CSCI 1106
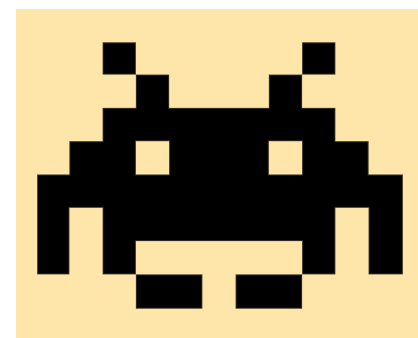# Lecture 10

Buttons, Text, and Lists

Announcements

- Today's Topics
  - Random Numbers
  - Buttons
  - Text
  - Lists

# Don't Push the **Big** Red Button…

- Buttons are sprites that identify an action and how to perform it

- Buttons identify an area for a user to click on

- Buttons generate an event that the application can respond via an event handler

Button State

- A button has three (3) states
  - **Up** is the normal state of the button
  - **Over** is when the mouse is hovering on the button
  - **Down** is when the button is pressed
- Idea: For each of the three states the button can have a different look (costume)

Creating Buttons

- Create *sprite with three costumes*
  - *Up*
  - *Over*
  - *Down*
- Have sprite receive FRAME event
  - If the mouse is touching the button
    If clicked **[Down]** use Costume 3
    Otherwise **[Over]** use Costume 2
  - Otherwise **[Up]** use Costume 1
- Only change costumes if necessary!
- When should we actually execute action associated with button?
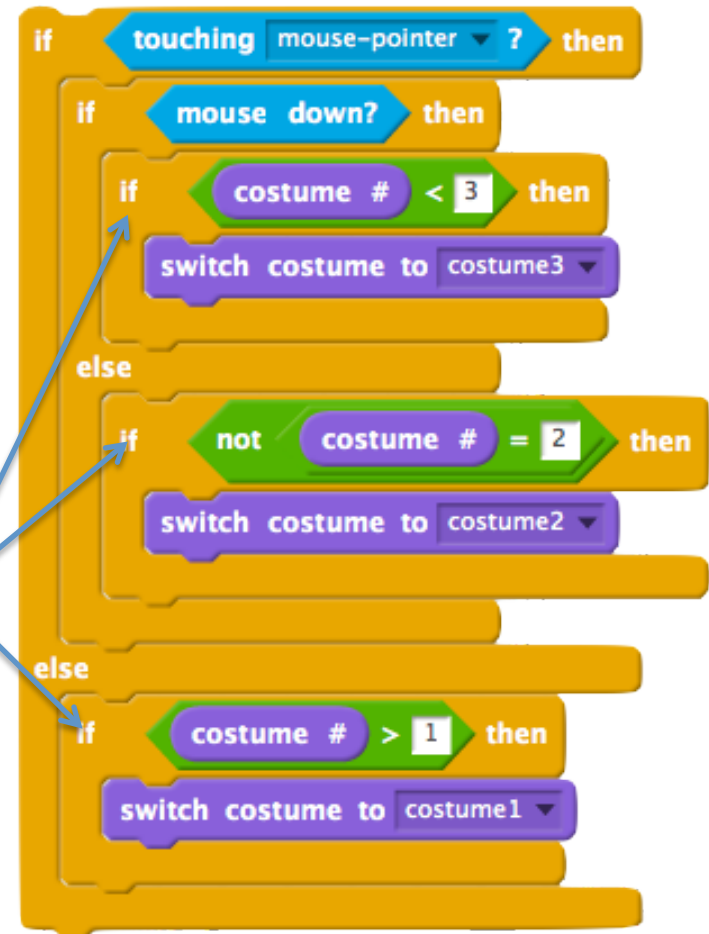
Text

- It is useful for games to display text
  - Instructions
  - Player information (score, health, level, etc)
  - Dialogue
- There are two types of text that we can dislpay
  - *Static* text, which does not change during the game
    - Instructions
    - Dialogue
  - *Dynamic* text, which changes as the game progresses
    - *Player information*

Static Text

- To create static text on the stage
  - Use sprite whose costume(s) contain text
  - Place sprite where you want to text to be displayed
- Switch the static text by switching costumes
- Pros:
  - Easy to do
  - Can use any tool to create and render the text
- Cons:
  - Text cannot be modified once program is running
  - Text design in the Scratch Paint Editor is minimalistic

Dynamic Text

- Three options for displaying dynamic text:
  - Variables
  - Say/Think blocks
  - Third party blocks

Dynamic Text: Variables

- To Use:
  - Create a variable
  - Drag the field displaying the variable to where you want to place it
  - Modify variable to change the text being displayed on stage
  - Hide / Show the variable as desired
- Pros:
  - Easy to use
- Cons:
  - Does not look good

Dynamic Text: Say/Think Blocks

- Use these blocks in your scripts when you wish a sprite to say or think something
- Pros:
  - Easy to use
  - Looks ok
- Cons:
  - Text is associated with a sprite
  - In many cases, the text is neither said nor thought
    - e.g., Player information

Dynamic Text: Third Party Blocks

- There are additional blocks, implemented by other people available on the web
  - You will need to find them on your own
- Pros:
  - Look good
- Cons:
  - Have to find them yourself
  - In many cases they are specialized
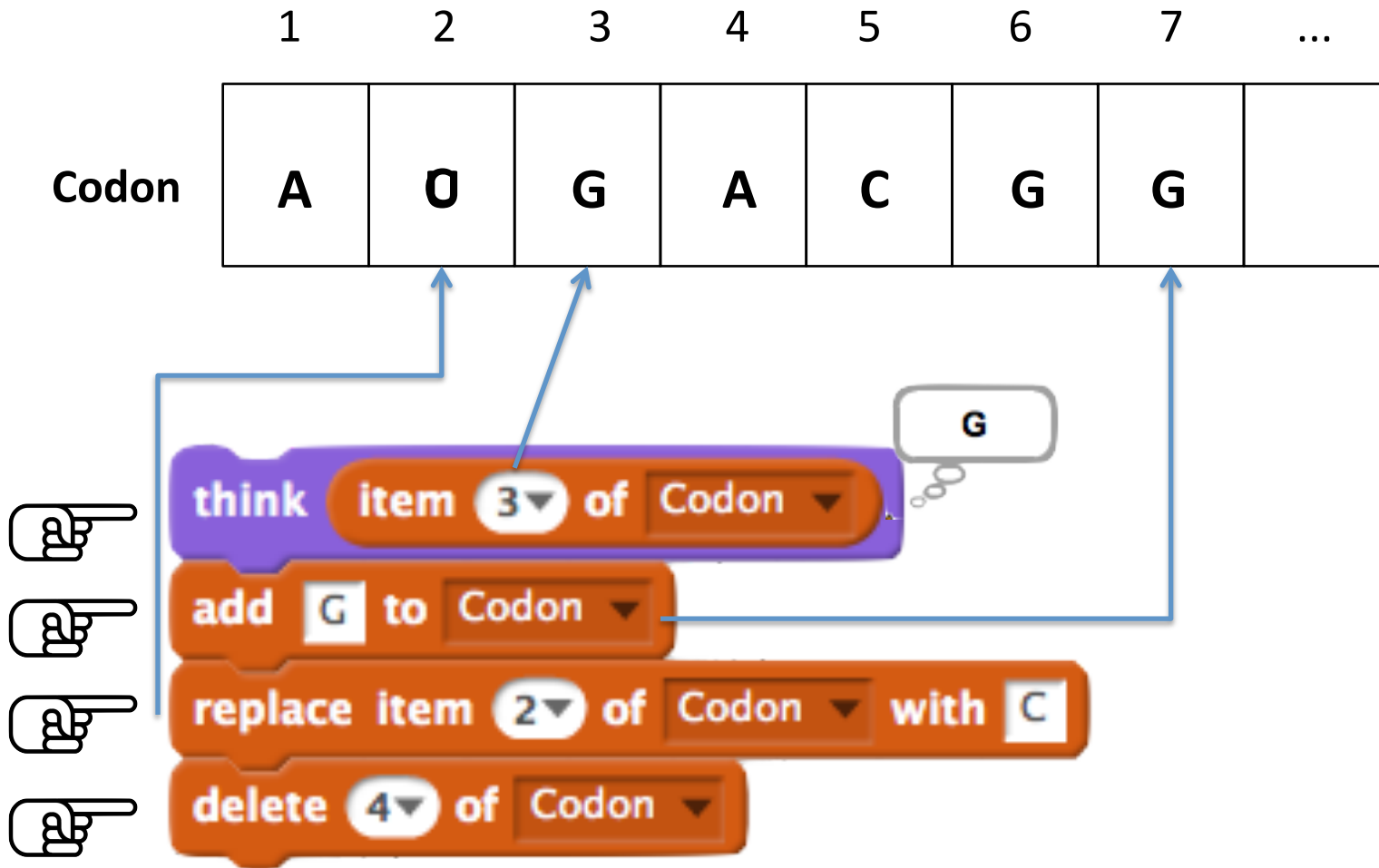   - e.g., a counter rather than a general text field

Lists

- A *list* is contiguous sequence of elements
  - Used to store lists of data, e.g.,
    - numbers
    - strings

A	U	G	A	C	G	G	
1	2	3	4	5	5	7	...
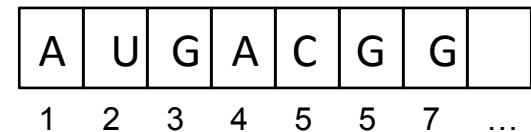
- Lists can be manipulated using operations:
  - *add* item to end of the list
  - delete i^{th} item of the list
  - *insert* item at location i
  - replace i^{th} location with item i
  - *access* i^{th} location

add thing to ToDo

delete 1 of ToDo

insert thing at 1 of ToDo

replace item 1 of ToDo with thing

item 1 of ToDo

List Operations

Looping over a List