# Homework 4

## Problem 4.1

**Solution:**
**Verification**:
a) **Factorial**:
Pre Condition: $P(n) := n > 0$
Post Condition: $Q(n, product) := n! == product$

Loop invariant: $I := product == (factor - 1)!$
Termination ordering: $n - factor$

b) **Euclidean Algorithm**:
Pre Condition: $P(m, n) := m > 0, n > 0$
Post Condition: $Q(m, n, x) := x == GCD(m, n)$

Loop invariant: $I := GCD(x, y) == GCD(m, n)$
Termination ordering: $x + y$