

TP-6: Algorithms and Computational Thinking

Tuesday, 31th October 2017

Implementing searching algorithms

Objective : In these exercises, you will get a basic understanding of using lists and performing various operation on the lists. You will also implement different searching algorithm in order to find items in a list.

Exercise 1

You will have to implement the mysterious number game ("le jeu du nombre mystérieux" in French). The goal of this game is to discover the number chosen by a computer. In order to help Alice, the program will indicate to her if the chosen number is greater or lower than the number proposed by Alice until she finds the correct chosen number. At the beginning of the game, Alice must set the maximum number that will be the maximum value of the list in which the program will randomly select the chosen number. For example, if Alice chooses 10, the list will contain the following numbers : 1,2,3,4,5,6,7,8,9,10.

Hint : You must use a binary search seen during the lecture.

Sample output if the chosen number of the program is 4 :

Program : "Merci d'indiquer la limite supérieure de la liste : "
User : 10

Program : "Deviner le nombre mystère entre 1 et 10 : "
User : 5
Program : "Le nombre mystère est plus petit !"

Program : "Deviner le nombre mystère entre 1 et 5 : "

User : 3

Program : "Le nombre mystère est plus grand!"

Program : "Deviner le nombre mystère entre 3 et 5 : "

User : 4

Program : "Bravo! Vous avez trouvé le nombre mystère (4)!"

Exercise 2

Steve is working at the Paleo festival and must check the tickets of the participants at the entrance. Each ticket has a unique number meaning that if a person enters with a ticket, another person will not be able to enter with the same ticket because the numbers will be the same. Unfortunately, some persons print the same ticket several times in order to try to enter without paying several tickets.

In this exercise, you must help Steve to check the tickets by creating a little program that verifies if a ticket number has already been checked or not and, consequently, if the person can enter or not. If the ticket number is checked for the first time by the program, the later adds it to the list of ticket number checked and let the person enters in the festival. If the ticket number is found in the list, Steve must say to the person that she/he must not enter because of her/him invalid ticket.

Hint : You must use a sequential search seen during the lecture.

Sample output if the list is empty at the beginning :

Program : "Ticket number to check?"

User : 4

Program : "Ok, you can get in!"

Program : "Ticket number to check?"

User : 4

Program : "This number have already be used, sorry!"