CSC640 Supplement on Testing

Test suite is composed of
1. **Test cases** - set of inputs and expected results that exercises a component in order to detect its faults
   - Can create black box (functional) test cases for highest layer (or user interface) as soon as use cases defined
   - Can create black box test cases for rest of classes as soon as their interfaces are defined (in Design phase)
2. **Test driver** - code that enables a component to be tested in isolation; used for testing only, not part of the product
   - Simulates the part of the system that calls the component being tested
   - Passes the test case inputs to the component and records or outputs the result for the tester
3. **Test stub** - partial temporary implementation of components (such as method) on which the tested component depends
   - Simulates component called by the component being tested
   - Must provide same interface and must return values of same type, but not necessarily correct (just enough so that the caller can keep going)
   - Can be created as soon as component's interface is defined (in Design phase)

Example structure of Driver code

For each method \( m_i \) with parameters \( p_1, \ldots, p_n \) and return value \( p_0 \):
- output (to log file or screen) name of method being tested
  - For each test case:
    - set local variables \( v_0, \ldots, v_n \) to be passed as arguments
      - for \( p_0, \ldots, p_n \)
      - call \( m_i(v_1, \ldots, v_n) \)
    - output (to log or screen) comparison of expected values (if can be manually computed) and actual values \( v_0, \ldots, v_n \) resulting from call

Example output:
- "called: SQRT(9)"
- "expected result: 3, actual result: 3"

Strategies for implementing stubs
1. Interface of stub: copy from Design document
2. Implementation of stub: do nothing when called; or always return the same values; or based on a simple test of inputs, return a few different values; or, interactively ask the tester to input the values to be returned.

Example 1: stub for SQRT(n) returns 1 if n>0, otherwise returns 0.
Example 2: stub for SQRT(n) asks tester to input square root of n.