TEACHER’S GUIDE

# Boolean Algebra and Loop Boundaries

**OBJECTIVES:** The student will write negations of Boolean assertions.

The student will use DeMorgan's Laws to solve Boolean algebra problems.

The student will establish post condition assertions for conditional loops.

The student will build boundary conditions for conditional loops using assertions and DeMorgan's Laws.

**ACTIVITIES/TIME:** Half Week

**MATERIALS:** Student Lesson A14: *Boolean Algebra and Loop Boundaries*

Handout A14.1, *Craps.java*

Worksheet A14.1, *Boolean Algebra*

Lab Assignment A14.1, *Rolling*

Teacher’s Guide, Lesson A14: *Boolean Algebra and Loop Boundaries*

Worksheet A14.1 - *Answer Sheet*

Lab Assignment A14.1 – Answers, *Rolling.java*

Code from Lesson A14 *- Craps.java*

**REFERENCES:** **Boolean Algebra at Wikipedia**  
<http://en.wikipedia.org/wiki/Boolean_algebra>

A full resource center for Boolean Algebra.

**INSTRUCTOR**

**NOTES:** One of the more difficult tasks for students to master is the development of conditional loops because of the Off By One Bug (OBOB). In Lesson A12, *Iterations*, students were taught the syntax of loops and some initial strategies to develop correct loops. This lesson presents the additional tools of Boolean Algebra and loop post condition assertions to help develop correct conditional loops.

These tools will be developed in a logical and orderly fashion and the payoff is a more disciplined system of constructing loop boundary conditions. The material is presented at this point in the curriculum because students will begin developing more complex algorithms involving data structures and conditional loops.

**WORKSHEET**

**NOTES:** Worksheet A14.1, *Boolean Algebra* gives students some practice using basic Boolean Algebra and some applications of DeMorgan's Laws.