Announcements

- Read Chapter 5 Sec 2 for next class
- New groups today
- Assignment 5 out
  - Part 1 and Part 2 Due Oct. 21
- Today
  - Interactive programming
  - Create billboards

Control of Flow

- Control of flow – how the sequence of actions in a program is controlled
  - What action happens first, second, third, ….
- In movie-style programs (Chaps 1-4) the sequence of actions is determined by the programmer
  - Creating a storyboard design
  - Writing program methods to carry out the designed sequence

Interactive Animations

- In interactive programs, the sequence of actions is determined at runtime, when the user provides input
  - Clicks the mouse
  - Presses a key on the keyboard
- Other sources of input are possible
Interactive Games

• In a video game where the user is guiding a spaceship, the sequence of actions …
  – Depends on what direction the user guides the ship
  – How fast the user presses the controls
• Each time the program runs, user input may cause a different sequence of actions
• Control of flow is “in the hands of the user”

Event Handlers

• An event may
  – Trigger a response, or
  – Move objects into positions that create some condition (e.g. a collision) that triggers a response
• An event handler is a method that is called to carry out the response.
• When an event is linked to an event handler, a behavior is created.

How does this effect your program?

• Our goal is to write interactive programs.
• The approach is the same as before, but the difference is now must be concerned with behaviors.
  – input from the user (events)
  – How objects respond to an event (event handler methods)

Example

• Build an air show flight simulator. The pilot (user) uses the biplane controls to perform acrobatic stunts.

• Problem: How do we write program code to provide a guidance system that allows the user to be the pilot?
Solution

- Use keyboard input
  - “F” key to move the biplane forward
  - Spacebar to make the biplane do a barrel roll
  - Note: other keys could be chosen
- Write event handler methods that respond to each key press
  - Example: Storyboards (next slide) and DEMO building world

Storyboards

- Since two keys are used, two events are possible – so two storyboard scenes

  **Event**: Spacebar press
  **Response**: Do together
- Roll biplane a full revolution
- Play biplane engine sound

  **Event**: F-key press
  **Response**: Do together
- Move biplane forward
- Play biplane engine sound

- Each storyboard outlines an event handler
  - Responds to a particular event

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**biplane.flyForward**

- No parameters
- No variables
- Description:
  - Do together
  - Move biplane forward
  - Sound: biplane.biplaneShort (0.102_324)

- Do not modify the length of the sound
  - Use “as is”
- Coordinate duration of **move** and **play sound**
  - Match duration of move to duration of sound

Events Editor - Linking

- Each event handler method must be linked to an event
  1) Select “create new event”
     - Then choose the type of event
  2) A template linking is created
Events Editor – Linking (cont)

3) Select type of key for event  
4) Select event handler method

Final result:

Add a Billboard with Instructions
• Add an event “I” to make the instructions hide or show

Classwork today
• Create 4 buttons and a spider robot
• Press green button and spider moves forward
• Press red button and spider moves backward
• Other two buttons?
• Create Billboard for instructions
• Create Method and Event for showing instructions