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Introduction to Computer Science, **Winter Semester 2018**
Practice Assignment 5

Discussion: 3.11.2018 - 8.11.2018

Exercise 5-1   Add GPA Bonus
               To Be Solved in Lab

Given a list `A` of floating-point numbers, representing students' GPAs, and a bonus mark as inputs from the user, write a Python algorithm that adds the bonus mark to all students' GPAs.

Exercise 5-2   Sum and Product
               To Be Solved in Lab

Given a list `A`, write an algorithm that calculates the sum of all elements in even positions(indices) and the product of all elements in the odd positions(indices)

Exercise 5-3   Check Sorted List

Given a list `A` of numbers, write an algorithm to check whether the list is sorted in ascending order or not.

Exercise 5-4   Find Key in Sorted List
               To be discussed in Tutorial

The simplest algorithm to search a list of Numbers `N` for a given key Key is to test successively each element.

```
N = eval(input("Enter a list of numbers:"))
m = len(N)
Key = eval(input("Enter a key:"))
i = 0
FOUND = False
while i < m and FOUND == False:
⎵ if Key == N[i]:
⎵ ⎵ FOUND = True
⎵ else:
⎵ ⎵ i = i+1
if FOUND == False:
⎵ print("Sorry, key is not in the list")
else:
⎵ print("Key found")
```

If a list is already stored in increasing order, a modified sequential search algorithm can be used that compares against each element in turn, stopping if a list element exceeds the target value.
Write an algorithm for the modified sequential search.

Exercise 5-5   Show Occurrences
               To be Solved in Tutorial

Write an algorithm that given a list of integers `A` and a number `x` prints the number of occurrences of `x`

in the list. In addition, the algorithm should print the positions where x occurs.
For example, if the list is [1, 2, 4, 1, 3] and x is 1 then the algorithm should print
1 occurs in the following positions: 0, 3
The number of occurences of 1 is 2
If the list is [1, 2, 4, 1, 3] and x is 0 then the algorithm should print
The number of occurences of 0 is 0

Exercise 5-6   Dice Role

Write an algorithm that prints a list of n dice six-sided rolls.

Exercise 5-7   Find Largest Number

Write an algorithm to find the maximum value stored in an (unsorted) list `A`.

Exercise 5-8   Thousand Numbers
             To Be Solved in Lab

Given a list of non-negative numbers. Write an algorithm to find the number of

- even positive numbers

- odd positive numbers

- Zeros

Additionally, the algorithm should find the sum of

- even positive numbers

- odd positive numbers

Exercise 5-9   Print Repeated
             To Be Discussed in Tutorial

Write an algorithm that given an **ordered** list of integers `A` prints the elements in the list that are repeated. If some elements occur more than twice, then these elements should be printed only once.

For example, for the list

1 1 1 1 4 6 7 7 8

your algorithm should print

1 7

Exercise 5-10   Reverse List

Write an algorithm that reverses the order of elements of the given list.

Exercise 5-11   Change Order

Write an algorithm that given a list of integers `A` moves all even elements in a list of integers to the front of the list and all odd elements to the rear.

Hint: you do not have to maintain any order other than all evens appearing before all odds in the list.

For example: if the list is of the form [1,4,5,6,2,10] then the algorithm should create a new list of the form [4,6,2,10,5,1] and prints the elements of the resulting list.