

Building Java Programs

Chapter 2

Lecture 2-3: Nested Loops continued

reading: 2.3

How do the following relate to Algebra?

$$b = 2, m = \frac{1}{2} \quad y = mx + b$$

$$(0,3), m = 2 \quad y = mx + b$$

$$(0,2), (4,3) \quad m = \frac{y_2 - y_1}{x_2 - x_1}, \quad y = mx + b$$

$$(1,2), (4,3) \quad m = \frac{y_2 - y_1}{x_2 - x_1}, \quad y - y_1 = m(x - x_1)$$

All the above are linear...

Algebra gives us tools for determining how sets of data relate to each other.

How does the following relate to Algebra?

$$(1,4), (2,3), (3,2), (4,1) \quad m = \frac{y_2 - y_1}{x_2 - x_1}, \quad y - y_1 = m(x - x_1)$$

Do the data reflect a linear relationship?

How can we tell?

- Look at the changes in x ... are they consistent?
 - Yes, increasing by 1
- Look at the changes in y ... are they consistent?
 - Yes, decreasing by 1
- Can we come up with an equation to model this data?
 - Yes! Pick two points and use the point-slope form:

$$P1 = (1,4) \text{ and } P2 = (2,3)$$
$$m = \frac{3 - 4}{2 - 1} = \frac{-1}{1}, \quad y - 4 = -1(x - 1)$$
$$y = -x + 5$$

How does the following relate to Algebra?

* * * *
* * *
* *
*

Row	# *'s
1	4
2	3
3	2
4	1

(1,4), (2,3), (3,2), (4,1)

$$m = \frac{y_2 - y_1}{x_2 - x_1}, y - y_1 = m(x - x_1)$$

Do the data reflect a linear relationship?

- Yes! Can we come up with an equation to model this data?
 - Yes! Pick two points and use the point-slope form
- Actually this is the same as the prior slide!
- We can use our algebra to help with for loops drawing figures!

Homework:

```
  / ** \  
 // ** \  
 /// ** \  
 //// ** \  
 ///// ** \  
+ = * = * = * = * = * = * = * +
```

Consider the nose code for the Rocketship project... (not including +=* line)

1. Each line is comprised of how many groups of characters?
2. How many chars are in each group?
3. Come up with a table for each relating the count of characters in the group to the line number.
4. Use your Algebra to determine an equation relating the count of characters to the line number.