PROGRAMMING FOR ALL – SPRING 2021 - WEEK #8 – 210517 & 210519

21/05/17 – TEST 2

Topics for the week: Value returning functions

- Value returning functions **read 5.7**
- Generating random numbers **read 5.7**
- Introduction to lists **read 7.1, 7.2**

Class exercises:

Functions with parameters in programs

- **Savings**

Continuously compounded interest is calculated by the formula

$$A(t) = Pe^{rt}$$

Where:

A(t) = amount after t years

P = principal

r = interest rate per year

t = number of years

Write a value returning function `savings` with appropriate parameters (the principal, the rate and the number of years) which returns savings after some number of years.

Then use this function to write a program that asks the user how much money wants to deposit to the bank account and how many years wants to keep it in the bank. The program should display the saved amount at the end. The bank offers the interest rate 0.5% (this value is used as a global constant).

The user can repeat the task, entering 0 or a negative number for the deposit ends the program.

- **Circle – menu**

The circumference of the circle with the radius r is: $C = 2\pi r$

The area of the circle with the radius r is: $A = \pi r^2$

Write two value returning functions `area` and `circumference` with a parameter representing a radius.

Then write a program that is using these functions that asks the user to enter a radius of the circle and offers a menu with options to display the circumference, the area, or both for the circle.

The user can repeatedly run the program, by entering 0 or a negative number for the radius the program ends.

- **Cubes – areas, volumes**

Write a values returning function `cube` with a parameter representing a base of a cube, which returns the surface area and the volume of the cube with the given base.

Use this function to write a program where a user can repeatedly enter a base of a cube and info about the surface area and volume will be displayed.

The user can enter the side repeatedly, by entering 0 or a negative number for the base ends the program.

At the end the program displays a number of "large" cubes; large cubes are cubes with volumes larger than 1000 (units cubed).

- **Digits in a string**

Write a values returning function `digits_in` with a parameter representing a string, which returns info whether digits are in the string.

Use this function to write a program where a user can repeatedly enter a string and info about digits in the string is displayed.

The user can enter strings repeatedly, by entering '#' he/she ends the program.

GENERATING RANDOM NUMBERS

- **Even Counter of random integers**

Write a program that generates, and displays 20 random integers from the interval (-10, 10), and displays the number of even integers generated.

- **Multiplication Skills**

Write a program that tests multiplication skills.

The program displays an exercise where two integers between 1 and 15 should be multiplied, and asks the user for an answer. If the answer is correct the program displays "You are correct", otherwise the program displays "You are not correct, the correct answer is…".

The user gets as many exercises as he/she wishes. At the end the program displays the number of assigned exercises and the number of exercises answered correctly.

Specification:

Use the Boolean value returning function `one_exercise`, which displays:

- one exercise;
- receives an answer from the user;
- displays a comment about the answer;
- returns `True` or `False` value about the answer.

The function is called each time when the user wants to continue with the practice.