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!

```java
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
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 $4! = 4 \times 3 \times 2 \times 1$.

The main method calls the `factorial` method and prints the result.