

Introduction to Computer Science, Winter Semester 2017
Practice Assignment 5

Discussion: 4.11.2017 - 9.11.2017

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 Check Sorted List
 To Be Discussed in Tutorial

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

Exercise 5-3 Find Key in Sorted List

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 5-4 Sum of Lists
 To Be Discussed in Tutorial

Given two lists A and B, write an algorithm that uses looping to store the sum of the corresponding elements of the lists A and B in a new list C.

Note: Assume that lists A and B have the same length.

Exercise 5-5 Dice Role

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

Exercise 5-6 Find Largest Number

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

Exercise 5-7 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 5-8 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 5-9 Reverse List

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

Exercise 5-10 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.

Exercise 5-11 Show Occurrences
To be Solved in Lab

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 occurrences 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 occurrences of 0 is 0