CSC 408F – SOFTWARE ENGINEERING FALL 2000/2001

End Term Test (25% of course mark) December 8, 2000

8 questions on **2** pages. **100 marks total. 50 minutes total**
Answer ANY 5 questions. All questions have equal weight. WRITE LEGIBLY!
Non-programmable calculators permitted.

1. The manager of Software Quality Assurance has authorized you to buy one software tool to help improve the quality of the software produced by your organization. You have narrowed your choice down to two alternatives

1. A tool that will accurately measure the degree of **cohesion** for each software module in a large system.
2. A tool that will accurately measure the amount of **coupling** among the modules in a software system.

Which tool would you buy? Justify your decision.

2. The Vice President for Software Quality Assurance has appointed you KISS Manager for a large software project. Your mandate is to encourage simplicity throughtout the project. Describe how you would go about achieving this goal.

3. Describe how the **fault seeding** technique can be used to estimate the number of faults in a program.

4. Describe the kinds of **information** that are used to transform a software system **failure** into a software system **fault**. Explain the significance of each kind of information and how it is used.

5. Assume you are working as a project manager for a large software producing company. Your company doesn't presently do **Software Reuse**, but you think it should. Write a convincing argument to justify why your company should be doing software reuse.

6. You have just been hired to take over as manager of a large software project (the previous manager was fired for failing to pass CSC408H). Implementation of the software is well under way. You have just discovered that the previous manager had done nothing about testing the software ("We'll just do it when the time comes" was the extent of the manager's planning for testing). Do you have a problem? What steps would you take to rectify the problem?

7. A sort function has the prototype: `int sort( double A[] , int N ) ;`

Where A is an array containing at least N double precision numbers

N is the number of elements in A to sort, $0 <= N <= 10,000,000$

The function sort should sort the first N elements of A into ascending order.
The function returns 1 (one) if the sort is successful and 0 (zero) otherwise.

You have been assigned to test this function

a) What kind of **software tools** would you like to have to help you test this function?
b) Describe a set of test cases that will **thoroughly** test this function.

8. The C++ class CoinBox shown below is intended to implement a simple vending machine for soft drinks. The vending machine accepts only quarters. A drink costs one dollar.

- The function `addQtr` is called when a quarter is inserted into the machine.
- The function `returnQtrs` is called when the coin return button is pushed.
- The function `vend` is called when a button is pushed to dispense a drink.
- The variable `allowVend` has the value one if a drink can be dispensed and the value zero otherwise.

Perform a detailed *Code Inspection* on this class.
(The line numbers are for reference only and are not a part of the class)

```
 1  class CoinBox {
 2    unsigned totalQtrs ;
 3    unsigned curQtrs ;
 4    unsigned allowVend ;
 5  public :
 6    CoinBox() {
 7      totalQtrs = 0 ;
 8      allowVend = 0 ;
 9      curQtrs = 0 ;
10    }
11    void returnQtrs() {
12      curQtrs = 0 ;
13    }
14    void addQtr() {
15      curQtrs = curQtrs + 1
16      if( curQtrs > 3 )
17          allowVend = 1 ;
18    }
19    void vend() {
20      if( allowVend ) {
21        totalQtrs = totalQtrs + curQtrs ;
22        curQtrs = 0 ;
23        allowVend = 0 ;
24      }
25    }
26  } ;
```