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

Announcements

- Read Chapter 5 Sec 2 for next Tuesday
- New groups today
- Assignment 5 out
  - Part 1 and Part 2 Due Oct. 24
- Test 1 back today

- Today
  - Interactive programming
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”

You Already Saw Events

- Each time the user provides some sort of input, an event is generated

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

- Storyboards (next slide) and DEMO building world

Storyboards

- Since two keys are used, two events are possible – so two storyboards are needed

<table>
<thead>
<tr>
<th>Event: Spacebar press</th>
<th>Event: F-key press</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response:</td>
<td>Response:</td>
</tr>
<tr>
<td>Do together</td>
<td>Do together</td>
</tr>
<tr>
<td>roll biplane a full revolution</td>
<td>move biplane forward</td>
</tr>
<tr>
<td>play biplane engine sound</td>
<td>play biplane engine sound</td>
</tr>
</tbody>
</table>

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

- biplane.flyForward

  - 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

```
When any key is typed, do Nothing
```

Events Editor – Linking (cont)

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

Final result:

```
When any key is typed, do Nothing
```

More Functionality

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?
- Event for instructions