Assignment 3—Implementation and Testing
CptS 322—Software Engineering I
Assigned: 28 March 2005
Due: 6 April 2005

1) Provably Correct Code: (50 pts)
1a) Write an implementation of the Factorial function (in the language of your choice).
1b) Prove that your implementation is correct.
1c) Proving that code is correct takes time, why should this be done, when should it be done?

2) Enforcing Intentions: (25 pts)
2a) Why is “enforcing intentions” a good programming practice?
2b) List five mechanisms that can be used to enforce intentions. Justify your choices.

3) Testing: (65 pts)
ACME is developing a new electronic parking meter that must meet the following requirements.
1) The meter’s maximum time value is 60 minutes.
2) The meter must accept nickels, dimes, and quarters.
3) Time is purchased at the rate of $0.01 per minute.
4) Change is not returned (unless the meter already had a full, 60-minute time value).
5) An ‘EMPTY’ message is displayed whenever the meter has a 0-minute time value.
Answer the following questions based upon these five requirements.
3a) Testing all possible coin insertion scenarios would be extremely time consuming. Present an equivalence partitioning of the coin insertion scenarios that would make testing more manageable. Justify your partitioning scheme.
3b) Propose three black box tests for the ACME meter, if possible. If not possible, explain why.
3c) Propose three gray box tests for the ACME meter, if possible. If not possible, explain why.
3d) Propose three white box tests for the ACME meter, if possible. If not possible, explain why.