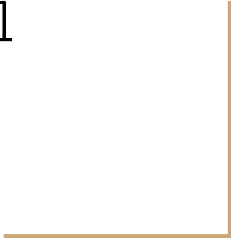
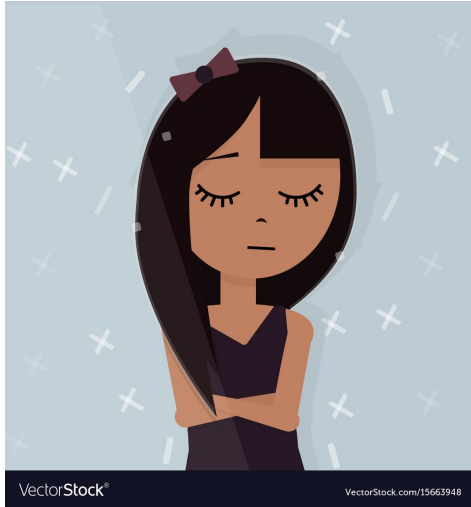


Programming, Problem Solving, and Algorithms

CPSC203, 2019 W1



Our Amazing TAs!



You?

Course Components:

Lectures -- activities based on problem solving and design

Labs -- practical project work.

Projects -- 4 total

POTD -- 50 small assignments

Exams -- 1MT (Oct 24) + Final

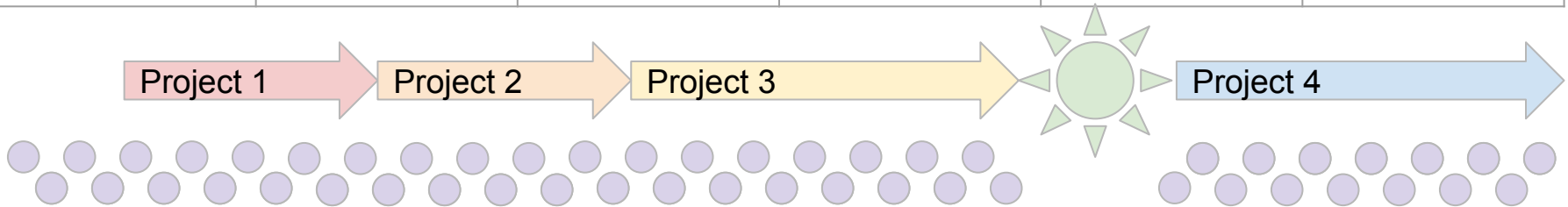
Text -- <https://runestone.academy/runestone/books/published/thinkcspy/index.html> (selections)

Piazza -- <https://piazza.com/class/k05u1pdsrwn121>

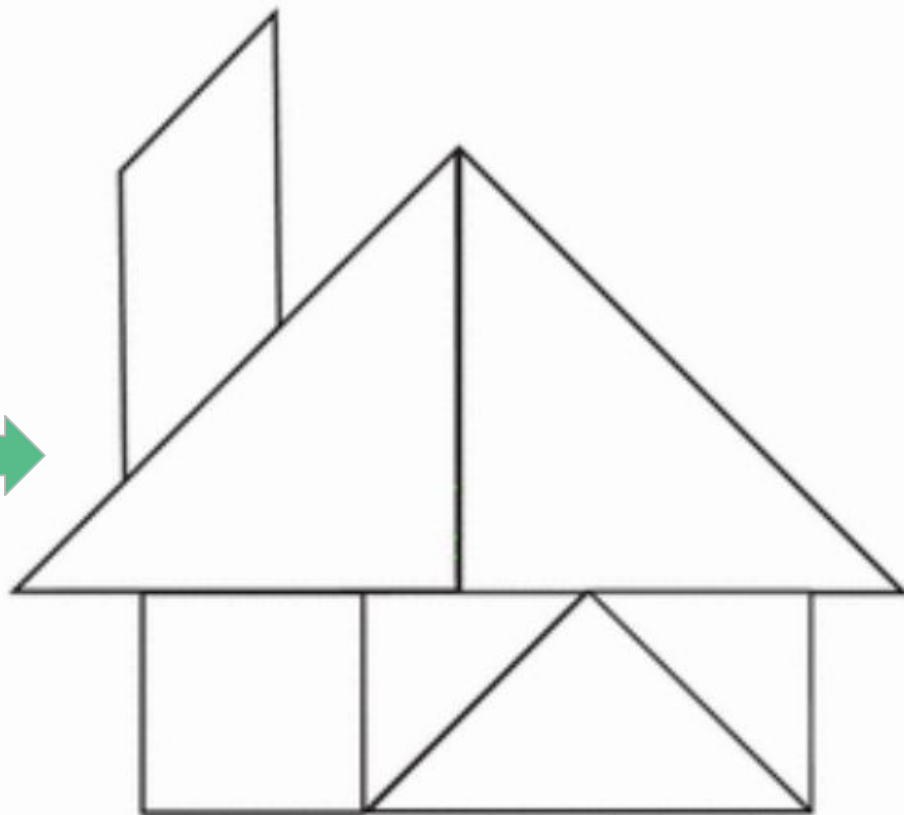
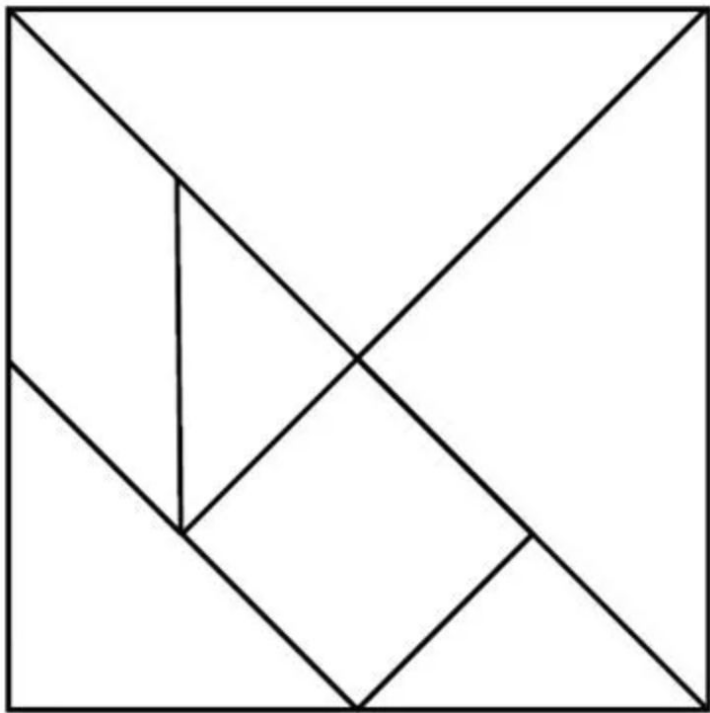
Website:

Semester Overview:

Handcraft	Billboard Hot 100	The Overstory and Pointillism	Artificial Music Composition	Road Trip Planning	Harry Potter's Social Network
Design	Web Scraping	Voronoi Diagrams	Markov Chains	Traveling Salesperson	Natural Language
Objects	Data Frames	Efficiency	Random Numbers	Intractable Problems	Graphs
Iteration	Matplotlib				



Tangrams



Elegance

(5min) Find 2 images, one which exemplifies your definition of elegance, and one which decidedly does not. Upload your images to this directory:

<https://bit.ly/2kgDDL3>

After looking at the images in the drive, write a short definition of the word *elegance*.

Elegance: the quality of being _____

Elegance

How does this apply to the way we solve problems in computing?

I g n i y:

S m l c t :

For further reading:

<https://www.smithsonianmag.com/arts-culture/how-steve-jobs-love-of-simplicity-fueled-a-design-revolution-23868877/>

Handcraft



Knitting

The language used to communicate patterns uses exactly the same fundamental constructs as Python!!

Sherbet Stripes

Notes: Bright, delicious stripes, vertical on the front and horizontal on the reverse side, make this dishcloth a welcome addition to your kitchen. A simple 4 row repeat of slip stitches creates a fun color work effect that is deceptively simple to work but must be done on double pointed needles to allow you to knit from either end of the work.

Slip Stitch Pattern (worked over four rows)

Row 1 (RS): With CC, *S11 WYIB, k1*, repeat between *s until 1 st remains, S11 WYIB.

Row 2 (WS): Slide the work to the other end of the needle and pick up MC to work. *K1, S11 WYIB*, repeat between *s until 2 st remains, K1. Turn work.

Row 3: With CC, *S11 WYIF, P1*, repeat between *s until 1 st remains, S11 WYIF.

Row 4: Slide the work to the other end of the needle and pick up MC to work. *P1, S11 WYIF*, repeat until 1 st remains, P1. Turn.

DIRECTIONS

With MC, CO 33 sts.

K 1 row.

Begin Slip Stitch Pattern and work 11 rep of the 4 row rep. (44 rows of patt.)

Break CC yarn.

K 1 row in MC.

BO all sts.

Finishing

Weave in ends, wash and block to dimensions.



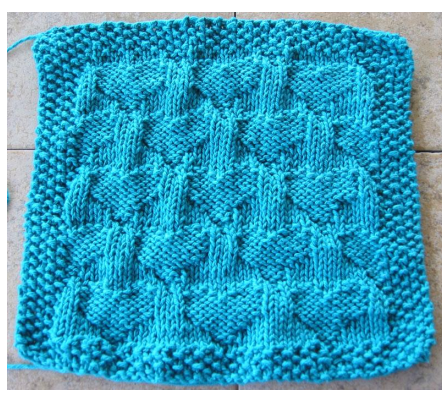
About the Designer

Gillian Wynne Grimm lives in a little white cottage on a tree lined street in Portland, Oregon where she knits, sews and generally enjoys making all manner of crafty and creative things.

Follow along with her adventures at Birchhollowcottage.com.

For pattern support, please contact info@birchhollowcottage.com

Knitting



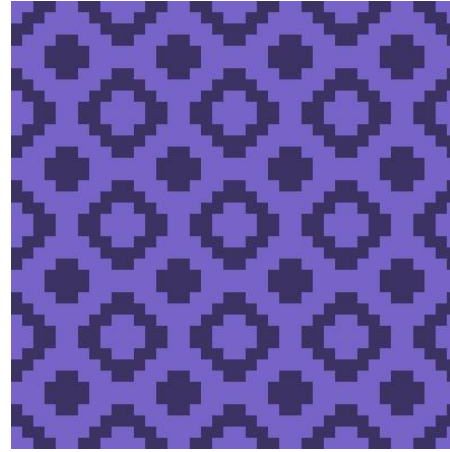
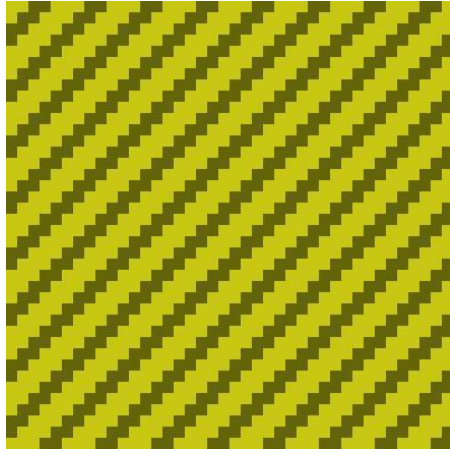
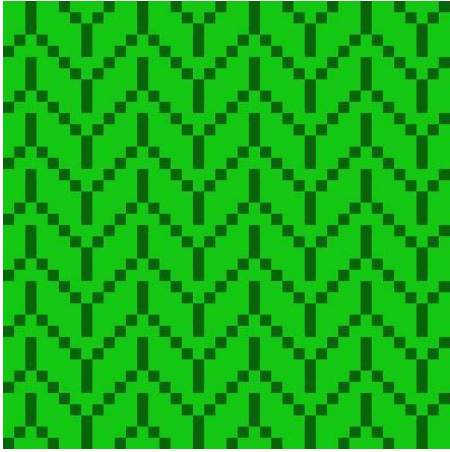
Quantifying the task...

1. If we describe one dimension of a square rag by n , how much work is done by the knitter? _____
2. If we have enough yarn for 36000000 stitches, what is the largest rag we could make? _____
3. If each stitch takes a second, what is the largest rag we could make in one evening? _____
4. If it takes an evening to make a 40×40 rag, how long will it take to make an 80×80 rag? _____
5. If it takes time t to make an n by n rag, how long will it take to make a $3n \times 3n$ rag? _____



General idea: quantify the size of the problem (n) and consider the cost of our task *as that size increases*.

Program Design



A handcraft is a collection of _____, each of which has a _____.

Every _____ is a collection of rows.

Every row is a collection of _____.

Every _____ is either "knit" or "purl."

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
```

Demo & Reflection

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

Review the code we wrote today 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:

ToDo for next class...

POTD: Monday (released 8a)

Reading: 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>

References:

Ch 17

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