National University of Computer and Emerging Sciences

Laboratory Manuals

for

Computer Networks

(CL -3001)

Course Instructor	Dr. Ahmad Raza
Lab Instructor(s)	Zain Ali Nasir
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Department of Computer Science
FAST-NU, Lahore, Pakistan

Introduction to Python

Python's Programming Standard:

- **Python docstrings** are strings used right after the definition of a function, method, class, or module (like in below example). They are used to document our code.

We can access these docstrings using the `__doc__` attribute.

```python
def add_binary(a, b):
    '''
    Returns the sum of two decimal numbers in binary digits.

            Parameters:
                    a (int): A decimal integer
                    b (int): Another decimal integer

            Returns:
                    binary_sum (str): Binary string of the sum of a and b
    '''
    binary_sum = bin(a+b)[2:]
    return binary_sum


print(add_binary.__doc__)
```

- **Variable Type Declaration** explicitly define the variable type:

  For Example:

  def foo(a : int, b : int) -> int:

        return a+b

  Users can define parameters type and return type of functions.

- **Error Handling** using try-except block and return proper errors for understanding.

  Visit this link for better understanding:
  https://docs.python.org/3/tutorial/errors.html

- **Naming Conventions** of python are as follows:
  1. *Package and module names* should be lowercase and underscore between names is permissible.
  2. *Class names* should normally use the CapWords convention.
  3. *Type variables names* should normally use CapWords preferring short names: `T`, `AnyStr`, `Num`. It is recommended to add suffixes `_co` or `_contra` to the variables used to declare covariant or contravariant behavior correspondingly

Instruction:

- Code should be properly commented.
- Proper error handling like invalid inputs and showing appropriate messages.
- Zero tolerance on plagiarism.
- Use of any code generation tool is prohibited, if anyone found using code generation tools may face serious consequences for instance **F** grade in Lab or zero in all labs.
- Complete Lab within allocated time. No extra time will be awarded.

Task : 1

Create three files and add some dummy data. Write a method to convert the upper case letters into lower case and vice versa. Remains other than alphabets unchanged. Append the content of file one into file 2 and content of file 2 into file 3 and content file of 3 into file 1.

Inputs:

file1.txt

"I like apple."

file2.txt

johndoe@gmail.com

file3.txt

APPS123

Output

file1.txt

"I like apple."

apps123

file2.txt

johndoe@gmail.com

"i LIKE APPLE"

file3.txt

APPS123

JOHNDOE@GMAIL.COM

Task 2:

Write a function to encrypt and decrypt the string in a way add index in the position when encrypting and during decrypting subtract index from the position.

For example:

"I like apple"

J ompk izaxq

Task 3:

Write a function to validate string belongs to IPv4 ao IPv6 or neither Function should return IPv4 , IPv6 or Neither based on string.

Example

198.16.23.4 valid IPv4 address but 198.256.23.4 and 190.01.23.2 are invalid IPv4

23ed:2345:45:23fa:4aab:edab, 23ed:0045:45:23FA:4EEB:ADAB   are valid IPv6 address but 23ej:2345:45:23fa:4aab:edab and 23ej:2345:45edf:23fa:4aab:edab are invalid IPv6