CSC165 tutorial exercise #1
fall 2014
sample solutions

Exercises

1. Suppose you have a collection of three python programs **q1.py**, **q2.py**, and **q3.py** that claim to solve the same problem, and three test suites **t1**, **t2**, and **t3** that are supposed to test them. Suppose you know that **q1.py** passes all three test suites, **q2.py** fails all three test suites, and that **q3.py** fails **t3** but passes the other two. You have a colleague who tends to make sweeping statements, without proof (below). For each statement, say whether it is true or false, and which test would need to be run on which program to verify your claim (the smallest number of combinations possible of program/test suite.). Justify your answer.

   (a) All three python programs pass all three test suites.
   False, test q2.py on t1

   (b) Some of the three python programs pass all three test suites.
   True, test q1.py on t1, t2, and t3

   (c) All three python programs don't pass all three test suites (that is, each fails at least one test suite).
   False, test q1.py on t1, t2, and t3

   (d) Some of the three python programs don't pass all three test suites (that is, they fail at least one test suite).
   True, test q2 on t1

2. Now suppose you know nothing about which of the three python programs pass which tests. Let A be the set of all possible python programs, T be the set of three python programs from the previous question, and P be the set of python programs that pass all three tests from the previous question. For each statement (a)–(d) in the previous question, draw a pair of Venn diagrams, with universe A containing interlocking T and P, diagramming the situation when the statement is True beside the situation when the statement is False. For each of the four regions in the diagram place an "X" if the region must be empty, and a "O" if the region must be occupied. Use the minimum number of Xs and Os necessary.

   (a) For True there must be an X in the region of T outside of P, and an O in the region of T inside P. For False there must be an O in the region of T outside of P.

   (b) For True there must be an O in the region of T inside P. For False there must be an X in the region of T inside P and an O in the region of T outside P.

   (c) For True there must be an X in the region of T inside P and an O in the region of T outside P. For False there must be an O in the region of T inside P.

   (d) For True there must be an O in the region of T outside P. For False there must be an X in the region of T outside P and an O in the region of T inside of P.