CompSci 4
Chap 5 Sec 1
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Note: thanks to Wanda Dann and Steve Cooper for slide ideas
Announcements

• Read Chapter 5 Sec 2 for next Tuesday
• No Class on Thursday –
  – TA’s will be in D240 9:15-10:15am for checkoffs
  – catch up day, get old work checked off
  – Need to catch up if behind!
• MakeUp Class, Pixar Talk
  – Monday Mar 21, 7:30pm
• New groups today
What we will do today

• Lecture on Chap 5, Sec 1
  – Interactive Programming
• Classwork
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”
Events

• Each time the user provides some sort of input, an event is generated
  – An event is something that happens

From Appendix

When spacebar pressed, Bee turns around
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

• A method is called to carry out the response. The type of method is called an event handler.

• 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 uses the biplane controls to perform acrobatic stunts.
Problem

• The idea in a flight simulator
  – Allow user to control the flight path

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

• Use keyboard input
  – Up-arrow 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

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

Event: Spacebar press
Response:
- Do together
  - roll biplane a full revolution
  - play biplane engine sound

Event: Up arrow press
Response:
- Do together
  - move biplane forward
  - play biplane engine sound

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

• A demo of building the biplane simulation
  – flyForward
  – barrel
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
Events Editor – Linking (cont)

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

Final result:
Testing

• Test event handler methods as they are developed
• Write a method and test it, write a method and test it, and so on
  – incremental development
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?