Class Today

• Learning about interactive programs

• Events
  – Pressing a key
  – Clicking on objects
  – Picking one object to move with arrow keys
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, 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
  – Each time the program runs, user input may cause a different sequence of actions
Event Listeners

• 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 listener is a procedure that is called to carry out the response.

• When an event is linked to an event listener, a behavior is created.

• How does this effect your program?
  – Input from the user (events)
  – How objects respond to events (event listener)
Setup for this example

- Madhatter (Randy), Queen, BoxTruck, objectMarker (to position direction to face)
How does an Alice world know where to start

• There is an event listener

• When the program starts a scene is activated, and myFirstMethod code executes
Example 1: Want Randy to turn around when we press the “t” key

• Add an event listener:
  – Keyboard, addKeyPressListener
Press “t” and Randy spins

- Must use `if` to determine if “t” has been pressed, and then what to do if it has
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 listener
Example 2: Click on Randy to get him to move into the car

- Add MouseClickOnObjectListener

- You can refer to the object you click on
You can limit who you can click on for this code

- We want it to work for Randy and Queen
Now Limited to Randy and Queen

• Shown here

```
this addMouseClickOnObjectListener, setOfVisuals = new Visual[] { this.Randy, this.queen } add detail
```

```
declare procedure mouseClicked

drop statement here
```

```
event getScreenDistanceFromLeft

event getScreenDistanceFromBottom

event getModelAtMouseLocation
```
Now use the object you click on as an object that can do things

• Can choose it:
Code to put the object in the truck
Try it out

• Place Queen and Randy on either side of truck – click on queen, then Randy
Drive the boxTruck with arrow keys

• Add an objectMoverEvent

• Set it to move the boxTruck with the arrow keys
How do we add in instructions?

An image

Instructions:

Click on a person and they will get in the truck

Press T for the madHatter to turn around

Use arrow keys to move the truck (but first put the two people in the truck)

Click on this picture to make it disappear
How to add in instructions

• Create an image with instructions
• Make it invisible (easier to setup)
• Then make it visible in myFirstMethod
• Setup an eventlistener so when you click on it it disappears, changes opacity or have it move out of the way.
EventListener for instructions

- Also Turn on instructions in myFirstMethod
Event Storyboard

• How do you create a storyboard when you don’t know what the story will be? It could be different every time you run it.
Event Storyboard

• How do you create a storyboard when you don’t know what the story will be? It could be different every time you run it.

• One pane for each type of event
This lecture covered

- Creating three types of events
  - Pressing a key
  - Clicking on an object or a set of objects
  - Moving an object with arrow keys
- Handling the events with event listeners