

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.