CS 278
Lab2: Logical connectives

Due: Thursday 9/6 by 11:30pm

Part 1

Implement the four fundamental logical functions:

1) the negation *not* (denoted $\neg$),
2) the disjunctive function *or* (denoted $\vee$),
3) the conjunctive function *and* (denoted $\wedge$),
4) the implicative function *implies* (denoted $\Rightarrow$).

The connectives are explained in the textbook. You need to write a method for each corresponding logical function. The input and output values for each of these functions should be characters 'T' or 'F'. (If you are using Java, then you need to write four methods, one for each of the four logical functions).

Part 2

Write a program which would do the following.
It should prompt the user to enter truth-values of propositions p, q, and r.
Then, it should compute truth-values of the two compound statements listed below, using the functions you implemented in Part 1.

Statement 1: $(\neg p \Rightarrow q) \wedge (r \Rightarrow p)$
Statement 2: $(p \vee (\neg q)) \wedge (r \vee \neg (p \Rightarrow q))$

Notice that your program needs to compute truth-values only of these two statements (statement 1 and statement 2). It has to use methods from Part 1 to do it. For instance, if the names of the methods for negation, disjunction, conjunction and implication are *neg*, *disj*, *conj*, *impl*, respectively, then the truth value of the first statement can be computed using nested function calls like the following:
conj(impl(neg(p), q), impl(r, p)).

An output produced by your program may look like the following:

```
_____________________________________
Please enter truth-value of p: T
Please enter truth-value of q: F
Please enter truth-value of r: F

Truth-value of statement 1 is T.
Truth-value of statement 2 is T.
_____________________________________
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Note: The input and output values for the methods implementing function from Part 1 should be of type char (to hold characters 'T' or 'F'). If you use boolean type values or numbers (0 and 1), then you will lose some points.

What to submit:

- Submit the source code of your program using Canvas.
- If you write your program in a programming language other than Java, then submit instructions on how to compile and run your program on CS machines.