



Workshop

Week 39

Warm-up

Use the **random number generator** from exercise 3 in the last workshop, and modify the code so that the program does not crash if the user enters invalid inputs, i.e. non-integers or a lower bound that is larger than the upper bound.

Exercise 1a

Most words in the English language contain vowels (i.e. a, e, i, o, u). Some of the exceptions are “shh”, “by” and “hmm”.

Write a program that determines the number of vowels in an English word. The program should:

- prompt the user for an English word.
- use a **for loop** to count the number of vowels in the word.
- display the word and its number of vowels.

1. Write an algorithm for the solution.
2. Implement the solution using Python.

Exercise 1a

Solution proposal for algorithm:

Input: word

Output: count

count \leftarrow 0

for all letters in word **do**

if letter is a, e, i, o or u **then**

 count \leftarrow count + 1

end if

end for

Print count



Exercise 1b

Modify the program in exercise 1a. Instead of re-starting the program for each new word, the program should display the number of vowels in a word for a specified number of words.

The program should:

- prompt the user for the number of words.
- use a **for loop** to prompt the user for a word
 - use a **for loop** to count number of vowels in the word
 - display the word and its number of vowels.

1. Write an algorithm for the solution.
2. Implement the solution using Python.

Exercise 1b

Solution proposal for algorithm:

Input: no_word

Output: count

```
for i  $\leftarrow$  1 to no_word do  
    Ask user for word  
    count  $\leftarrow$  0  
    for all letters in word do  
        if letter is a, e, i, o or u then  
            count  $\leftarrow$  count + 1  
        end if  
    end for  
    Print count  
end for
```



Exercise 1c

Modify the program in exercise 1b. Instead of specifying the number of words at the beginning of the program, the program should continue to ask the user for a new word until the user decides to quit the program.

The program should:

- use a **while loop** that in each iteration:
 - prompts the user for word.
 - use a **for loop** to count the number of vowels in the word.
 - display the word and its number of vowels.
 - ask for next word unless the user decides to quit.
1. Write an algorithm for the solution.
 2. Implement the solution using Python.
 3. Modify the program so that the **while loop** uses a **Boolean flag**.

Exercise 1c

Solution proposal for algorithm:

Input: word

Output: count

```
while the user does not want to quit do  
    count  $\leftarrow$  0  
    for all letters in word do  
        if letter is a, e, i, o or u then  
            count  $\leftarrow$  count + 1  
        end if  
    end for  
    Print count  
    Ask for next word  
end while
```



Exercise 2

Write a program that computes the average exam scores of students.

The program should:

- use a **while loop** that in each iteration:
 - prompt the user for the number of exams.
 - use a **for loop** to prompt the user for each of the exam scores.
 - compute and display the average score to the user.
 - ask whether the user want to enter the grades for another student.
1. Write an algorithm for the solution.
 2. Implement the solution in Python.

Exercise 2

Solution proposal for the algorithm:

```
while there are more student do  
    numExams  $\leftarrow$  number of exam scores to average  
    total  $\leftarrow$  0  
    for i  $\leftarrow$  1 to numExams do  
        Ask for the exam score  
        Add exam score to total  
    end for  
    Compute the average score  
    Print the average score  
    Ask the user whether there are more students  
end while
```

