## Chapter 4:
## Events

Programming with Alice and Java
First Edition

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## Objectives

- Explore the different types of events that can be processed in an Alice world.
- Distinguish between events that fire once and those that fire repeatedly.
- Examine the difference between loop processing and event processing.
- Create events that respond immediately to input from the keyboard and mouse.
- Use events to monitor conditions and changes in the values of variables.

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## Events Processing

- Most software applications use a *graphical user interface* (GUI) that contains buttons, text fields, lists, and menus.
- The mouse and keyboard are used to interact with a program.
- An *event* is generated every time the user clicks the mouse button or presses a keyboard key.
- The program's response to events is called *event processing* or *event handling*.
- There is a default event: When the world starts.

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## Alice Events

| World Events |
|---|
| When the world starts |
| When the world is running |

| Mouse Events |
|---|
| When the mouse is clicked on something |
| While the mouse is pressed on something |
| Let the mouse move the camera |
| Let the mouse orient the camera |
| Let the mouse move objects |

| Keyboard Events |
|---|
| When a key is typed |
| While a key is pressed |
| Let the arrow keys move the object |

| Condition Events |
|---|
| When a variable changes |
| While something is true |
| When something becomes true |

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## World Events

- Class of events that are generated based on situations that occur in a running Alice world.
- By default, When the world starts event handler calls my first method, but it can be modified.
- To get the While the world running event, a When the world starts event must be changed.

- The While the world is running event has three sections and can be configured.
- The statements in the Begin and End are executed only once.
- The statement in the During section is executed repeatedly.

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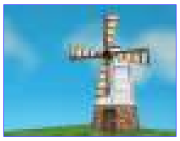
## World Events (continued)



- In a During section the statement runs While the world is running, but the event can be replaced by an infinite loop (While true).
- Using a loop does not allow other actions to take place.

**The Begin and End sections are empty**

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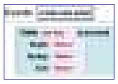
## Keyboard Events

- This class of events provides the ability to respond to user-initiated keyboard presses.
- The When a key is typed and While a key is pressed events are fired when the user presses any of the standard keyboard keys (digits, letters, space bar or enter key).
- The Let the arrow keys move an object event specifically manages the use of arrow keys



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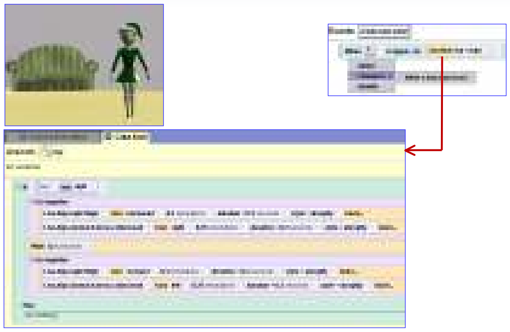
## Keyboard Events (continued)



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## Mouse Events

- This class of events allows the user to use the mouse to interact with a running world.
- There are five types of mouse events.

The When mouse is clicked on something event

It is similar to the While mouse is pressed on something event

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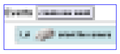
## Mouse Events (continued)

- Using Let the mouse move the camera event allows the user to move the camera forward, backward, right, and left.



- The Let the mouse orient the camera event can be used to rotate the camera.

- The object in this event is actually a list of objects; multiple objects can be moved at the same time.

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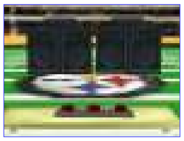
## Condition Events

- The events of this class are triggered by the logic set in the program.
- Each of these events is based on the status of a variable or expression



The While something is true event

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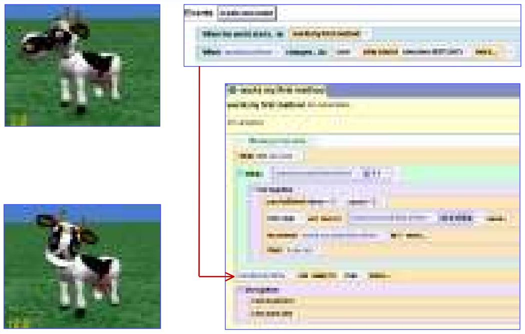
## Condition Events (continued)



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## More Environment Details

- Objects can be organized and manipulated in groups.
- Predefined locations can be created and used to coordinate the movement of objects. A *dummy object* can be added at the desired location. This object is invisible and is used only as a reference.
- There are three functions that allow the user to input a number, a yes or no answer, and a string while a world is playing. Each of these functions can be customized so that the resulting pop-up dialog window prompts the user for the appropriate input.

- A print statement allows you to send text output to the screen while a world is running.

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## Summary

- Events are generated under various circumstances (e.g. pressing a mouse button or keyboard key).
- A program can be set up to respond to some events and to ignore others.
- Some events have Begin, During, and End sections to tailor the way the event is handled.
- Processing events is often a better solution than a loop-based approach.
- Keyboard events can recognize the use of any standard keyboard key.
- Some events fire once; other events fire repeatedly as long as the action is occurring.

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