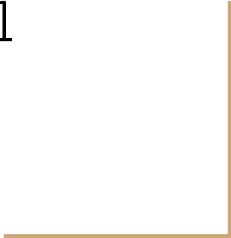


# Programming, Problem Solving, and Algorithms

CPSC203, 2019 W1



# Announcements

Lab this week is laptop setup: Anaconda's Python3 and PyCharm

"Problem of the Day" starts today!

## Today:

Problem Decomposition using Python Classes

POTD

# Classes in Python

Mechanism for creating user-defined types.

Used to identify attributes with an object.

Associates functionality with the relevant objects.

Ex:

```
8  @dataclass
9  class color:
10     """
11     color: simply gathers color components
12     """
13     red: int = 120
14     green: int = 120
15     blue: int = 120
```

# Design Strategies

1. Decompose a problem into classes
2. List the data associated with each class
3. Write the “driver” code that illustrates the functionality you expect from each class.
4. Implement the functions you expect.
5. Run the driver code to test your functionality.

stitches  
short rows  
blocks  
hc

# Demo & Reflection

<https://repl.it/@ckh205/knittingSkeleton>

Review the code we've written and make 3 observations:

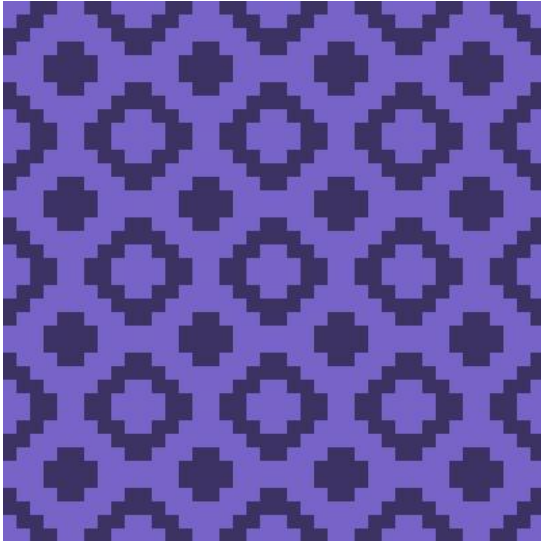
1. Line \_\_: \_\_\_\_\_
2. Line \_\_: \_\_\_\_\_
3. Line \_\_: \_\_\_\_\_

Was our decomposition necessary? Why not just use a 2d array of rectangles?

Abstraction/Encapsulation:

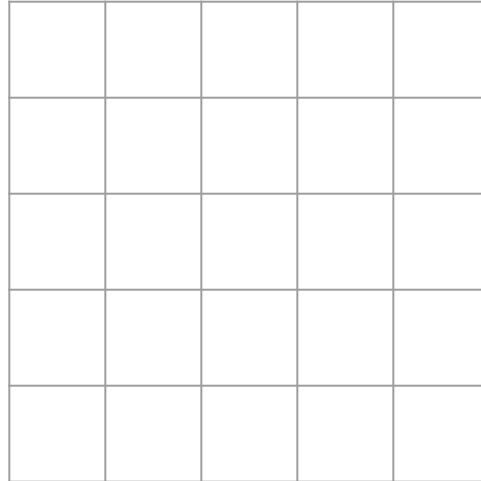
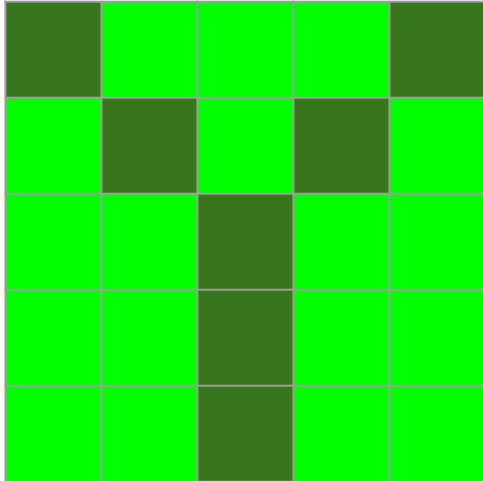
# Adding Functionality

Creating blocks is an arduous task. We'd like a way to make new blocks out of old ones! How many different kinds of blocks are found in this image? How are they related to one another?



# Flip Vertical

Suppose we want to create a new block which is just the vertical reflection of a given block. Sketch the new block. Describe how you would accomplish the flipped block, in terms of the block representation in our code (list of rows).



1.

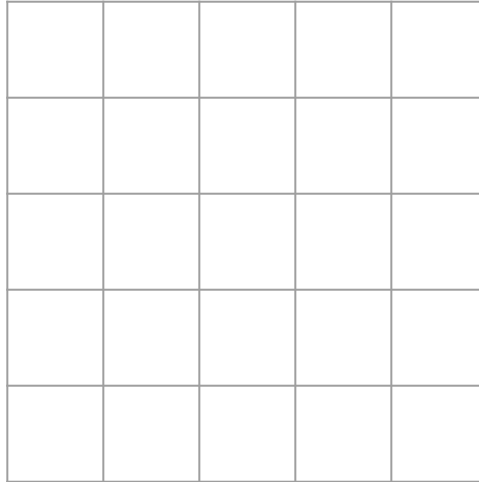
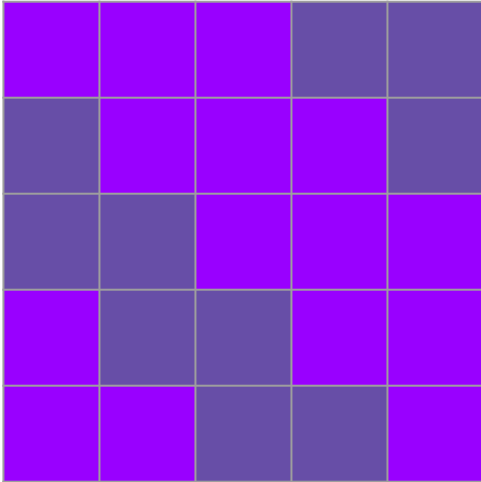
2.

3.

4.

# Flip Horizontal

Suppose we want to create a new block which is just the horizontal reflection of a given block. Sketch the new block. Describe how you would accomplish the flipped block, in terms of the block representation in our code.



1.

2.

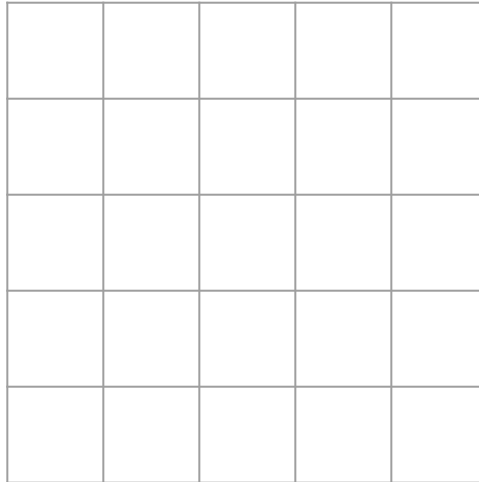
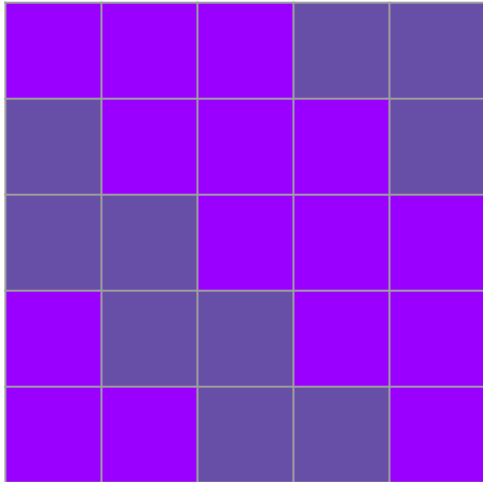
3.

4.



# Rotate 180

Suppose we want to create a new block which is a 180 degree rotation of a given block. Sketch the new block. Describe how you would accomplish the flipped block.



1.

2.

3.

4.

# POTD #1 Thu

<https://repl.it/@ckh205/POTD01>

Describe any snags you run into:

1. Line \_\_\_\_: \_\_\_\_\_

2. Line \_\_\_\_: \_\_\_\_\_

3. Line \_\_\_\_: \_\_\_\_\_

4. Line \_\_\_\_: \_\_\_\_\_

5. Line \_\_\_\_: \_\_\_\_\_

# ToDo for next class...

POTD: Thu demo, Fri practice. Next week for real.

Reading: TLACS Ch 4 (intro to turtle graphics and iteration)

Play: <https://www.google.com/search?q=color+picker>

Adapt: Use today's demo to create a handcraft of your own! Upload your creation to <https://bit.ly/2ly0z8Q> (please make unique file names)

References:

TLACS Ch 17

<https://docs.python.org/3/library/dataclasses.html>