# Tutorial 14

1. Solve the following recurrence relations
   a. $a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3}$ with $a_0 = -5$, $a_1 = 4$, and $a_2 = 88$.
   b. $a_n = -3a_{n-1} - 3a_{n-2} - a_{n-3}$ with $a_0 = 5, a_1 = -9$, and $a_2 = 15$.
   c. $a_n = 2a_{n-1} + 3 \cdot 2^n$ for $n \geq 1$ with $a_1 = 5$.
   d. $a_n = 2a_{n-1} + 2n^2$ for $n \geq 1$ with $a_1 = 2$.
2. What is the general form of the particular solution guaranteed to exist by Theorem 6 of the linear nonhomogeneous recurrence relation $a_n = 8a_{n-2} - 16a_{n-4} + F(n)$ if
   a. $F(n) = n^3$?
   b. $F(n) = (-2)^n$?
   c. $F(n) = n2^n$?
   d. $F(n) = n^2 4^n$?
   e. $F(n) = (n^2 - 2)(-2)^n$?
   f. $F(n) = 2$?

# Tutorial 14 Cont'd

3. What is the general form of the solutions of a linear homogeneous recurrence relation if its characteristic equation has roots 1, 1, 1, 1,-2,-2,-2, 3, 3,-4?
4. Suppose that each person in a group of $n$ people votes for exactly two people from a slate of candidates to fill two positions on a committee. The top two finishers both win positions as long as each receives more than $n/2$ votes. Devise a DC algorithm that determines whether the two candidates who received the most votes each received at least $n/2$ votes and, if so, determine who these two candidates are.
5. Set up a DC recurrence relation for the number of multiplications required to compute $x^n$, where $x$ is a real number and $n$ is a positive integer;