CSE 305 Programming Languages Spring, 2005
Homework 8
Maximum Points: 18
Due 9:00 am, Monday, April 4, 2005

Professor Shapiro

March 28, 2005

Write the answers to this homework set into a file named `hw8`, and submit it using the `submit` script, by the date and time shown above.

1. Do the following parts of exercise 7.9 (page 315-316) of the text. Instead of superscripts, write the integer to indicate order immediately after the right parenthesis. For example, the answer to

   ```
   a + b * c + d
   ```

   would be written as

   ```
   ((a + (b * c)1)2 + d)3
   ```

   (a) (3) `a * (b - 1) / c mod d`
   (b) (3) `-a or c = d and e`
   (c) (3) `a > b xor c or d <= 17`

2. (3) Fortran is one of the few current languages that has an operator (**) for exponentiation. What is printed by the following Fortran program? (Programs compiled by f77, f90, and f95 print the same number.)

   ```
   Program exptest

   Integer i, j, k

   j = 2
   k = 4

   i = j ** 2 ** k - 1

   Print *, i

   End
   ```

3. (3) The text says that, "C++, Java, and C# allow conditional targets on assignment statements"[1], but our course notes say that "neither our Java compiler nor our BeanShell allowed it"[2]. Include in your `hw8` file a C++ program and its run to show whether or not the `CC` compiler allows the conditional target.

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[1]*Sebesta*, p. 310.
[2]`http://www.cse.buffalo.edu/~shapiro/Courses/CSE305/2005/notes8.html`

4. (3) To see the benefit of short-circuit evaluation, run the following Java program

```
public class ShortCircuitTest {

    public static boolean isIn(int x, int[] a) {
        int i=0;
        for (i = 0; i < a.length & a[i] != x; i++){}
        return i < a.length;
    }

    public static void main(String[] args) {
        int[] a = {2,4,6,8,10};
        int i = 7;
        if (isIn(i,a)) {System.out.println("Yes");}
        else {System.out.println("No");}
    } // end of main()

} // ShortCircuitTest
```

which you can find in `/projects/shapiro/CSE305/ShortCircuitTest.java`. Analyze for your-self the reason this program throws an exception. Recall that Java has both the short-circuiting operators `&&` and `||`, as well as the non-short-circuiting operators `&` and `|`. Convince yourself that if you simply change the `&` to `&&` in `isIn`, the program will work.

Rewrite the method `isIn` so that it runs correctly **without using the short-circuiting operators.** Make as small a change in the program as you can. (My version has exactly the same statements as the original—just some different expressions.) Submit both your program and the record of its compilation and run.