1. *Tribonacci* numbers are similar to *fibonacci* numbers, except that the sequence starts with three predetermined terms and each term afterwards is the sum of the preceding three terms.

   Example:

   0, 0, 1, 1, 2, 4, 7, 13, 24, 44, 81, 149, 274, 504, 927, 1705, 3136, 5768, 10609, 19513, 35890, 66012, … (the first index of sequence is zero, not one!)

   Write a function that calculates *k*th element for the *tribonacci* sequence with both the iterative method and the recursive method. Also try to draw the recursion tree for the recursive method with different values.

2. Hofstadter female and male sequences are examples for mutual recursion where there are two functions, the first calls the second and in turn the second calls the first.

   Definition:

   $F(0) = 1, \quad M(0) = 0$

   $F(n) = n - M\big(F(n-1)\big), \qquad n > 0$

   $M(n) = n - F\big(M(n-1)\big), \qquad n > 0$

   Example:

   F: 1, 1, 2, 2, 3, 3, 4, 5, 5, 6, 6, 7, 8, 8, 9, 9, 10, 11, 11, 12, 13,...

   M: 0, 0, 1, 2, 2, 3, 4, 4, 5, 6, 6, 7, 7, 8, 9, 9, 10, 11, 11, 12, 12,...

   Try to implement *Hofstadter* sequences and analyze results by showing each function call in the process.

   <u>References:</u>

   https://en.wikipedia.org/wiki/Generalizations_of_Fibonacci_numbers#Tribonacci_numbers
   https://en.wikipedia.org/wiki/Hofstadter_sequence#Hofstadter_Female_and_Male_sequences