# CSC165 tutorial exercise \#1 <br> winter 2013 

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.py, t2.py, and t3.py 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. py 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 programs would have to be tested with which test suites 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 with t1.py, or t2.py or t3.py, or test q3.py with t3.py.
(b) There is one of the three python programs that passes all three test suites. True, test q1.py with all three test suites.
(c) None of the three python programs passes all three test suites. False, test q1.py with all three test suites.
(d) There is one of the three python programs that fails all three test suites. True, test q2.py with all three test suites.
2. Now suppose you know nothing about which of the three python programs pass which tests. Let $P$ be the set of all possible python programs, $Q$ be the set of three python programs from the previous question, and $T$ be the set of python programs that pass the three tests from the previous question. For each statement (a)-(d) in the previous question, draw a pair of Venn diagrams, with universe $P$ containing interlocking $Q$ and $T$, 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 a "?" if the region may be empty or occupied, an "X" if the region must not be occupied, and a "O" if the region must be occupied.
In these diagrams I take the slightly extreme position that I know nothing about python programs other than the three mentioned. Other reasonable points of view may affect the placement of "?". The fact that I know $Q$ to be non-empty forces " $O$ " to pop up a few times.
(a) For True the intersection of $T$ and $Q$ should have an " $O$ ", the portion of $Q$ outside $T$ should have an " X " and all other regions should have "?". For False the region of $Q$ outside $T$ should have an "O" and all other regions should have "?".
(b) For True the intersection of $T$ and $Q$ should have an " $O$ " and all other regions should have "?". For False the intersection of $T$ and $Q$ should have an "X", the region of $Q$ outside of $T$ should have an "O", and all other regions should have "?".
(c) For True the portion of $Q$ outside of $T$ should have an " O ", the intersection of $Q$ and $T$ should have an "X", and all other regions should have "?". For False the intersection of $T$ and $Q$ should have an "O" and all other regions have "?".
(d) for True the portion of $Q$ outside of $T$ should have an " $O$ " and all other regions should have "?". For False all regions should have "?" - all we know is that every program passes at least one test suite.

