

**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](http://www.cs.vt.edu/curator)) under the heading OOC05.

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1. [25 points each] Solve each of the following recurrence relations:
  - a)  $a_0 = 0, a_1 = 10, a_n = a_{n-1} + 6a_{n-2}$  for  $n > 1$
  - b)  $b_0 = 1, b_n = 5b_{n-1} + 4$  for  $n \geq 1$  (Hint: look for example in the notes.)
2. [25 points] The characteristic polynomial for a linear homogeneous recurrence relation with constant coefficients has the roots 1, 1 and 3. What is the general solution of the recurrence relation.
3. [25 points] You have an unlimited number of red and blue cubes. Find a recurrence relation for the number of different ways to build a vertical stack of  $n$  blocks, for  $n > 0$ , such that there are never two adjacent red blocks. Explain your logic, but do not solve the recurrence relation.