1994 Paper 10 Question 11

Discrete Mathematics

Consider finite strings over the alphabet $\{A, B, C\}$. Say that a string is *valid* if it does not contain either of the substrings AA, AB.

List the *invalid* strings of length 3. [4 marks]

Let $v(n)$ be the number of valid strings of length n. Show that for all $n \geqslant 0$

$$v(n+2) = 2.v(n+1) + v(n).$$ [7 marks]

Hence determine a general formula for $v(n)$. [9 marks]