Homework 1

Variables, strings and conditions

General instructions

- Read the questions **carefully** and make sure your programs work according to the requirements.
- The homework needs to be done individually!
- Read the submission rules on the course web page. All the questions need to be submitted together in the file ex1_012345678.py attached to the homework, after changing the number 012345678 with your ID number (9 digits, including check digit).
- Final submission date: see course web page.
- Check your code: in order to ensure correctness of your programs and their robustness in the presence of faulty input, for each question run your program with a variety of different inputs, those that are given as examples in the question and additional ones of your choice (check that the output is correct and that the program does not crash).
- Because the checking of the homework is automated, **please make sure to respect the format of the input (including spaces).**
- How to write the solution: in this homework, you need to complete the code in the attached outline file.
- **You are not allowed to change the names of the variables that already appear in the attached outline file. You need to work with the variables already declared in the outline.** The code of each question must work and produce the correct answer for the input that will be given in the variables present in the outline (the variables that feature a question mark and need to be provided with an input, as shown in the example during the recitation). You are also allowed to add additional variables.
- **You may not erase the instructions present in the outline.**

Question 1

You are given a variable *R* that represents the radius of a circle (you can assume that *R* is positive). Compute and print the following numbers:

- The diameter of the circle
- The circumference of the circle $(2\pi R)$
- The surface of the circle (πR^2)

We define $\pi = 3.14$

The printed strings need to appear exactly as shown below (pay attention to the spaces and punctuation).

Note: if one of your float variables appear as 31.400000000000002, you can leave it as is.

Example:

For R=5, your program should print:

Diameter is: 10

Circumference is: 31.4

Area is: 78.5

Question 2

Let *S* be a non-empty string.

If the length of *S* is longer than 10, print the same string with the following changes:

- The 10 first characters will be in lowercase
- The other characters will be in uppercase
- Non-alphabetic characters should be left as is

Otherwise:

- The first character will be replaced by the character $
- The last character will be replaced by the character @

Example: for the string *S* = "Hello, dear world!", you should print:

hello, deaR WORLD!

For the string *S* = "Hello", you should print:

$ell@

Question 3

You are given a variable of type *int* called *number*. The program should print one of the following messages:

If *number* is even, it should print:

I am <number> and I am even

If *number* is odd, it should print:

> I am \<number\> and I am odd

In both cases, \<number\> needs to be replaced by the value of the variable *number*.

For example, if *number* = 17, you should print:

> I am 17 and I am odd

If *number* = 542, you should print:

> I am 542 and I am even

If *number* = -6, you should print:

> I am -6 and I am even

Question 4

Given three **positive** numbers *a,b,c*, print the result of the following computations (every result should be printed on a separate line) :

- $\sqrt[c]{a + b}$

- $\sqrt[c]{a^b}$

- $\dfrac{a}{b} - \dfrac{b}{c}$

The result should be a decimal number with exactly 5 digits after the decimal point.

Hint: in order to print exactly 5 digits after the decimal point, use string formatting.

Example: for *a* = 9, *b* = 5, *c* = 5, you should print:

> 1.69522
>
> 9.00000
>
> 0.80000

Question 5

Given an integer variable *year* (of type *int*) which represents a year, check if that year is a leap year (you can assume that *year* is positive). A leap year is a year that satisfies one of the conditions below:

- The year is divisible by 4 but not by 100
- The year is divisible by 400

For example, 2004 is a leap year, but 1900 is not (because it is divisible by 100). 2000 is a leap year, because it is divisible by 400.

If *year* is a leap year, print:

> \<year\> is a leap year

If *year* is not a leap year, print:

<year> is not a leap year

<year> needs to be replaced by the value of the variable *year*. For example:

2004 is a leap year

and

1900 is not a leap year