Methods

Oct 23

method definition, parameters, return values, structure

What, Why methods (functions)

- Math: "functions maps an input value of one type (the domain) to an output value of another type (the range)"
  - $f(x) = x^2$
  - Java functions do that and more

- Why
  - Repetition
  - Readability
  - Re-use
  - Revisability
  - Break down task into set of smaller tasks (which helps get the 4 r's)

Defining a method

- 2 Parts
  - Header/signature
    1. Modifiers: public, static
    2. Return type
       1. void
       2. other than void
    3. Name
    4. Parameters: type and name
- Body
  - Local variables
  - Local actions
  - Return statement (may be optional)

Fun With Functions

part 1

- You have a program ...
  - want to find the max of 3 integers
  - idea -- put the max finder into a method
  - Neat trick:
    - you do not need to know how to implement the method, all you need to know is what goes into the signature line
    - For the user of the functions viewpoint, all they need to know is that signature line.
  - So, what does it look like
    - give it the name max3

Fun with Functions

part 2, the main method

- Write the main function that will use max3
  - Get 3 integers from command line
  - call max3
    - save result
    - print

Fun With Functions

part 3, max3

- Begin at the end, return!
  - since the function has a non-void it must have return
  - I usually create a variable "rtn" that will hold the value to be returned
  - Then put in a return.
    - This will compile!!!!
    - Simpler but still compile?
      - Sometime VSC will do this much for you
- Now all I need to do is really write the body!

```
public static int max3(int i1, int i2, int i3) {
  int rtn = 0;
  return rtn;
}
```

Primes

- A prime number is one that is evenly divisible by only itself and one.
  - put alternately the remainder when divided by any integer smaller than itself (except 1) is not equal to 0.

- Write a program to determine which of the numbers in 1..100 are prime?
  - Could do this all in main, but lets do it with a method named "isPrime"
    - What are the parameters?
    - What is the return?
    - Signature?

- Control flow within this program

Chalkboard

Factorial

- Write a program that takes one positive integer input
- The program has a method named factorial that takes one integer parameter and returns an integer.
  - the integer returned is the factorial 4! = 4*3*2*1
- The main method calls the factorial method and prints the result.