’ anger.
Storyboard

• Possible design – method with Object parameter named *who*, for object clicked

  **Event:** an object is mouse-clicked

  **Event handler:** *shootBolt*

  **Parameter:** *who* – object clicked

  Do in order

  prepare to strike object that was clicked
  thunder plays and lightning strikes object clicked
  lightning is repositioned for next strike

  – The actions in storyboard are complex
  – Break actions into simpler steps using stepwise refinement
**Event:** an object is mouse-clicked

**Event handler:** `shootBolt`

**Parameter:** `who` – object clicked

Do in order

- prepare to strike object that was clicked
- thunder plays and lightning strikes object clicked
- lightning is repositioned for next strike

**prepareToShoot**

**Parameter:** `target`

Do together

- turn Zeus to face the `target`
- make the lightning bolt visible

**lightning and Thunder:**

**Parameter:** `target`

Do together

- play sound
- call `specialEffects` method
  - send `target`
specialEffects:

**parameter**: target

Do in order

Do together

- lightning bolt move to target
- smoke move to target

Do together

- set smoke to visible
- set lightning to invisible
- call smoke cycle – built-in method
- set target color to black
- move target up and down
A Driver

- shootBolt method - top level of our design
- It calls other methods and controls the overall action of the program – we call this a **driver**
One Link

- In the fire rescue example, we used three links – one for each person in the burning building.

In this example, we use only one link by selecting “object under mouse cursor” as the argument.
prepareToShoot

• In setting up initial scene, made lightning bolt invisible by setting its opacity to 0 (0%)
• To prepare to shoot lightning bolt, make it visible, set opacity back to 1 (100%)
lightningAndThunder

• Coordinate the sound of the thunder with lightning and other special effects
specialEffects

- Smoke.cycle is a built-in instruction with a duration of about 2 ½ seconds
Demo

• Test run of Zeus world – (this version doesn’t have the if statements from Chap 6 added in)
• When parameters are used in interactive programming – especially important to test that all possible parameter values work as expected
  – What happens if you click on each philosopher, one at a time?
• Also try things that shouldn’t work
  – What happens if you click on a column?
  – What happens if you click on a philosopher twice?
  – What happens if you click on Zeus?
Classwork today

• Create 2 worlds (or can combine them)
  – Problem 14, page 140
  – Problem 15, page 141 (can use any person)