Class Variables and Methods

- Java class variables and methods are identified by the static keyword. We’ll also look at some examples for class methods in the Java Math class.

- The static keyword can be put on the element of a class to say that it belongs to the class itself, rather than to individual objects. We can do this with variables (the data) and with methods.

-Class variables: most of the data we define in a class has one copy per object. Our SavingsAccount objects each have their own balance. A student would probably have it’s own name, and each different Student object would have their own name.

- But on rare occasions its valuable to have a variable that belongs to a class. This means there will only be one copy of that data item. We don’t access this class variables using the object reference because there is no object. Instead we use:

ClassName.variableName

- The System class is a class variable. We’ve used System.in and System.out.

- In addition to the class variables, we can have class methods. These are methods that can be used by calling the ClassName. Most of our methods use object data. For our SavingsAccount.getBalance( ) it returns the account balance. And with withdraw and deposit modify that balance.

- Our class methods don’t have access to our object data. They can operate on any class variables, but mostly they just operate on parameters.

We can recognize class variables and methods by:

A. their location in the documentation

B. their location in the class definition

C. the use of the keyword static

D. the use of the keyword class

- So a prototypical example of using static or class methods is the Math class. This is the class Java provides to do math beyond simple arithmetic. All of these functions don’t need object data to operate on. We give the methods the data we need the class to perform the operation on and then it gives back the result.

Examples of Math Class Methods:

Static int abs( int num )

-Returns the absolute value of num (also exists for float, double, and long).

int diff = Math.abs( num1 – num2 );

Static double pow( double base, double exponent);

-Returns base to the power of exponent.

double result = Math.pow( 2, 10 );

2^10 = 1024

Static long round( double num )

-Returns the closest long to the double with the ties rounding up.

long result = Math.round(myDouble);

Static double sqrt(double num)

-Returns the square root of num

double result = Math.sqrt(myDouble);

The methods in the Math class operate primarily on

* A .the fields, or instance variables, of Math class objects
* B. data passed as parameters to the methods.