

PRINT Your Name: \_\_\_\_\_

**Quiz for March 30, 2006**

Find a recurrence relation for the number of strings of zeros and ones of length  $n$  that contain a pair of consecutive zeros.

**ANSWER:** Let  $a_n$  equal the number of strings of zeros and ones of length  $n$  that contain a pair of consecutive zeros. Suppose  $n \geq 2$ . A string of zeros and ones of length  $n$  that contains a pair of consecutive zeros ends in either 1 (and the first  $n - 1$  numbers contains a pair of consecutive zeros), or 10 (and the first  $n - 2$  numbers contains a pair of consecutive zeros), or 00 (and the first  $n - 2$  numbers can be anything). We conclude that  $a_n = a_{n-1} + a_{n-2} + 2^{n-2}$ .