

CS103 – Spring 2022- Lab 9 Exercises

Exercise Instructions

- Make a folder **Lab09** inside your **cs103sp22** folder.
- Create a new notebook inside your Lab09 folder (`lab09.ipynb`).

You have two types of questions: exercises and practice problems. The answers will be given for the exercises, and you are expected to solve the practice problems. However, feel free to seek help from your friends or TAs to solve the problems. Remember, the lab assignments are not individual, and you can get any help you want.

Grade by #correct: Exercises: 70 points

Each practice problem: 15 points

Deliverables: `lab09.ipynb`

Exercises

EXERCISE 1:

Write a function **`isSorted`** that takes a list `L`. The function will print `Sorted` if the list is sorted, otherwise it will print `Unsorted`. The list can be sorted by increasing or decreasing order.

Sample Input

```
L = [26, 8, 6, 2, 1]
```

Sample Output

```
Sorted
```

EXERCISE 2:

Write a function **`factorial`** that takes an int `n` and returns `n!` value. *Use Recursion to solve this exercise.*

Sample Input:

```
n = 5
```

Sample Output:

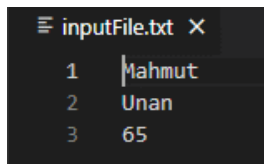
```
120
```

EXERCISE 3:

Write a function “**fChecker**” that doesn’t take any input. The function reads “inputFile.txt” and reads it line by line. Assume the first line is the first name, second line is the last name, and the third line is the age of the person. *You will have to create this inputFile.txt.* The function should print the greetings message with the expected age in 5 years. **Hint:** To read the file line by line, you can use `readline()` function:

```
fo = open("foo.txt", "r") # Open a file
line = fo.readline()# Read the file line by line
```

Also, the output variable (line) will include an `endofline` (`\n`) character. You will need to remove it.

Sample Input

```
inputFile.txt X
1 Mahmut
2 Unan
3 65
```

Sample Output

Hello, Mahmut Unan. You will be 70 years old in 5 years.

Practice Problems

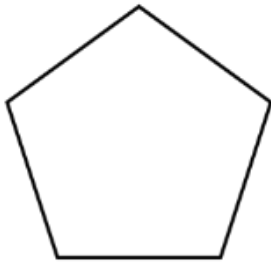
PRACTICE PROBLEM 1:

Write a function `tPolygon` that takes an int `"n"` and draws an **equiangular polygon**. Use Turtle Graphics for your drawing. The polygon should have `n` vertices. The function should calculate the angle and the side length. Assume the side length for each polygon is `n*n` pixels. The color of the polygon depends on the `n`; if `n` is an even number, the polygon should be **blue**; otherwise, it should be **black**. **Note:** Do not hardcode your parameters for the turtle functions. Calculate them.

Sample Input

```
n = 5
```

Sample Output



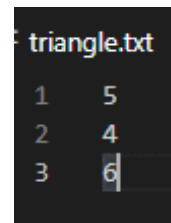
(*each side is 25 pixels)

PRACTICE PROBLEM 2:

Write a function `triangleChecker` that doesn't take any input. The function reads `"triangle.txt"` which includes three numbers (each line has one number). *You will have to create this text file.* Assume these values are the side lengths of the triangle. The function should check the validity of the triangle and print whether the triangle is valid or not. If it is valid, the result should also indicate the type of triangle (equilateral, isosceles, or scalene).

Here are some hints about triangles:

- Triangle inequality only depends on the length of the sides.
- An **equilateral** triangle is a triangle in which all three sides are equal.
- A **scalene** triangle is a triangle that has three unequal sides.
- An **isosceles** triangle is a triangle with (at least) two equal sides

Sample Input

```
triangle.txt
1 5
2 4
3 6
```

Sample Output

```
The triangle is valid.
It is a scalene triangle.
```