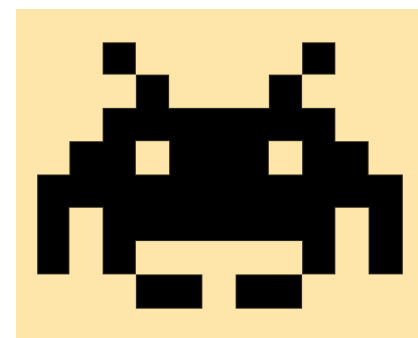




CSCI 1106

Lecture 9



Buttons, Text, Lists, and Random
Numbers



Announcements

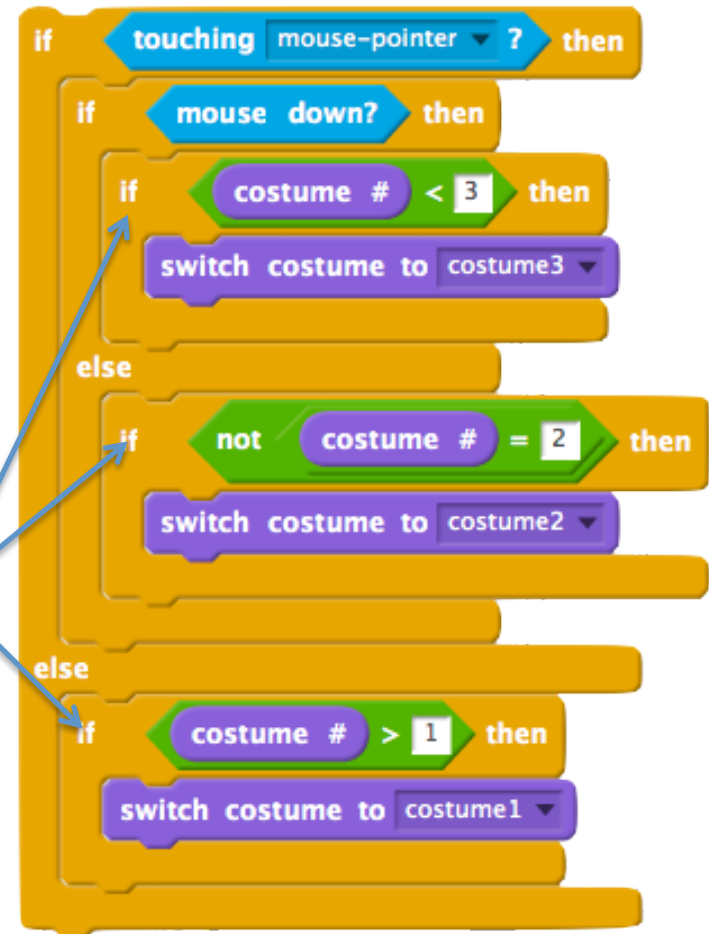
- No class this Friday
- Today's Topics
 - Buttons
 - Text
 - Lists
 - Random Numbers

Button State

- Buttons are sprites with commonly 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?



when this sprite clicked

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 display
 - *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

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

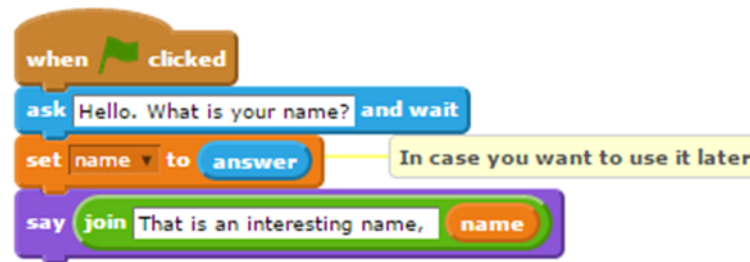


Dynamic Text: Say/Think Blocks

- 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
 - (How to ... in scratch)
- Pros:
 - Look good
- Cons:
 - Have to find them yourself
 - In many cases they are specialized

Lists

- A *list* is contiguous sequence of elements
 - Used to store multiple pieces of information at once, e.g.,
 - numbers
 - strings

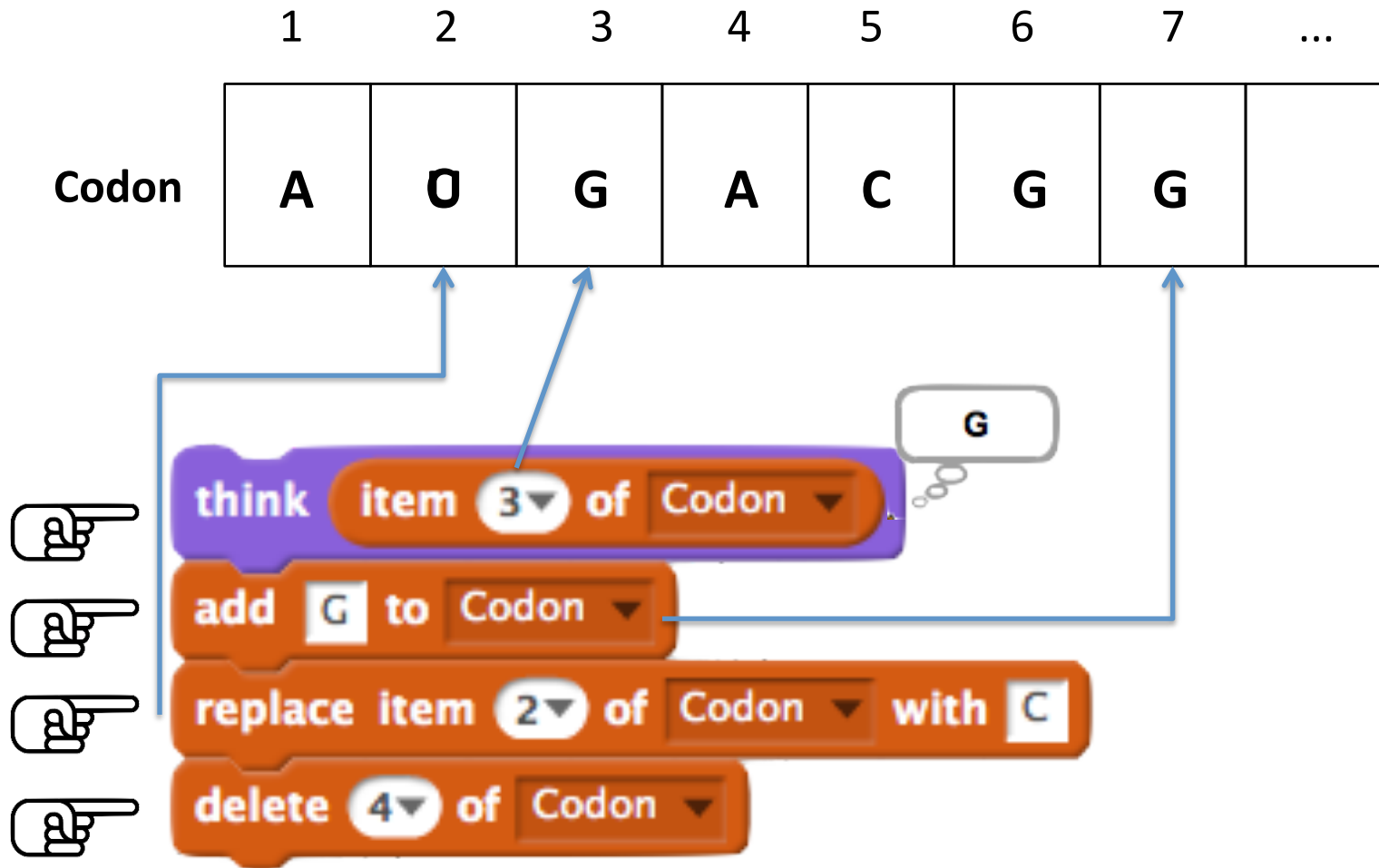
A	U	G	A	C	G	G	
1	2	3	4	5	5	7	...

- Lists can be manipulated using operations:

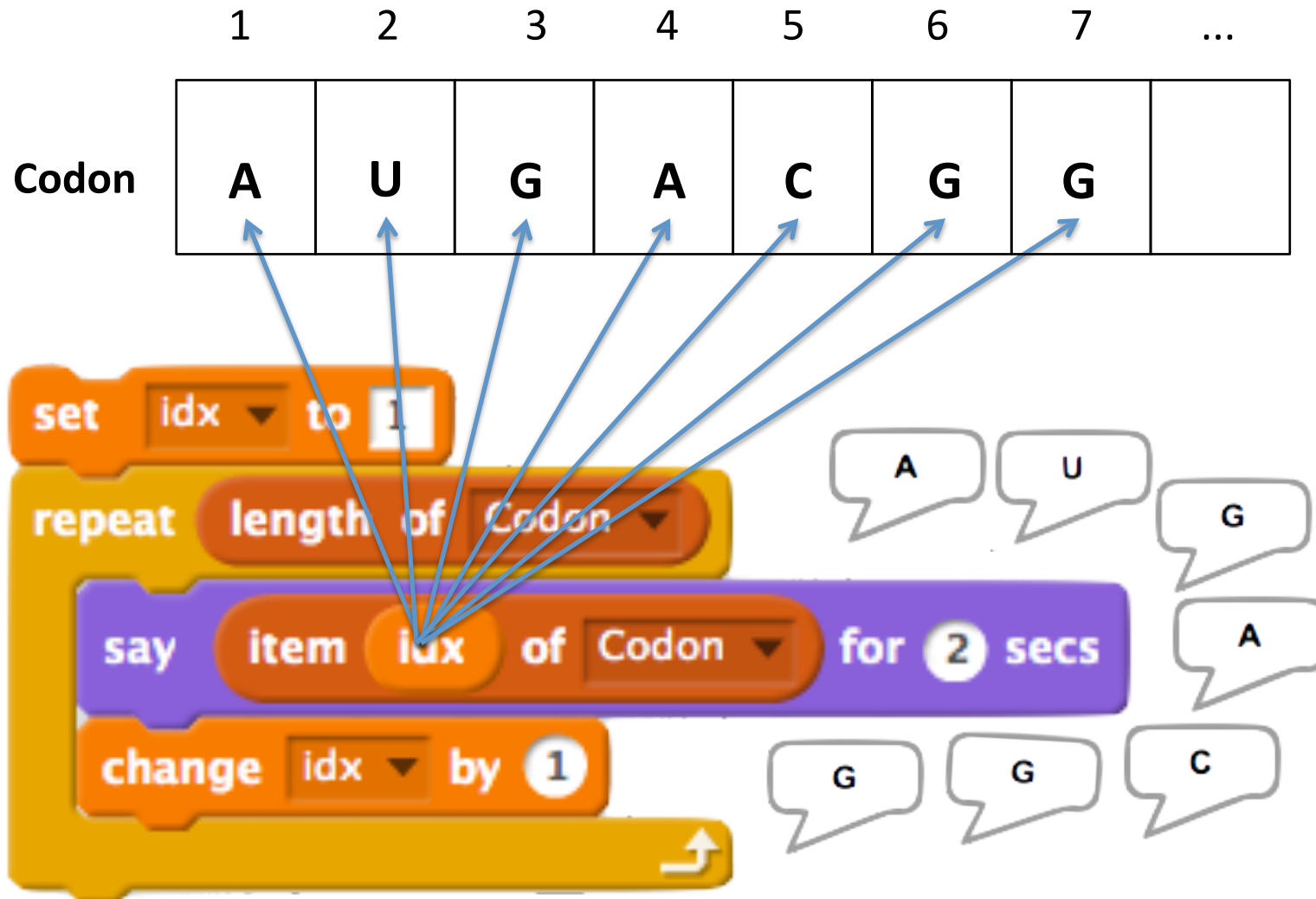
- *add* item to end of the list
- delete i^{th} item of the list
- *insert* item at location i
- replace i^{th} location with another
- *access* i^{th} location
- *Check if list contains specific item*
- *Show/Hide*



List Operations



Looping over a List

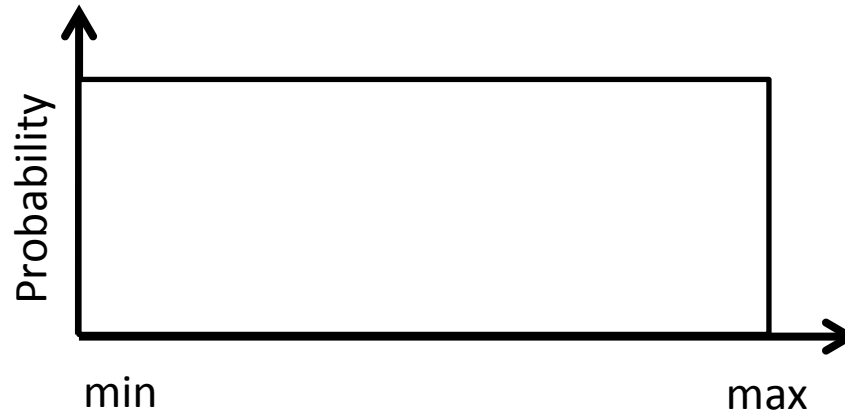


A Random Aside

- **Idea:** Most systems have a pseudorandom source of values
 - The source is an infinite sequence of values
 - The values look random
 - Are sufficiently random for our purposes
- Each system is a little different, but all work similarly
 - Each system provides a Random function
 - The function returns a value chosen pseudorandomly from a fixed range

pick random 1 to 10 in Scratch

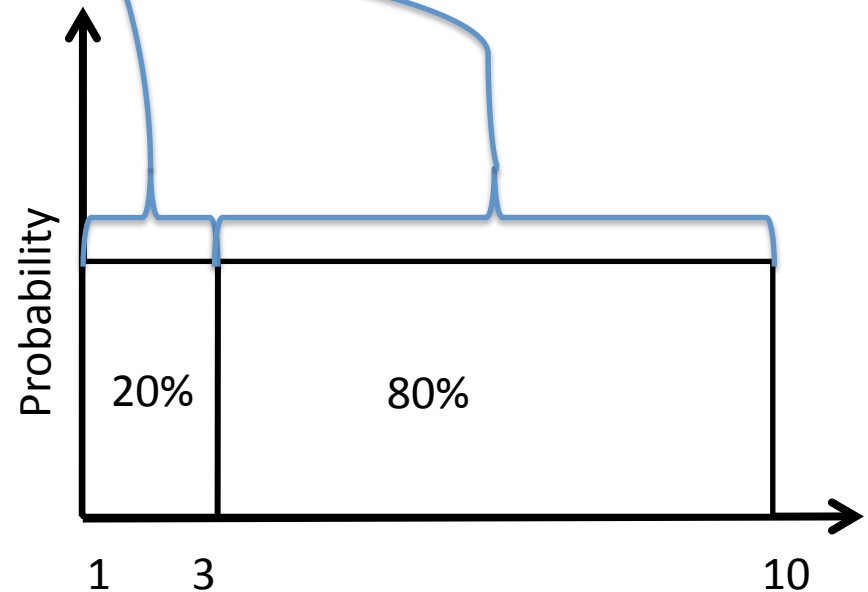
- Scratch has a pick random 1 to 10 function
- Returns a value in the range $\min \leq n \leq \max$
- Value is selected at random from a *uniform distribution*
- What does a uniform distribution mean?



A Random Code Example

```
if pick random 1 to 10 < 3 then
else
```

- If you wanted to implement a coin toss, how would you do it?

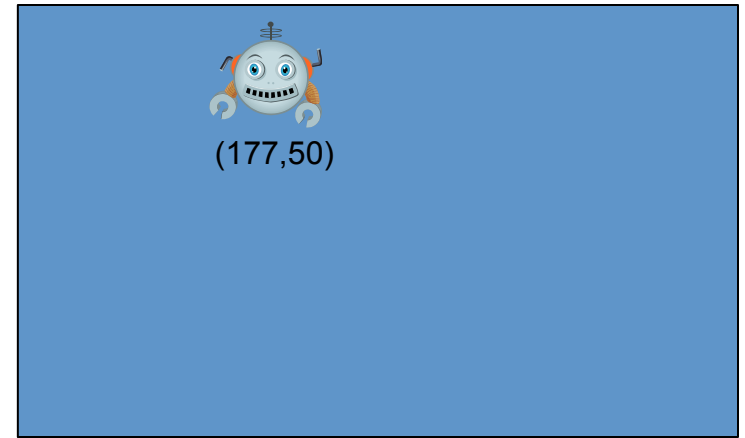


Another Random Example

- How do we place an object at a random horizontal position on the stage?

y = 50;

x = ???



-240

240



min value

max value