HINT Assignment 3 #3

You must do part a) before doing parts b) and c).

HINT Assignment 3 #4

The Frequency analysis of this cipher text is:

N: 29	D: 12	P: 8	U: 3
R: 20	I: 12	E: 7	V: 3
B: 17	J: 12	H: 6	T: 2
O: 17	K: 10	L: 5	C: 1
G: 15	A: 9	Q: 4	F: 1
Z: 14	W: 9	M: 3	

Note: this cipher text is not long enough to coincide directly with the frequency analysis for very long passages of English text. The frequency analysis is still useful: in the plaintext "E" appeared most often and "T" appeared more often than most of the other letters.

HINT Assignment 3 #5

$$S_2 = \sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$$

$$S_3 = \sum_{i=1}^{n} i^3 = \left(\frac{(n+1)n}{2}\right)^2$$

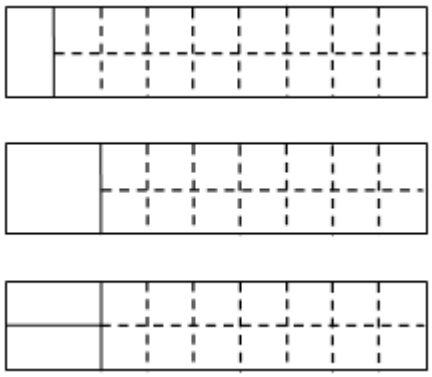
HINT Assignment 3 #7

Consider 2 cases:

- Case 1: The first digit in the word is not a 2.
- Case 2: The first digit in the word is a 2.

HINT Assignment 3 #8

Consider the three cases given by the three ways to tile the two left most squares in the $2 \times n$ rectangle:

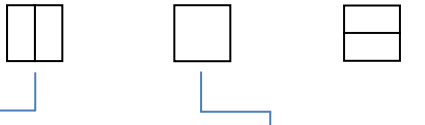


In each case how many ways are there to tile the rest of the rectangle? To further understand how this counting method works; count all the ways to tile the first four rectangles.

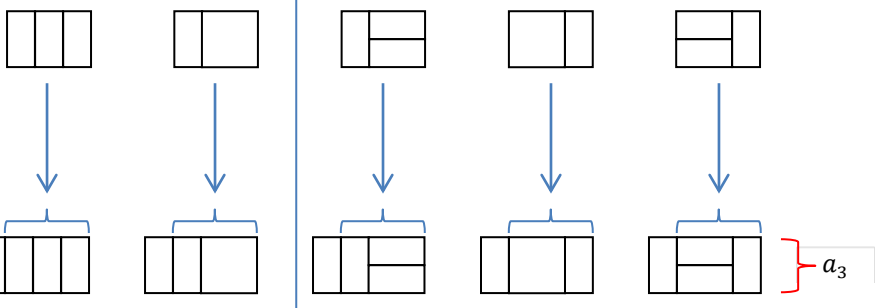
Let $a_n =$ the number of ways to tile a $2 \times n$ rectangle using dominoes and square tetrominoes.

$a_1 = 1$

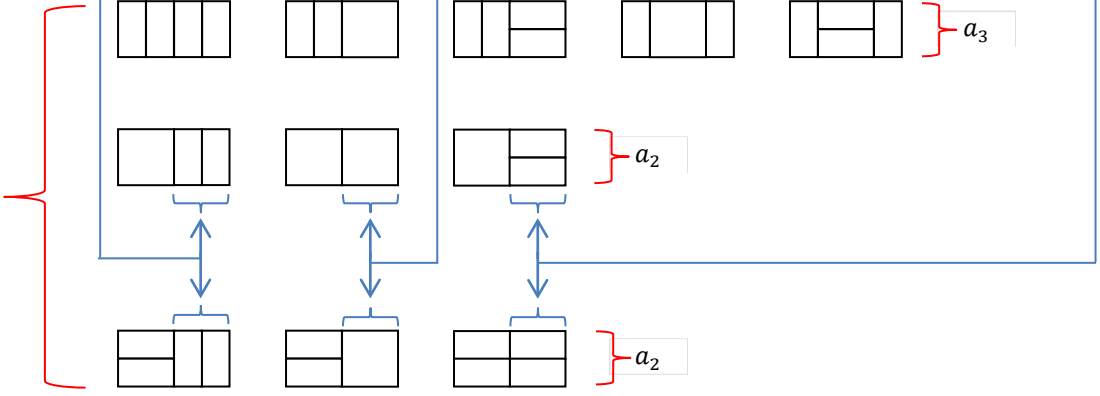
$a_2 = 3$



$a_3 = 5$



$a_4 = 11$



HINT Assignment 3 #9

Let a_n denote the number of ways the bug can reach vertex C for the first time in n minutes. Consider the bug's choice for the first minute. It can either go to E or to B:

- If it goes to E, then think about the symmetry of the pentagon. If the question was restated so the bug started at vertex *E* would the question be any different?

- If it goes to B, then the bug must return to A (when > 2) .