MAT2440 Module 2 – Boolean variables and logical operators.

Objectives: Understand how Boolean values and logical operators work in python.

1. Create a new trinket titled "2440 Module 2" to begin today's activities. Type all of today's work into this trinket.

2. Basics:

   (a) A Boolean variable is either true or false. In Python, these are written in the following way:

   ```
   p = True
   q = False
   ```

   (b) Boolean values appear when doing comparisons. Try the following:

   ```
   print 3 == 2
   print 3 > 2
   ```

   (c) Boolean values also determine the behavior of if/else statements and while loops.

   ```
   i = 0
   while i < 10:
       print i
       i += 1


   if True:
       print 'Hi!'
   else:
       print 'Bye!'
   ```

3. Operators:

   (a) The negation operator:

   ```
   not p
   ```

   (b) The AND operator:

```
p and q
```

(c) The OR operator:

```
p or q
```

4. Write code to do the following:

(a) With p true and q false, compute the truth value of the following:

    i. $p \lor q$

    ii. $p \to q$ (Hint: There is no conditional operator, so use an equivalent form)

    iii. $(p \to q) \land \neg q$

    iv. $p \to (q \land \neg q)$

(b) Use the following trinket

$$\texttt{https://trinket.io/python/177455c243}$$

that constructs truth tables for the following problems:

    i. Construct a truth table for $\neg p \lor q$.

    ii. Construct a truth table for $(p \lor q) \lor r$.

    iii. Construct a truth table that shows that $\neg(p \lor q) \equiv \neg p \land \neg q$.