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)

How does an Alice world know where to start
• There is an event listener

Example 1: Want Randy to turn around when we press the “t” key
• Add an event listener:
  – Keyboard, addKeyPressListener
  – Knows some key has been pressed, but not which one

Setup for this example
• Madhatter (Randy), Queen, BoxTruck, objectMarker (to position direction to face)
Press “t” and Randy spins

• Must use if to determine if “t” has been pressed, and then what to do if it has

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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

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Example 2: Click on Randy to get him to move into the car

• Add MouseClickOnObjectListener

• You can refer to the object you click on

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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

```
declare procedure mouseClicked
    do in order
        if isMouseOverObject then
            add statement here
```

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

- Can choose it:

```
this.boxTruck
```

```
addMouseClickOnObjectListener, setOfVisuals, newVisuals
```

Code to put the object in the truck

```
addMouseClickOnObjectListener, setOfVisuals, newVisuals
```

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.

• 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