TERM TEST TWO

CPSC 241, Winter 2000

Wednesday, March 8, 2000

NAME AND STUDENT NUMBER:

1. Write down all your work. Use the back sides of the sheets, if needed.
2. Calculators are allowed, but not needed (and not recommended).
3. Maximum Possible Score = 30. The marks for each question are given in brackets.

1. Define the following terms and concepts.

[2](a) $f : A \to B$ is one-to-one.

[2](b) $f : A \to B$ is onto.

[2](c) A is countable.

[4] **2**. Show that a set A is countable if there is a one-to-one function $f : A \to Z^+$.

[4] **3**. Prove that the set $\sum^*$ is countable.

4. Solve the recurrence relations.

[4](a) $a_{n+2} - 5a_{n+1} + 6a_n = 0$, $n \geq 0$, $a_0 = 2$, $a_1 = 5$.

[4](b) $a_{n+2} - 2a_{n+1} + a_n = 2$, $n \geq 0$, $a_0 = 3$, $a_1 = 6$.

5. [2](a) Develop $(1-x^4)^4$.

[2](b) Find the coefficients of x^2 and x^6 in $(1-x)^{-4}$.

[4](c) Find the number of ways to distribute 14 identical objects among four distinct boxes provided each box contains at least two and at most five objects.