Assigned: Tuesday 1 February 2010
Due: Tuesday 8 February 2010

Collaboration: This homework assignment is to be completed individually.

Submission: Follow the instructions for submitting programs via P-Web and handing in a printed copy.

Place your implementations of the following methods in one class called Basics.java. For each method, called say $foo$, write a method $void$ $testFoo()$ that runs several test cases of the method. Then, in $main$, call each of your test methods. Write Javadoc documentation for your methods.

1. Implement a method called $isMultiple$ that takes two $long$ variables $a$ and $b$ and returns $true$ only if there is some integer $i$ such that $a == b * i$.

2. Implement a method called $isOdd$ that takes an $int$ variable $i$ and returns $true$ if $i$ is odd. You cannot use the * (multiplication), % (modulus), or / (division) operators.

3. Implement a method called $oddSumTo$ that takes an $int$ variable $n$ and returns the sum of all positive odd numbers less than $n$.

4. Implement a method called $isOddProd$ that takes an array of $int$ values and returns $true$ if any pair of numbers in the array has a product that is odd.

5. Implement a method called $allDistinct$ that takes an array of $int$ values and returns $true$ if no two elements have equal values.

6. Implement a method called $reverseArray$ that takes an array of $String$ values and reverses their order in the array.

7. Implement a method called $readBoolean$ that takes an $InputStream$ (e.g., System.in, a FileInputStream) and reads one line, returning a reasonable boolean interpretation of the result (e.g. $true$ for “y”, “Yes”, “T”, etc., and $false$ for “n”, “False”, “F”, etc.). If no reasonable interpretation can be made, throw a java.util.InputMismatchException with an appropriate message. Document and justify your choice for handling any other exceptions.

Acknowledgments Problems 1-6 adapted from M. T. Goodrich and R. T. Tamassia’s Data Structure & Algorithms in Java, 4/e (Wiley, 2005), §1.10.