You may work in pairs or purely individually for this assignment. Prepare your answers to the following questions in a plain ASCII text file or MS Word document. Submit your file to the Curator system by the posted deadline for this assignment. No late submissions will be accepted. If you work in pairs, list the names and email PIDs of both members at the beginning of the file, and submit your solution under only one PID. No other formats will be graded.

For this assignment, you may (and are encouraged to) work in pairs; if you do so, you must also write your solutions in such a way that it is clear how each member contributed to deriving the solution.

You will submit your answers to the Curator System (www.cs.vt.edu/curator) under the heading `OOC06`.

1. [60 points] Solve each of the following recurrence relations:

a) $a_0 = 1,\ a_n = 3a_{n-1} + 4$ for $n > 0$

b) $b_0 = 1,\ b_1 = 1,\ b_n = 3b_{n-1} + 4b_{n-2}$ for $n > 1$

c) $c_0 = 2,\ c_1 = 2,\ c_n = 2c_{n-1} - c_{n-2}$ for $n > 1$

d) $d_0 = 1,\ d_1 = 2,\ d_n = 2d_{n-1} + 2d_{n-2}$ for $n > 1$

2. [20 points] Suppose that you deposit $1000 in a savings account on January 1, 2013, and that you deposit an additional $100 in to the account on each subsequent January 1. The bank pays a fixed annual rate of 5%, deposited at the end of each year. In other words, on December 31 of each year, the bank deposits 5% of the value of the account on the preceding January 1 (including your new deposit of $100).

Find a recurrence relation for the value of the account, P_n, after n years. Then solve that recurrence relation to obtain a non-recursive formula for P_n. Then calculate P_{20}.

3. [20 points] Find, but do not solve, a recurrence relation for the number of different ways to make a stack of n chips, using red, white, and blue chips, such that no two red chips are adjacent in the stack.