CSC 111:
Intro to Computer Science through Programming

Spring 2017
Prof. Sara Mathieson

Admin

- Homework 8 is due April 11 (tomorrow)
- **Office hours today 3-5pm** (Ford 355, usually move to 345)
- Thursday office hours moved to 10am-12pm for the rest of the semester

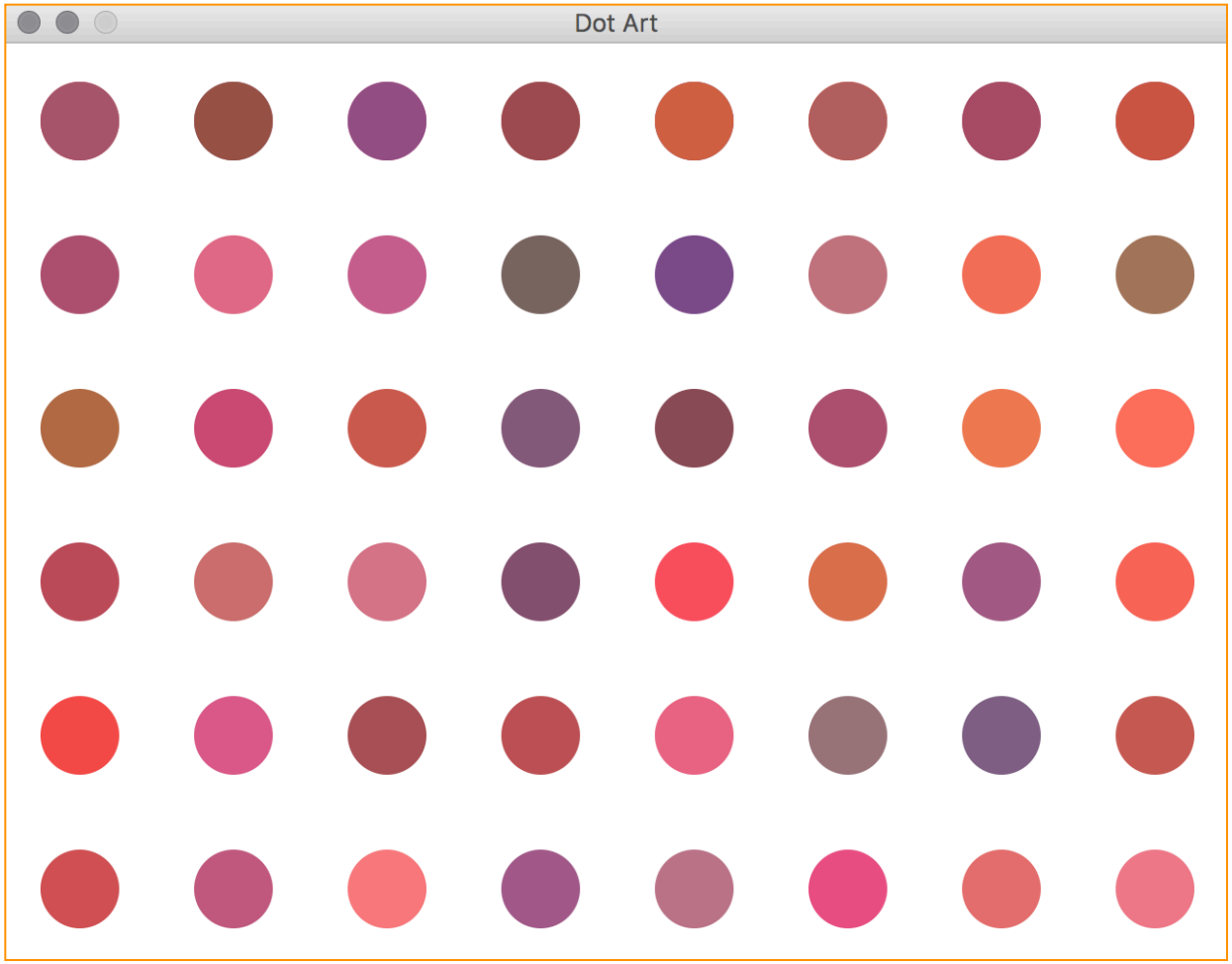
Outline: 4/10

- Examples from Lab 6 and last week
- Review Recursion
- Classes (all this week and next)

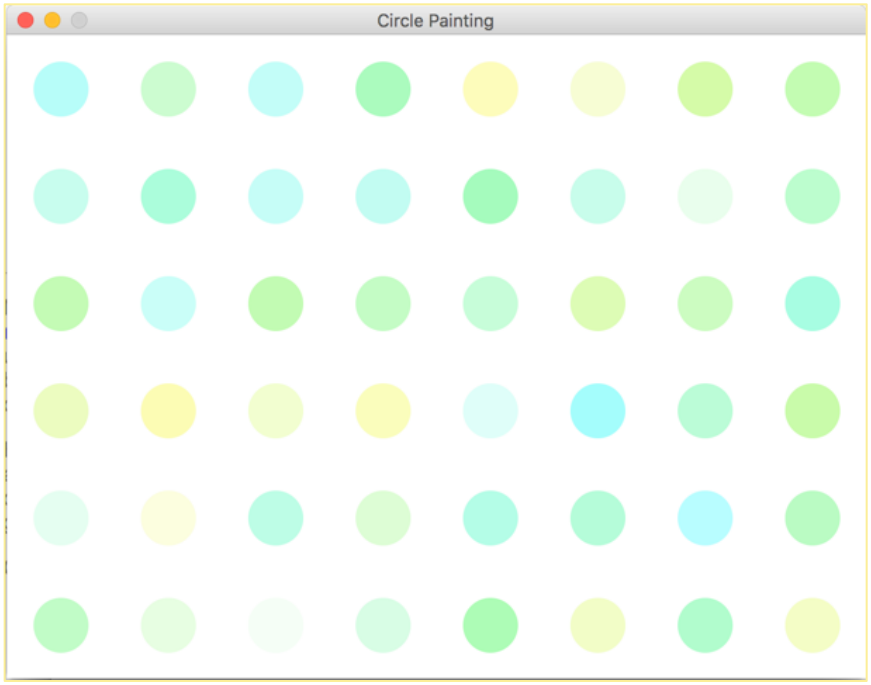
Lab 6 Examples

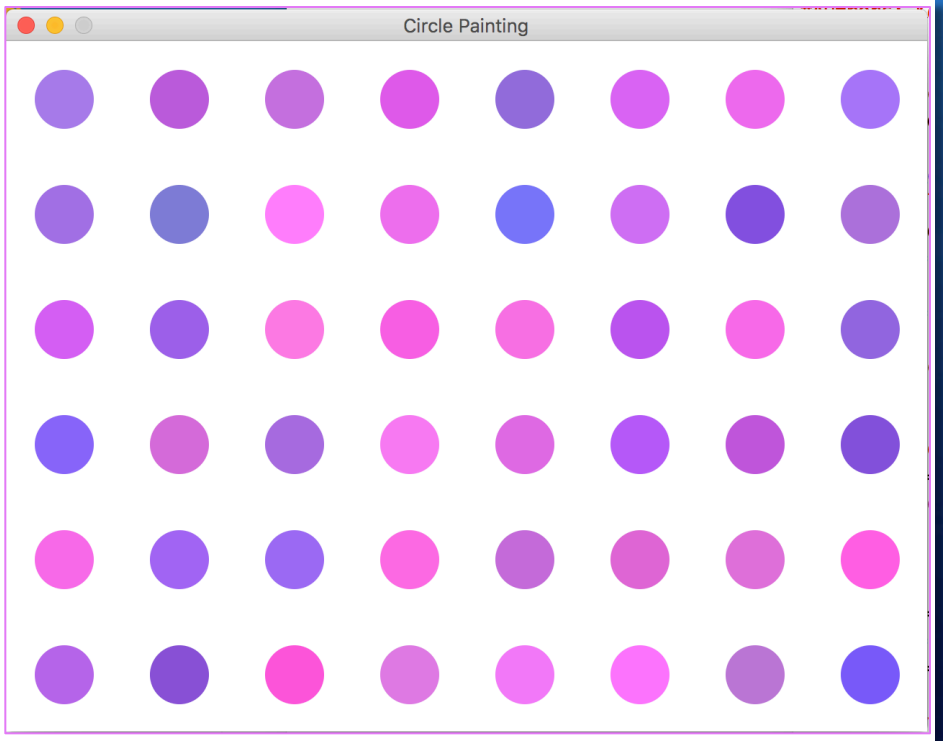
(selected by me)

Part A: Jess and Yingchuan

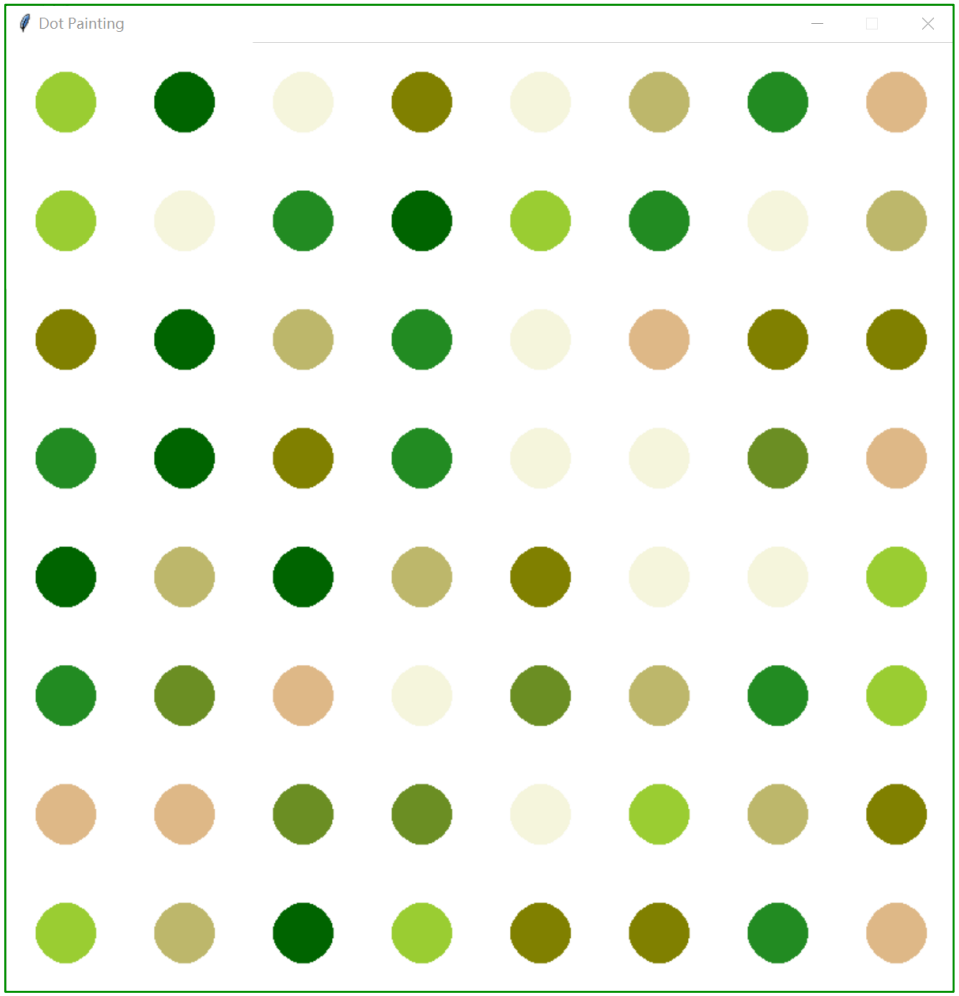


Part A: Caitlin and Katherine

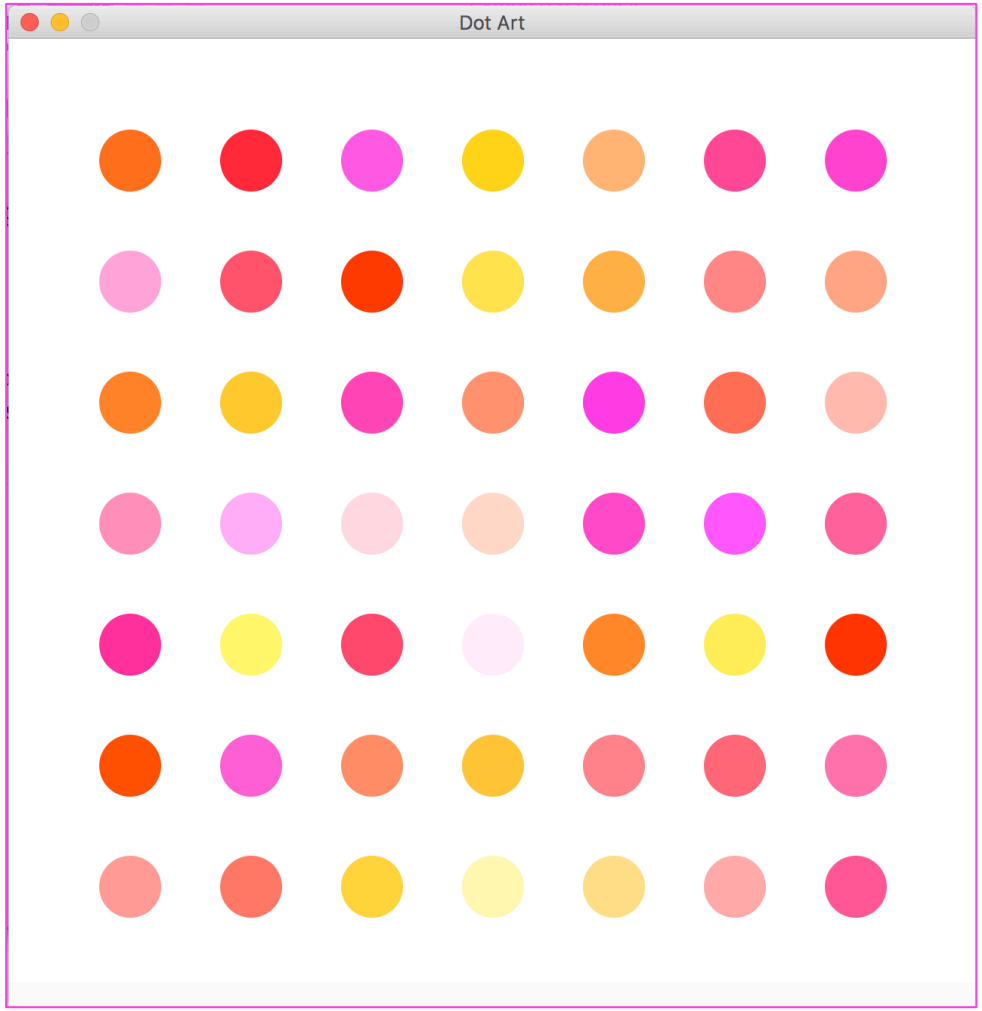




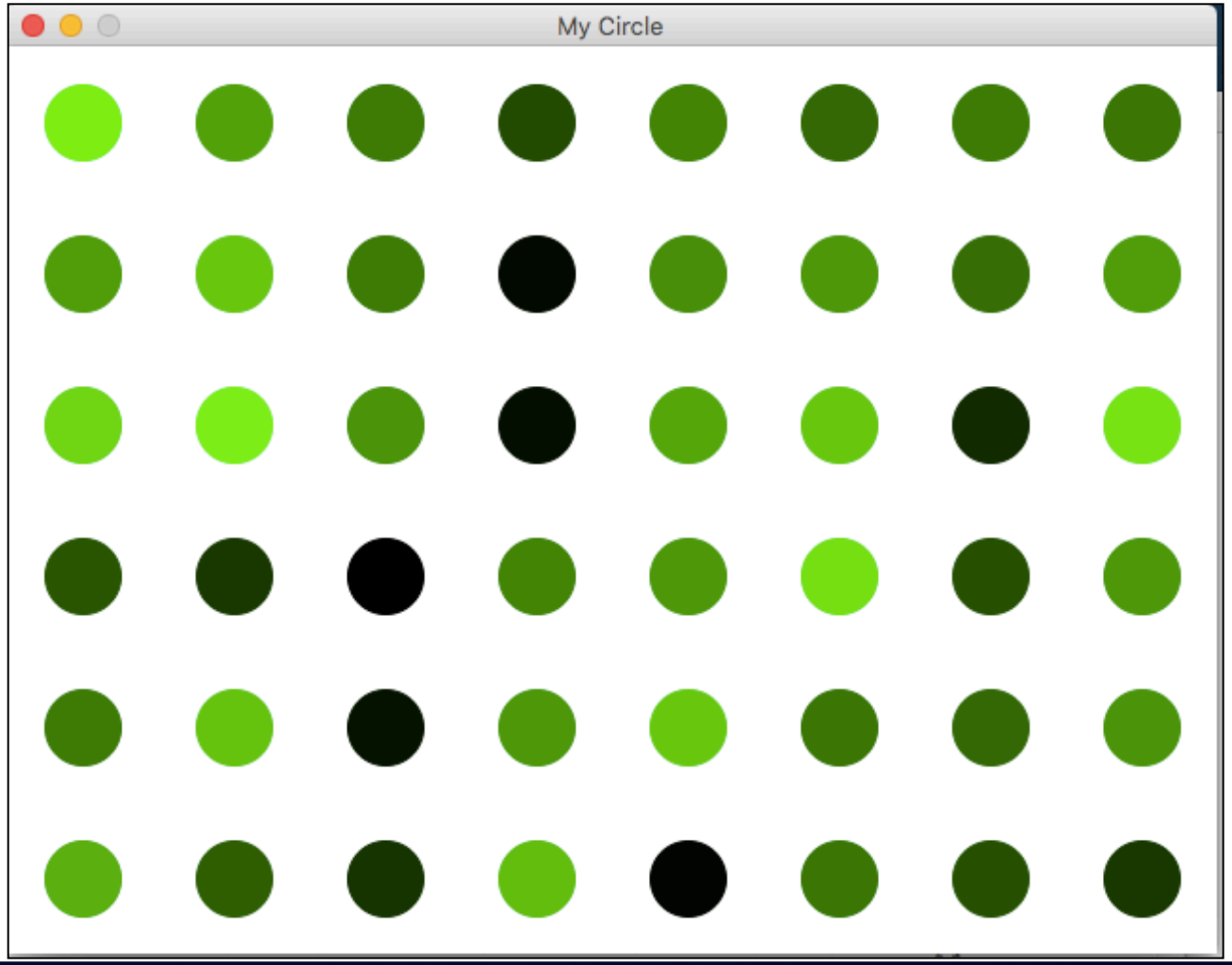
Part A: Ryan and Zhu



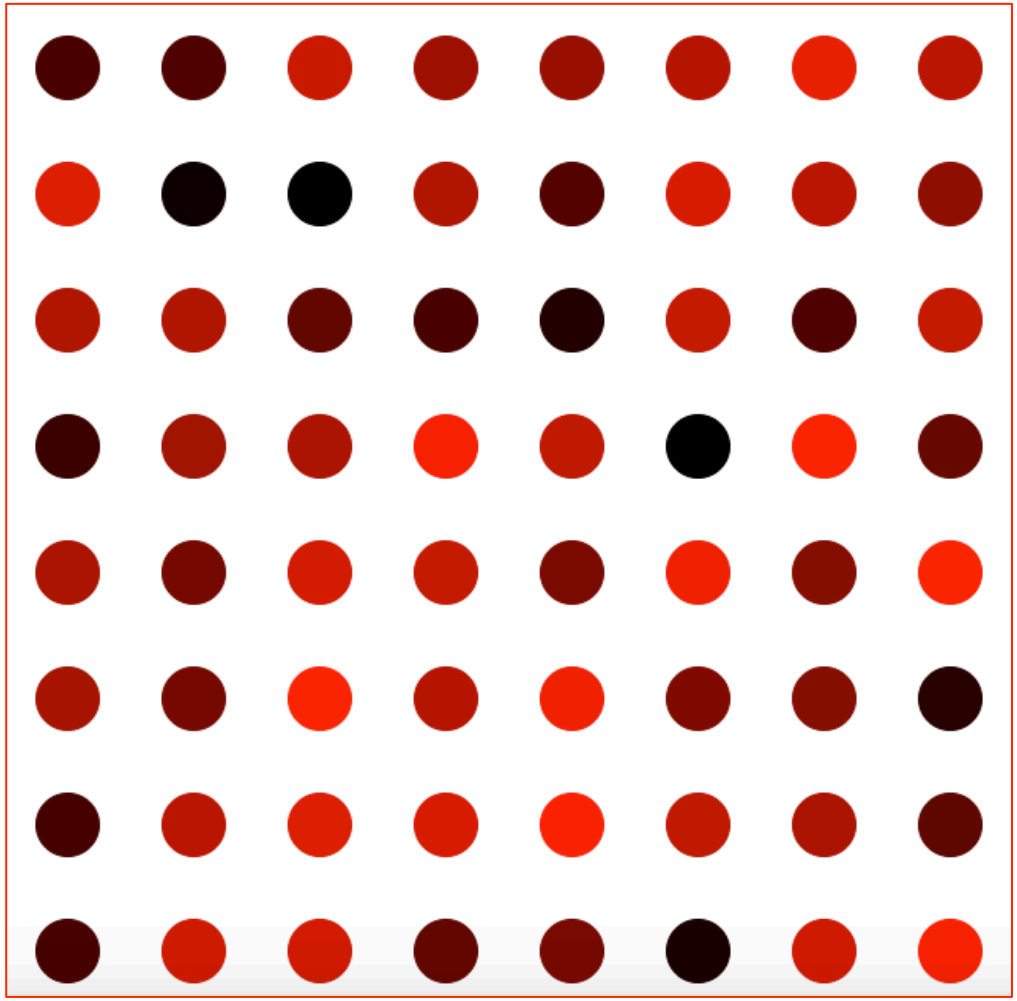
Part A: Sakaiza and Mai



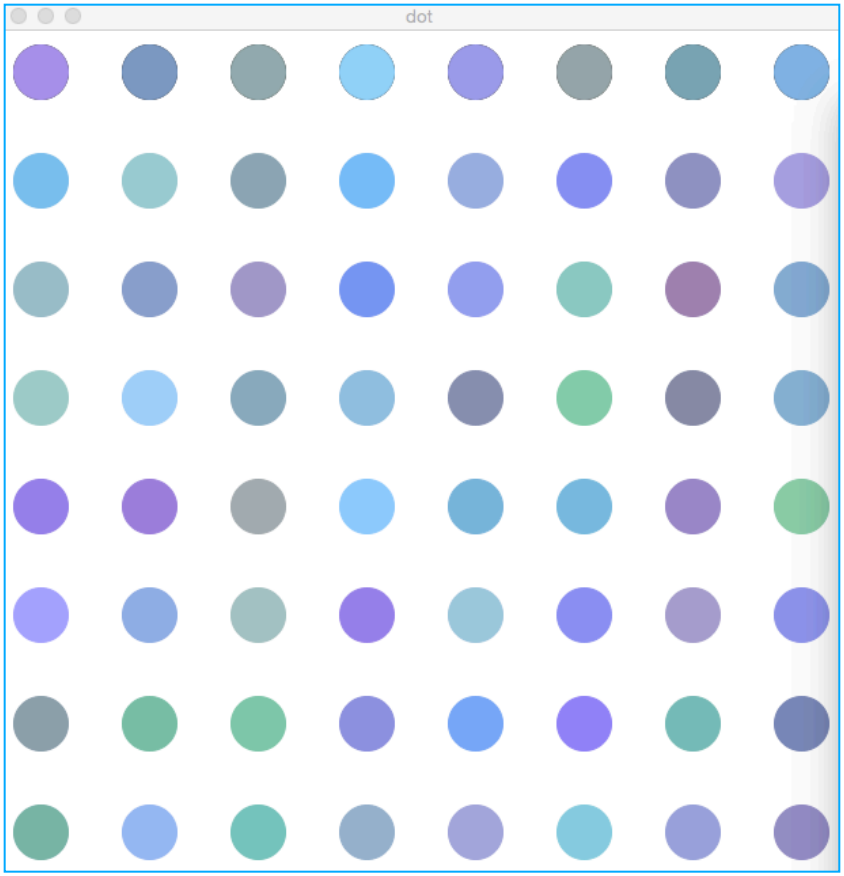
Part A: Ann and Rachel Carr

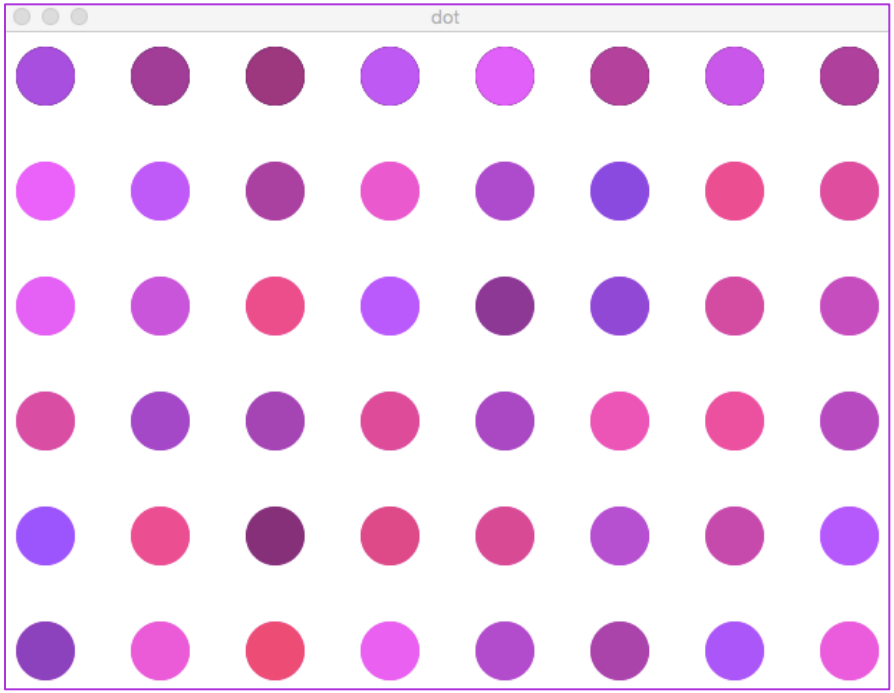


Part A: Kirthna and Shayla

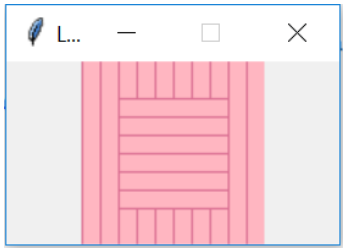


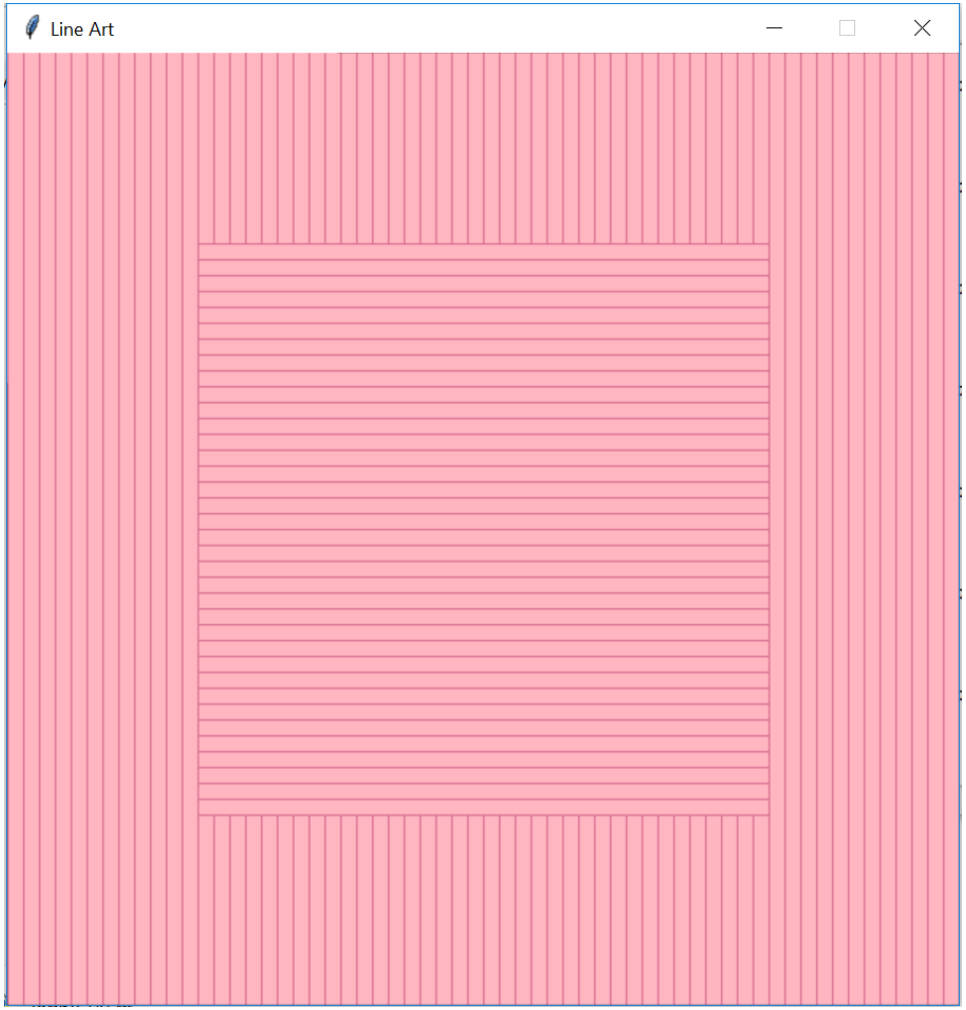
Part A: Stella and Allison



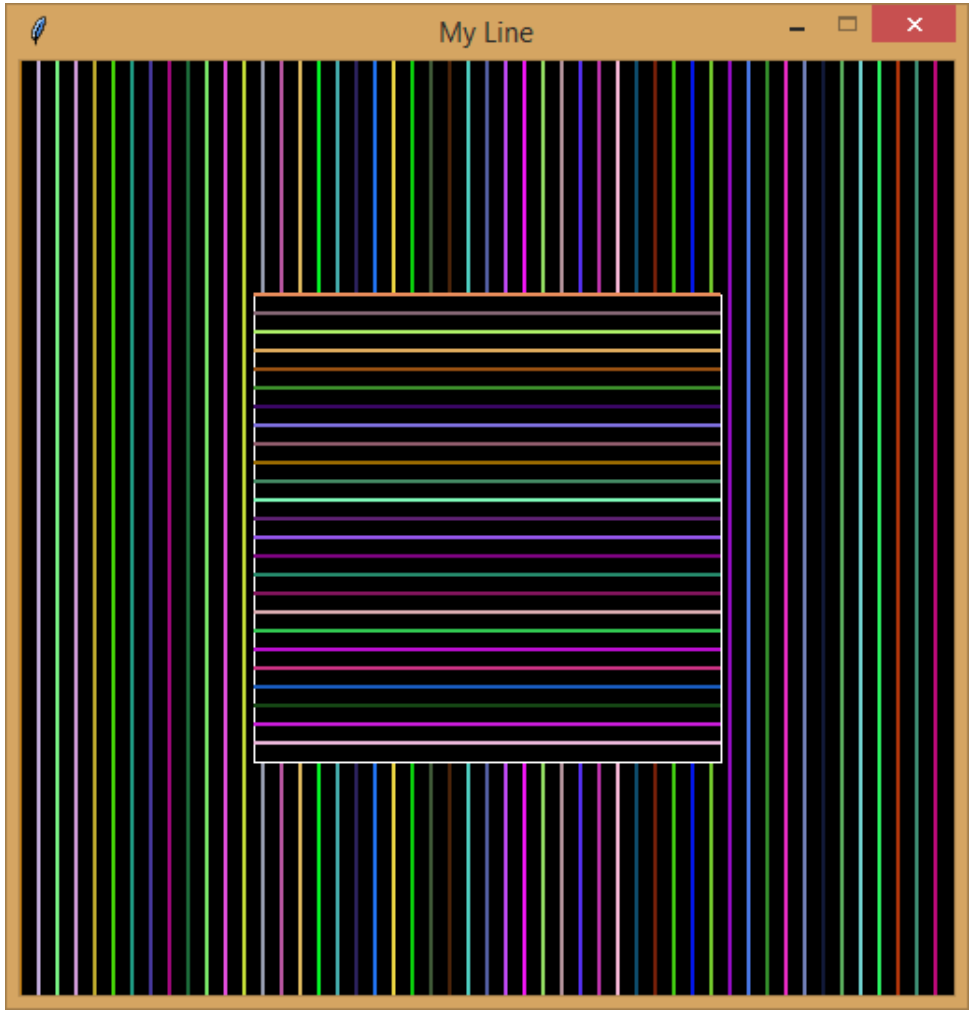


Part B: Erika and Chujun

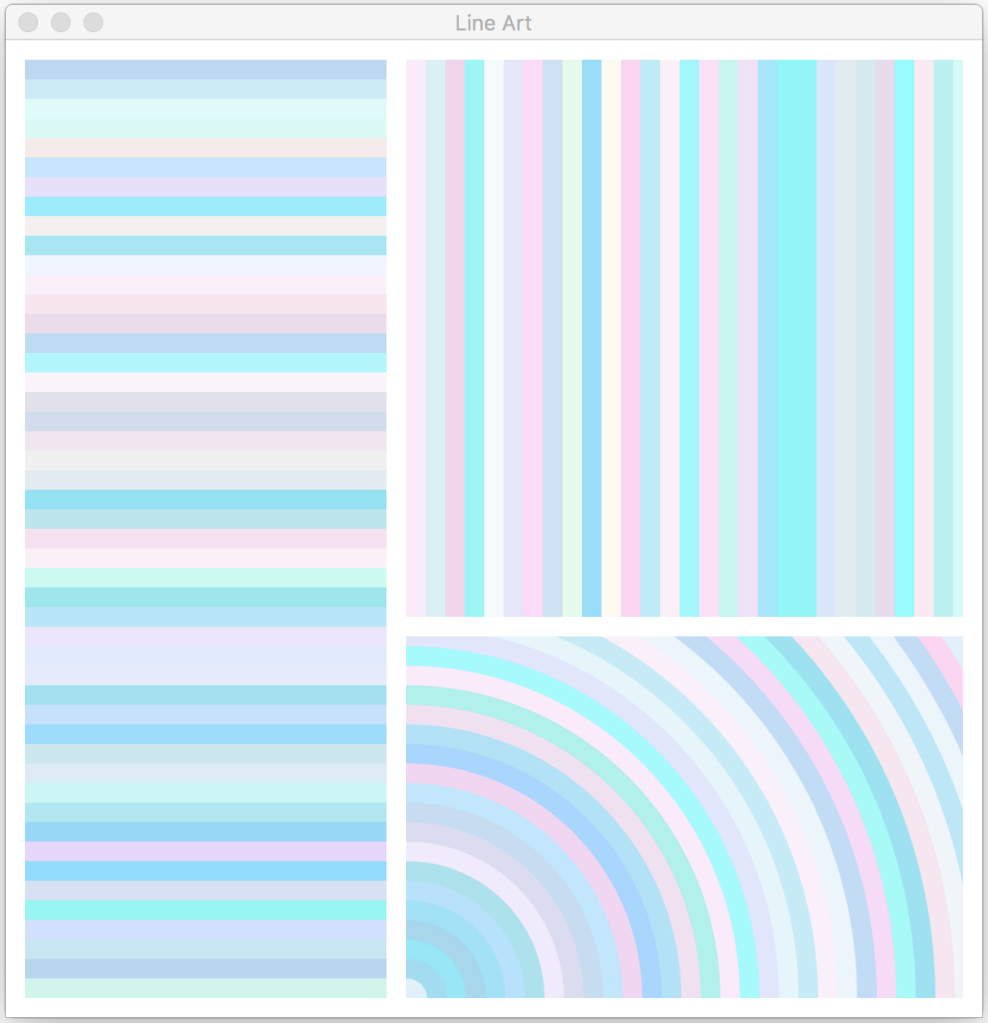




Part B: Shehrbano and Jocelyn Yax

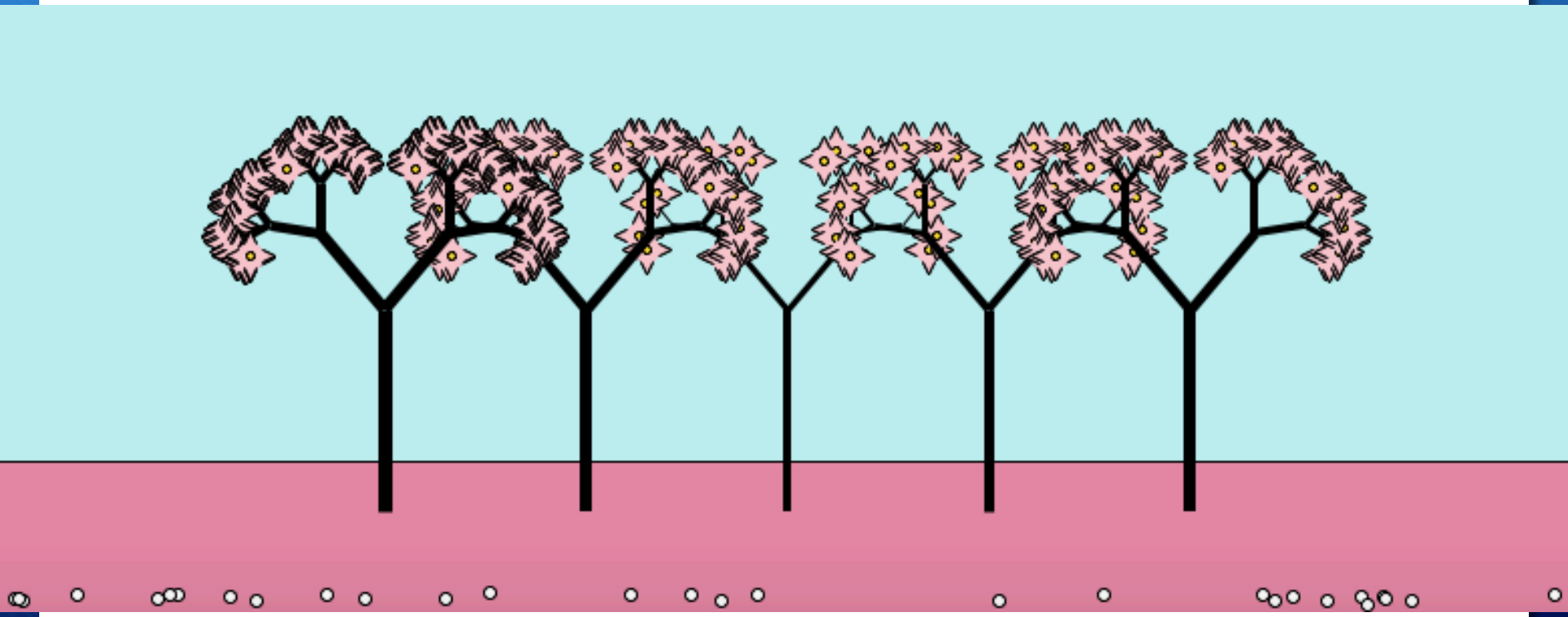


Extensions: Hening

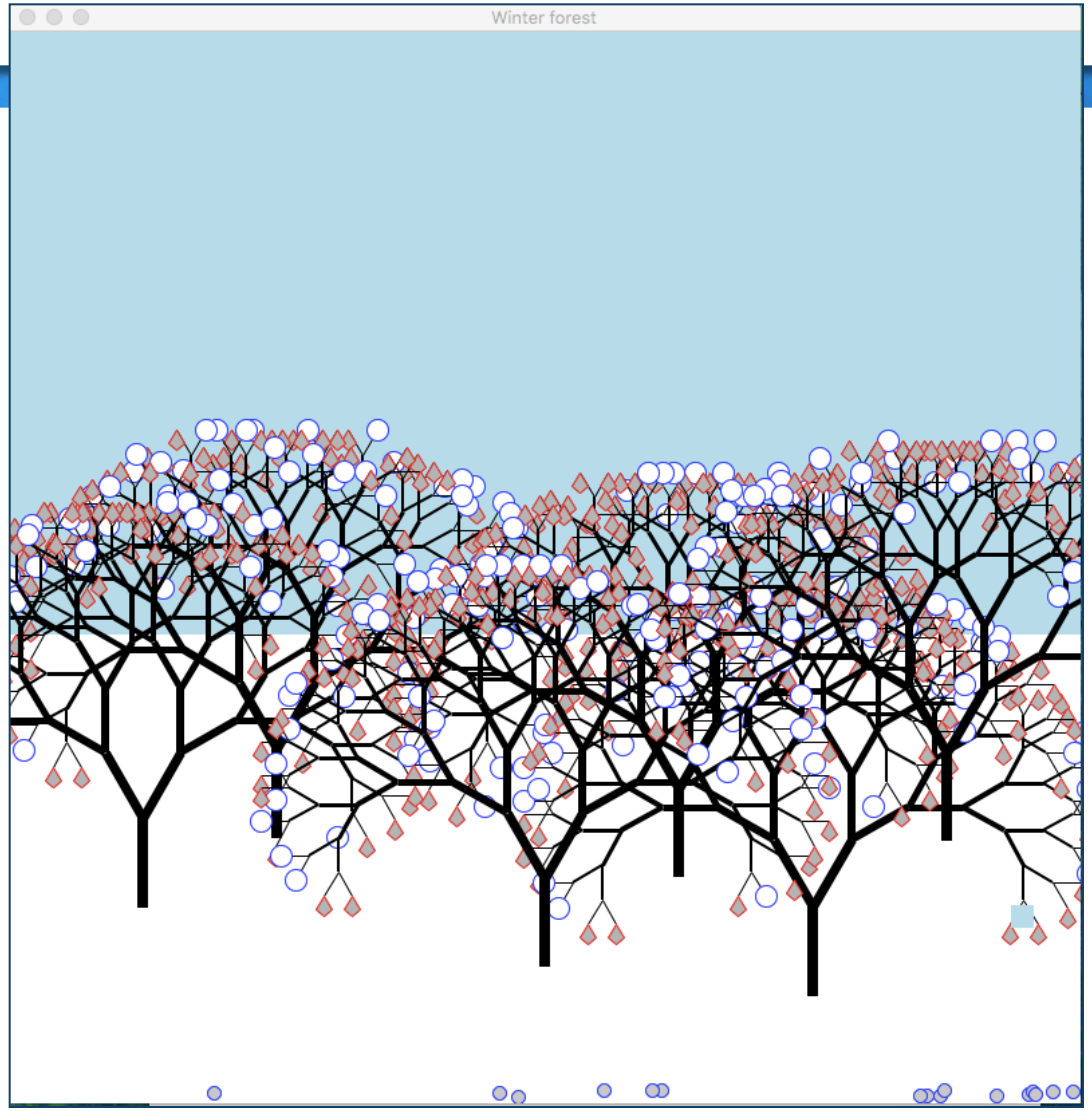


Tree Examples

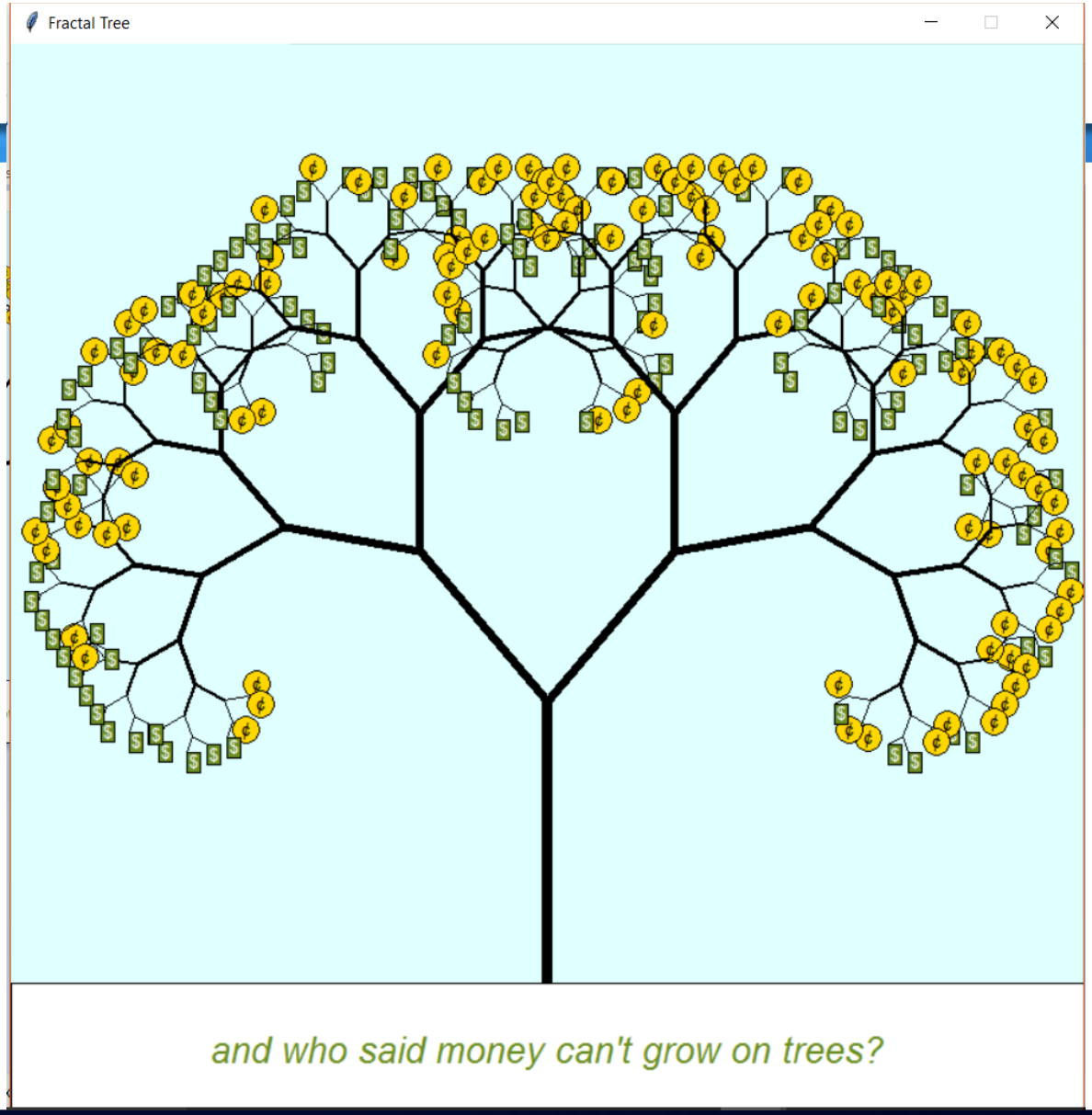
Alejandra



Stefany and Jessica Keast



Kiki and Elise



Recap Recursion

Informal quiz: discuss with a partner

1) The goal in this question is to write a recursive function that will determine whether or not a string is a palindrome. What should the return type be?

2) A student is writing this function and tries out the base case shown below. How would you fix it to agree with (1)?

```
def palindrome(string):

    if len(string) == 0:
        return 0
```

3) Instead of checking whether the string is equal to its reverse, in the recursive case, check whether the first and last characters are equal. If they are not equal, what should be returned? If they are equal, what should happen next?

4) Put (2) and (3) together and write this function in a new file.

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```
def palindrome(string):

    if len(string) <= 1:
        return True
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Live coding

Begin (writing) Classes

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- We can use/modify class instances using *methods*

```
dot.move(dx,dy)
```

Dice example

- Goal: write a class called MSDie, which will construct a multi-sided die.
- What information should be contained in this class? i.e. what should a die "know" about itself?

Nasco: Foam Polyhedral Dice

Dice example

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- What information should be contained in this class? i.e. what should a die "know" about itself?

The number of sides it has, current value (top)

- What actions should we be able to perform with this die?

Roll the die, check the current value, set value

Nasco: Foam Polyhedral Dice

Dice example

- I should be able to do something like this in the shell:

```
>>> die1 = MSDie(6)
>>> die1.roll()
>>> die1.get_value()
2
>>> die1.set_value(5)
>>> die1.get_value()
5
>>>
>>> die2 = MSDie(8)
>>> die2.roll()
>>> die2.get_value()
3
>>> die2.roll()
>>> die2.get_value()
2
```

Live coding

Dice example

```
import random

class MSDie:

    def __init__(self, num_sides):
        self.sides = num_sides
        self.value = 1

    def roll(self):
        self.value = random.randint(1,self.sides)

    def get_value(self):
        return self.value

    def set_value(self, new_value):
        self.value = new_value
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Constructor always defined using __init__. All instance variables assigned.

Dice example

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Three methods, all involve modifying or accessing instance variables.

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All methods and constructor must have "self" as a first parameter.

Dice example

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    def get_value(self):
        return self.value

    def set_value(self, new_value):
        self.value = new_value
```

Whenever we access an instance variable, we must use "self."