Home Assignment 1

Variables, Strings, Conditions

General directions:

- Read questions thoroughly and make sure your programs fulfill the required task.

- The assignment should be solved on your own!

- Follow the submission guidelines written on the website. In particular, all questions ought to be submitted in the attached template file ex1_012345678.py, after replacing the digits 012345678 with your 9-digit ID number (Teudat Zehut if you have one, otherwise it's typically a number beginning with 9).

- Submission is due by: see website.

- Self testing: to verify your programs are correct and robust, run your programs with many possible inputs – the examples from this file, as well as other inputs of your choice. All outputs must be correct and your programs must never crash.

- We often use automated testing of assignments, so your outputs must match the required format **exactly** (whitespace and capitalization matter!)
  Follow the output format provided in the examples.

- Task: in this assignment you need to add your code to the given template file.

- Do not change any variable name in the template file.
  Your input will be given to you in the variables predefined in the template file, currently assigned the invalid value ???. Your code should use these values, make a computation, and provide the required output.
  Your code may use additional variables, if needed.

- Do not remove comments from the template file.
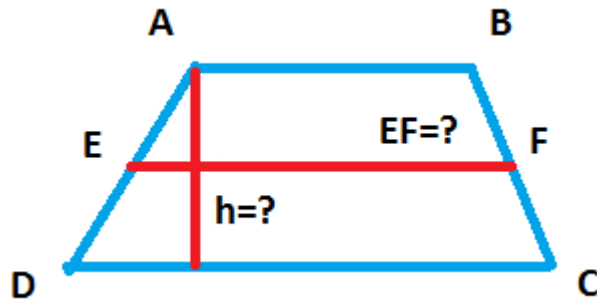
Question 1

You are given a trapezoid whose vertices are A, B, C, D (see diagram). In addition, you are given the length of its four edges AB, BC, DC, AD and its area S (lengths and area are positive numbers). Compute and print:

    a. The circumference of the trapezoid.

    b. The length $EF = \frac{AB+DC}{2}$ of the midsegment of the trapezoid.

    c. The height h of the trapezoid.

       (Reminder: the formula for trapezoid area is $S = \frac{(AB+DC)\cdot h}{2} = EF \cdot h$)

Outputs should match the example below (watch for punctuation and whitespace).

==Note: computations may yield numbers with a multi-digit decimal representation, e.g., **31.400000000000002**. These numbers should be printed verbatim, with no rounding.==

Example. For the inputs AB=20.0, BC=10.0, AD=15.0, DC=35.0, S=220.0 the output is:

    Diameter is: 80.0
    Midsegment is: 27.5
    Height is: 8.0

Question 2

You are given the variable `my_name`, whose value is a nonempty string (some English name). You need to print the string 'Hello' followed by a space, the name stored in `my_name`, and an exclamation mark.

<u>Note</u>: even if the first letter of `my_name` is set in lowercase, it has to be printed as a proper name (first letter capitalized).

You may assume all characters in `my_name` are either lowercase or uppercase English letters.

Example 1. For the input my_name='Tom' the output is

Hello Tom!

Example 2. For the input my_name='oxana' the output is

Hello Oxana!

Question 3

You are given the <u>string</u> variable `number`, whose value is the decimal representation of an integer. The program should print a message as follows.

In case the number is divisible by 7, the program should print

   I am <number> and I am divisible by 7

Otherwise, it should print

   I am <number> and I am not divisible by 7

In each case, the actual integer should be printed instead of <number>.

Example 1. For the input number = '49' the output is:

   I am 49 and I am divisible by 7

Example 2. For the input number = '-17' the output is:

   I am -17 and I am not divisible by 7

Question 4

You are given two variables: a string `text` and a number `copies` (which stands for the number of copies required). You need to create a new string `new_str`, which is the concatenation of the two following strings (see example below):

a) `str1` is a string consisting in characters in **odd** indices of `text` (in order).
b) `str2` is a string consisting in characters in **even** indices of `text` (in order).
   Reminder: zero is even.

Now `new_str` contains `str1` followed by `str2`. It needs to be printed `copies` times.

You may assume that `copies` is a positive integer and that the length of `text` is at least 3.

Example 1. For the inputs text='tom', copies=3 the output is

otmotmotm

Explanation: `str1` is 'o', `str2` is 'tm', so `new_str` is 'otm' and it is printed thrice.

Example 2. For the inputs text='oxana', copies=3 the output is

xnoaaxnoaaxnoaa

Note: Python indices start from 0 (not from 1).

Question 5

You are given a string variable `name` and an int variable `q`. You need to do the following:

a) if the input is not valid (see below) you should print:

   Error: illegal input!

   an input is considered invalid when it satisfies at least one of the following:
   - `q` is negative
   - `q` is not strictly smaller than the length of `name` f
   - `name` is the empty string

b) otherwise, you need to:
   - create two substrings of `name`: `sub1` consists of the characters between index 0 and index `q` (not including the one in index `q`); `sub2` consists of the characters between index `q` and the end of `name`.
   - `sub1` and `sub2` should be set to the (respective) reversed strings. That is, in each string the first character is swapped with the last character, the second is swapped with the second-to-last, etc.
   - print `sub1`, then a space, then `sub2`.

Example 1. For inputs name='droLtromedloV', q=4 the output is:

Lord Voldemort

Explanation: `sub1` is 'droL', `sub2` is 'tromedloV'; after reversing `sub1` is 'Lord' and `sub2` is 'Voldemort'.

Example 2. For inputs name='droLtromedloV', q=-4 the output is:

Error: illegal input!

Example 3. For inputs name='', q=4 the output is:

Error: illegal input!

Good luck!