Laboratory Assignment 1



Problem 1 - Indexing [3 pts]

Return the first letter on your name as a string.

- You should use your my_name variable for correctness.
- inputs : N/Aoutput : string

>>> F

Problem 2 - Indexing II [8 pts]

Ask for a number from the user to define an index, then return the letter in your name that corresponds to that index starting from 0 (for input $n \rightarrow \text{return nth index}$).

- If the number is negative or the number is more than the number of letters on your name, take modulo and use that as the new number.
- You should use your my_name variable for correctness.
- inputs : input $\in \mathbb{Z}$
- output : string

```
my_name = "Tarkan"

>>>
Enter a number: 0
T

>>>
Enter a number: -2
a

Explanation: -2 mod 6 = 4, so we took the 4'th indexed character. 6 comes from the number of letters on my_name.

>>>
Enter a number: 18
T

Explanation: 18 mod 6 = 0, so we took the 0'th indexed character.
```

Problem 3 - Slicing [12 pts]

Ask two numbers from the user to define indexes, then find the substring of your my_name variable taking these two index values as beginning and end. Return this substring.

- Both of these numbers should be taken as modulo of the length of your name as problem 2.
- Order of the numbers does not matter, slice it using minimum maximum.
- Both indexes are inclusive.
- inputs : input1, input2 ∈ Z.
- output : string

```
my name = "Tarkan"
>>>
Enter first number: 2
Enter second number: 5
rkan
>>>
Enter first number: 0
Enter second number: 6
Т
Explanation: index 6 mod 6 = 0, so we slice from 0 th index to 0 th index
(inclusive), which ends up being the first indexed character.
>>>
Enter first number: -2
Enter second number: 3
ka
Explanation: index -2 mod 6 = 4, so we slice from 3 th index to 4 th index
(inclusive), which ends up being the 3rd and 4th indexed characters.
>>>
Enter first number: 3
Enter second number: 9
k
Explanation: index 9 mod 6 = 3, so we slice from 3 th index to 3 th index
(inclusive), which ends up being only the 3rd indexed character.
```

Problem 4 - Vowels [11 pts]

Ask for a string from the user, then count the number of vowels in the input and return the result.

- If the input does not have any vowels, return 0.
- vowels ∈ { 'a', 'e', 'i', 'o', 'u', 'A', 'E', 'I', 'O', 'U'}
- inputs: input = {x: printable characters except whitespaces and len(x) ∈
 [1, 100]}. (This includes letters in English, numbers and punctuation characters.)
- outputs: integer

```
>>>
Enter input: inf211
1
>>>
Enter input: F!ucvh1!UjK\;'an!+!@#
3
Explanation: Only vowels in this string are 'u', 'U' an 'a'.
>>>
Enter input: zxvxsdf
0
```

Problem 5 - Summation [10 pts]

Sum up all the digits on your id number and return the result.

```
inputs: N/Aoutputs: integermy_id = "1234"
```

>>> 10

Problem 6 - Factorial [11 pts]

Ask for a number from the user, then calculate and return the factorial of that number.

- Do NOT use any libraries or predefined functions
- inputs: input = $\{x: x \in \mathbb{N} \text{ and } x \leq 30\}$
- outputs: integer

```
>>>
Enter input: <u>4</u>
24
```

```
>>>
Enter input: <u>12</u>
479001600

>>>
Enter input: <u>0</u>
```

Problem 7 - Divisibility [5 pts]

Ask for a number from the user. If that number is divisible to <u>both</u> 3 and 7 return **True**, else return **False**.

```
• inputs: input ∈ ℕ
• outputs: boolean
>>>
Enter a number: 12
False
>>>
Enter a number: 21
True
```

Problem 8 - Divisibility II [8 pts]

Ask for a number from the user.

- 1. If that number is only divisible to 3, return 1,
- 2. if that number is only divisible to 7, return 2,
- 3. if that number is divisible to both 3 and 7, return 3.
- inputs: input ∈ ℕ• outputs: integer

```
>>>
Enter a number: 12

1

>>>
Enter a number: 14

2

>>>
Enter a number: 21

3
```

Problem 9 - Prime Number [15 pts]

Ask for a number from the user, then find if that number is a prime number. [1] If the number is a prime number, return **True**, else return **False**.

```
inputs: input = { x: x ∈ N and x > 1}
outputs: boolean
>>>
Enter a number: 12
False
>>>
Enter a number: 23
True
```

Problem 10 - Square root [17 pts]

Find the square root of a given number using Heron's method (Babylonian method) [2] that we discussed in the first lecture.

- Do NOT use any libraries or predefined functions (i.e. sqrt)
- Choose an appropriate iteration number.
- Choose an appropriate starting guess. (i.e 1)
- inputs: input = $\{x: x \in R \text{ and } 1E9 \ge x \ge 0.0\}$
- outputs: float

```
>>> Enter a number: <u>16</u>
4.0

>>> Enter a number: <u>12</u>
3.4641016151377544

>>> Enter a number: <u>473891.421</u>
688.397720071762
```

```
[1] <a href="https://en.wikipedia.org/wiki/Prime_number">https://en.wikipedia.org/wiki/Prime_number</a>
```

[2]

https://en.wikipedia.org/wiki/Methods_of_computing_square_roots#Babylonian_meth
od