Strings, Puzzle App I

CSE 120 Winter 2018

Instructor: Justin Hsia

Teaching Assistants: Anupam Gupta, Cheng Ni, Eugene Oh, Sam Wolfson, Sophie Tian, Teagan Horkan

Going beyond Pokemon Go: preparing for an augmented reality future

"Franzi argues that AR is essentially different than other kinds of technology we interact with because of its immersive potential. 'It is directly sitting between your perception of reality and your actions in the physical world,' she says.

"What can those apps do once they have the ability to change your view of the physical world? ...If you're driving, an application might block your view of pedestrians crossing the street," Franzi says, 'or they might startle you with scurrying spiders.' "

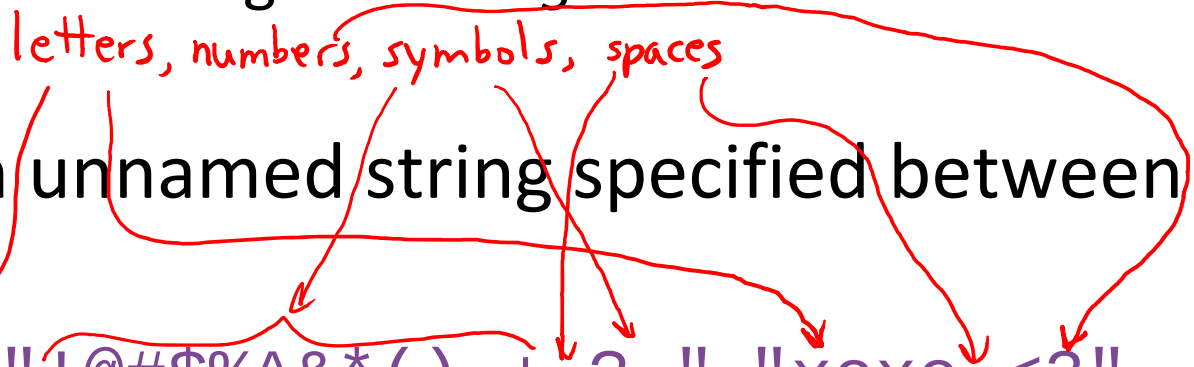
- http://www.cbc.ca/radio/spark/going-beyond-pokemon-go-preparing-for-an-augmented-reality-future-1.4406069

Administrivia

- Assignments:
  - Controlling Elli due tonight before 11:59 pm (2/12)
  - Color Filters due before section tomorrow (2/13)
  - Reading Check 6 due before section Thursday (2/15)
  - Word Guessing due Friday (2/16)
  - Living Computers Museum Report due next Tuesday (2/20)
- Programming assignments: checked off OR submitted
  - We *highly* recommend getting checked off
- "Big Ideas" lecture on Friday: Artificial Intelligence

Strings

- A string is a string of characters (0 or more)
  - Strings cannot be modified, but string variables can be reassigned
  - Individual characters can be accessed (not modified), numbered from left-to-right *starting at 0*



- String literal: an unnamed string specified between double-quotes
  - *e.g.* `"hello"`, `"!@#$%^&*()_+ ?~"`, `"xoxo <3"`
  - `""` is known as the empty string (0 characters in it)

Using Strings

- Declaration: `String str;` (string variable)
- Assignment: `str = "hello";` (string; position 0 1 2 3 4)

- Get character using `str.charAt(i)` `str.charAt(1)` → `'e'`
- Get length using `str.length()` 5

- Concatenation: join strings using '+' operator
  - *e.g.* `"hi "` + `"there"` gives you `"hi there"`

+ plus when used with numbers, concatenate when used with strings

- Conversion to string usually occurs *implicitly*
  - Can also explicitly use `str()`

Strings vs. Arrays

- Strings are *sort of* like arrays of characters:

	Array	String
Declare	`char[] chArray;`	`String str;`
Initialize	`chArray = {'h', 'i', '!'};`	`str = "hi!";`
Get element	`chArray[1]`	`str.charAt(1)`
Get length	`chArray.length`	`str.length()`

Example: Recording User Input

- `keyPressed()` lets you read user input 1 character at a time

- Use a `String` variable to "store"
  - Add/append new characters using concatenation

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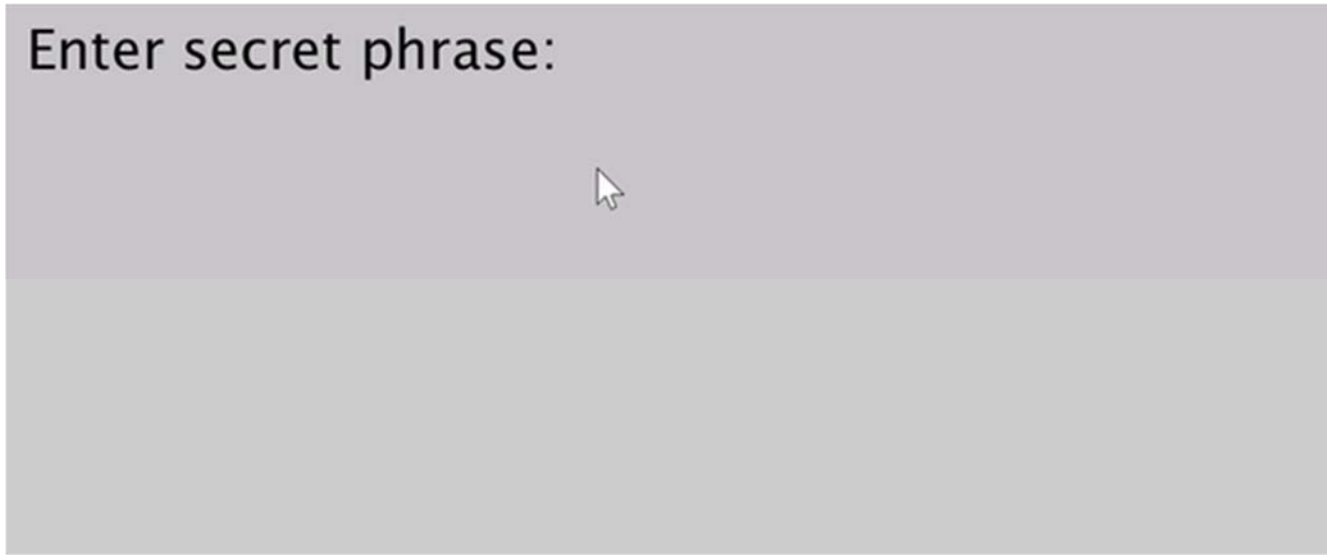
```
String input = "";

void draw() {
}

void keyPressed() {
  input = input + str(key);
  println("input = " + input);
}
```

Word Guessing

- Learn to use text input & output
  - Player 1 enters a secret phrase
  - Player 2 tries to guess the secret phrase
  - Game tells you how many letters correct & # of attempts



Outline

- **The Game**
- Design Phase
- Coding Phase

15 Puzzle

- Sliding puzzle that consists of numbered square tiles in random order with one tile missing
  - Also known as “Mystic Square”

only the 7 and 13 can slide into the current open space

- We will program just the game mechanics
  - Won’t do winning condition, since not all game states are solvable

App Mechanics

- Tiles numbered 1-15 are shown on game board
  - One “open” or “empty” square
- Clicking a tile next to the empty square will “slide” that tile into the empty space
  - Clicking other tiles has no effect
  - Clicking outside of the game board has no effect
- Include a Reset button to return the game board to its initial state

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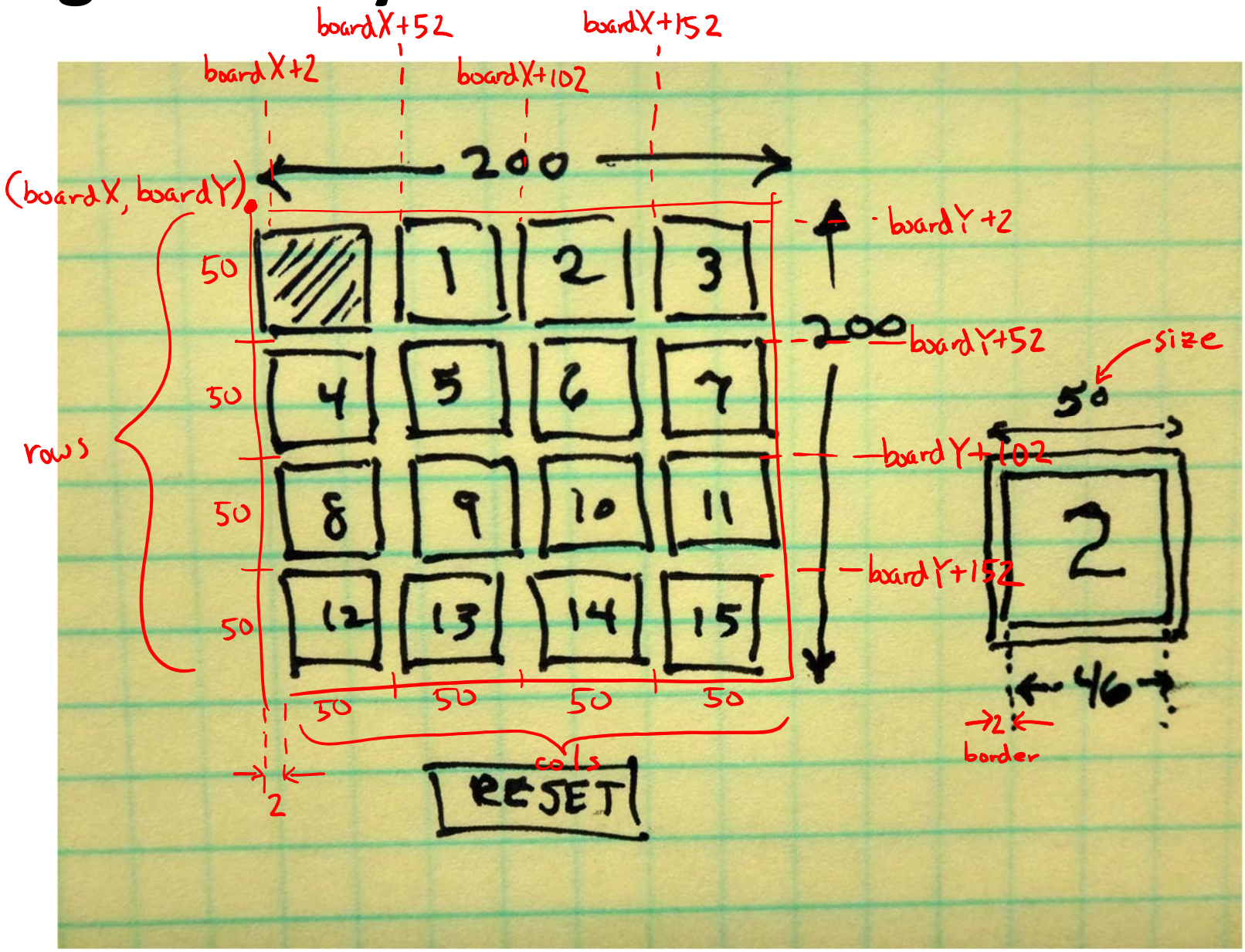
Design the Layout



Coding Decisions

- How to represent the state of the game board?

int array of size 16

```
int[] board = { 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15};
```

- How to implement the "slide" functionality?

swap values in array

- How to respond to clicks?
  1. detect click on Reset button (reset)
     - ↳ rectangular region
  2. detect click on tile (possibly slide)
     - ↳ rectangular region of game board
     - ↳ calculate tile coordinates of click

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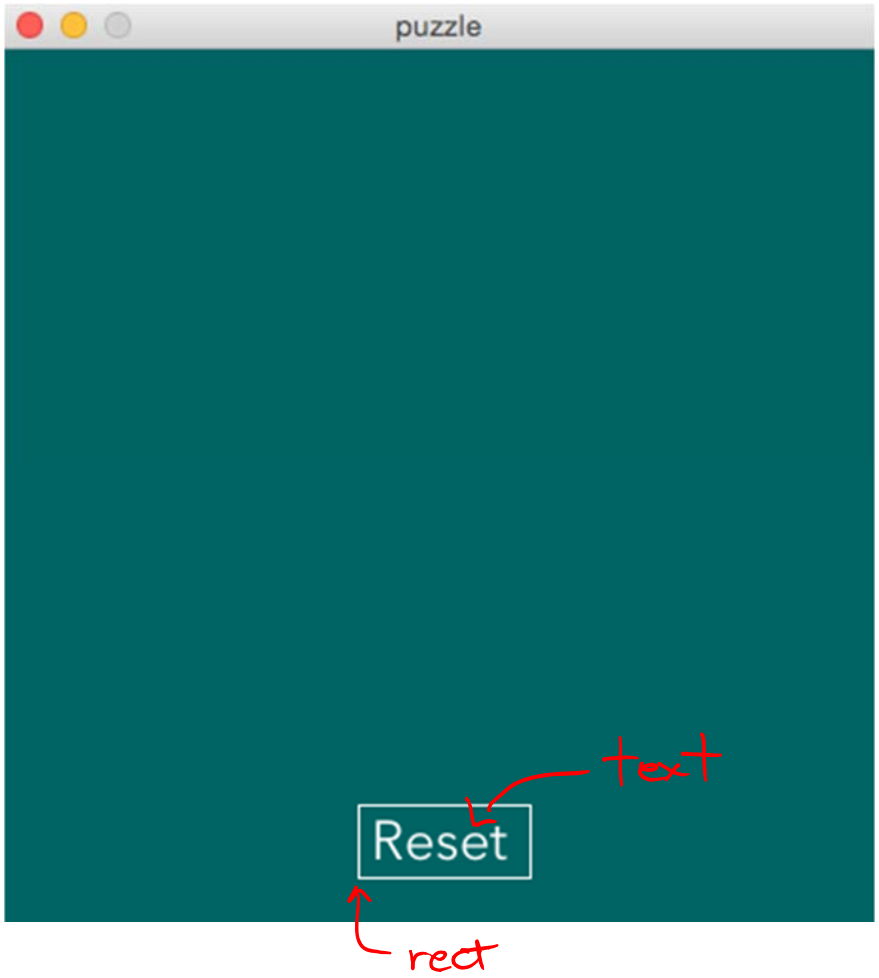
Create the Reset Button



Create the Tile Layout