

## IST687 – Activity 1: Boolean Logic

Write a piece of R code that you could use to teach a seven-year-old child about Boolean logic. If you have never encountered Boolean logic before (sometimes it is called Boolean algebra), you will have to look it up to discover the three essential operations (AND, OR, NOT) and how they work. In addition, you will have to discover the “operators” (i.e., the special punctuation marks) that R uses to represent Boolean operations.

For example, here is a single line of code (and the response from the R-console in bold) that represents one of the two possible outcomes of the AND operator:

```
> # This line shows the Boolean AND function at work
> 1 & 1
[1] TRUE
```

Take note of several important aspects of this example: 1) It has a comment that explains a little bit of what is going on (all of the stuff after the # character); 2) it needs more comments if it is going to be helpful to a seven-year-old; and 3) more lines of code are needed to demonstrate the other outcome of AND, as well as all of the outcomes of OR and NOT. Keeping your seven-year-old in mind, write and submit the rest of the code and comments.

Then use these conditional statements within an if statement, to print out the expected logic. For example:

```
> # show the use of an 'if' statement - that 1&1 is true
> if( 1&1 ) print("1&1 is true") else print("error somewhere")
```

### Learning Goals for this activity:

- A. Making sure that you have R running properly on your computer.
- B. Familiarity with the command line (console) interface of R.
- C. Understanding of the foundation of “conditionals” in programming: Boolean logic/algebra.
- D. Developing informative commenting practices.

### Essential Guide for All IST687 Activities (appears at the end of all activity guides)

1. All IST687 activities work on what some people call a “constructivist learning” model. By developing a product on your own, testing it to find flaws, improving it, and comparing your solution to the solutions of other people, you can obtain a deeper understanding of a problem, the tools that might solve that problem, and a range of solutions that those tools may facilitate. The constructivist model only works to the extent that the student/learner has the drive to explore a problem, be

frustrated, fail, try again, possibly fail again, and finally push through to a satisfactory level of understanding.

2. Each IST687 activity builds on skills and knowledge developed in the previous activities, so your success across the span of the course depends at each stage on your investment in earlier stages. Take the time to experiment, play, try new things, practice, improve, and learn as much as possible. These investments will pay off later.
3. Using the expertise of others, the Internet, and other sources of information is not only acceptable - it is expected. You must ***always, always, always*** give credit to your sources. For example, if you find a chunk of code from r-bloggers.com that helps you with developing a solution, by all means borrow that chunk of code, but make sure to use a comment in your code to document the source of the borrowed code chunk. The discussion boards in the learning management system have been setup to encourage appropriate sharing of knowledge and wisdom among peers. Feel free to ask a question or pose a solution on these boards.
4. Building on the previous point, when submitting code as your solution to the activity, the comments matter at least as much, if not more than the code itself. A good rule of thumb is that every line of code should have a comment, and every meaningful block of code should be preceded by a comment block that is just about as long as the code itself. As noted above, you can use comments to give proper credit to your sources and you can use comments to identify your submission as your own.