Artificial Intelligence

Introduction to Python programming

CAUTION!!!

- You should create a repository either on bitbucket.org or github. You should add a reading rights for the Instructor.
- To verify you answers to problem 2 and 3 you can go to https://projecteuler.net

1 Reversing a list

Please write a complete Python program that reverses the elements in a list. You should ask the user for the number of elements in the list first, and then prompt the user for each element. You should write a function listReverse(x) that reverses the elements in list x. Your program should display the list before and after the reversal - before and after calling the function. You cannot use the list reverse() method.

2 Fibonacci Sequence – Project Euler problem #2

A Fibonacci number is calculated as a sum of the two preceeding numbers in the Fibonacci sequence. Therefore, starting with 1 and 2, the first 10 numbers are :

$$1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...$$

Your assignment is to calculate a sum of all even numbers of the Fibonacci sequence whose values do not exceed four million

3 Coded Triangle Numbers – Project Euler problem #42

If we define a n^{th}term of triange numbers as $t_n = \frac{1}{2}n(n+1)$, the first 10 tringle number will be:

$$1, 3, 6, 10, 15, 21, 28, 36, 45, 55, ...$$

By converting letters in the word to a number corresponding to its alphabetical position and adding these values we will determine a word value, ex.: for a word "SKY" we will have a value: $19 + 11 + 25 = 55 = t_{10}$. If the word value is a triangle number then we can say that the word is a trinagle word.

In the file *words.txt* you will find nearly 2000 english words. Your assignment is to detemine howmany of them are triangle words,

4 Insertion Sort

Your asignment is to write a complete Python program that creates a list of 20 random integers and sorts them using an insertion sort function: insertsort(x). You have to implement the function yourself. Insertion sort keeps the initial part of the list sorted, say x[0:i]. (Remember, this means all the items from 0 up to but not including i.) At the beginning, the single item in x[0:1] is sorted, The item x[i] is moved down to its proper place by repeatedly exchanging it with its predecessors until it is in place, at which point x[0:i+1] is sorted. The process continues until all items have been moved to their proper places. Your program has to display the unsorted and sorted lists. You cannot use the list sort() method.