Assignment : Programming with Python

Due Date: April 19th 11:55 pm

General Instructions:

1) All submissions must be individual and will be checked through Turnitin for plagiarism.
2) Coding Scheme for this assignment is **2N-B**. Honor Code violations will be investigated accordingly.
3) **Please remember to include your name and ID at the top of the assignment.**
4) Late submissions will not be accepted for any assignment without prior approval **at least 24 hours** before the assignment due date. If there is a reason that you need to turn something in late, you need to contact the instructor/TA at least 24 hours before the assignment is due.
5) Please submit your python code as Question_<number>.py files i.e., Question_1.py for Question 1 and so on.
6) .zip files will not be accepted.
7) There are total of **11** problems. Attempt all problems.
8) Upload your submissions to '**Assignment Submission**' folder on LMS.

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1. Suppose the cover price of a book is Rs. 200, but bookstores get a 25% discount. Shipping costs Rs. 40 for the first copy and Rs. 10 for each additional copy. Write a Python program to calculate the total wholesale cost for 60 copies. [8 Marks]

2. A number, x, is a power of y if it is divisible by y and x/y is a power of y. Write a function in Python that takes parameters x and y and returns **True** if x is a power of y. [8 Marks]

3. Write a function in Python that takes three parameters a, b, and c and returns their greatest common divisor. [8 Marks]

4. Write a Python script that reads the current time and converts it to a time of day in hours, minutes, and seconds, plus the number of days since the epoch. [8 Marks]

5. Write a function in Python that takes three integers as arguments, and that prints either "Yes" or "No", depending on whether you can or cannot form a triangle from the given lengths. [8 Marks]
   Hint: If any of the three lengths is greater than the sum of the other two, then you cannot form a triangle. Otherwise, you can.

6. The following functions are all intended to check whether a string contains any uppercase letters, but at least some of them are wrong. For each function, describe what the function actually does, assuming that the parameter is a string. [10 Marks]
   Note: Submit a pdf file for this question

   (a)*def any_uppercase1(s): for c in s:*
      if c.isupper():
        return True

```
        else:
          return False
```

(b)
```
    def any_uppercase2(s):
      for c in s:
        if 'c'.isupper():
          return 'True'
        else:
          return 'False'
```

(c)
```
    def any_uppercase3(s):
      for c in s:
        flag = c.isupper()
      return flag
```

(d)
```
    def any_uppercase4(s):
      flag = False
      for c in s:
        flag = flag or c.isupper()
      return flag
```

(e)
```
    def any_uppercase5(s):
      for c in s:
        if not c.isupper():
          return False
      return True
```

7. Write a function in Python that takes a list of numbers and returns the cumulative sum; that is, a new list where the nth element is the sum of the first $n + 1$ elements from the original list. [8 Marks]
   Example:
   ```
   >>> t = [1, 2, 3]
   >>> cumulative_sum(t)
   [1, 3, 6]
   ```

8. Write a Python program that reads a file, breaks each line into words, strips whitespace and punctuation from the words, and converts them to uppercase. [10 Marks]
   Hint: The string module provides a string named whitespace, which contains space, tab, new-line, etc., and punctuation which contains the punctuation characters.
   ```
   >>> import string
   >>> string.punctuation
   '!"#$%&'()*+,-./:;<=>?@[\]^_`{|}~'
   ```
   Also, you might consider using the string methods strip, replace and translate.

9. Write a program that searches a directory and all of its subdirectories recursively, and returns a list of complete paths for all files with a given suffix (like .mp3). [8 Marks]
   Hint: os.path provides several useful functions for manipulating file and path names.

10) Analyze Earthquakes

The National Earthquake Information Center (NEIC) determines the location and size of all significant earthquakes that occur worldwide and disseminates this information immediately to national and international agencies, scientists, critical facilities, and the general public. The NEIC compiles and provides to scientists and to the public an extensive seismic database that serves as a foundation for scientific research through the operation of modern digital national and global seismograph networks and cooperative international agreements. The NEIC is the national data center and archive for earthquake information.
This dataset includes a record of the date, time, location, depth, magnitude, and source of every earthquake with a reported magnitude 5.5 or higher since 1965.

Conduct an EDA on the dataset and try to uncover meaningful and/or interesting insights from the dataset.

11) The dataset contains data on Indian cities (sourced from Govt of India website) and has information about various characteristics.
Columns for the dataset are as follows:

'name_of_city'   : Name of the City
'state_code'   : State Code of the City
'state_name'   : State Name of the City
'dist_code'   : District Code where the city belongs (99 means multiple district)
'population_total'   : Total Population
'population_male'   : Male Population
'population_female'   : Female Population
'0-6_population_total' : 0-6 Age Total Population
'0-6_population_male'   : 0-6 Age Male Population
'0-6_population_female' : 0-6 Age Female Population
'literates_total'   : Total Literates
'literates_male'   : Male Literates
'literates_female'   : Female Literates
'sex_ratio'   : Sex Ratio
'child_sex_ratio'   : Sex ratio in 0-6
'effective_literacy_rate_total' : Literacy rate over Age 7
'effective_literacy_rate_male' : Male Literacy rate over Age 7
'effective_literacy_rate_female': Female Literacy rate over Age 7
'location'   : Lat,Lng
'total_graduates'   : Total Number of Graduates
'male_graduates'   : Male Graduates
'female_graduates'   : Female Graduates

Conduct an EDA on the dataset and try to uncover meaningful and/or interesting insights from the dataset. Before conducting the EDA state the questions that you would want to address from the dataset, and then conduct analyses accordingly.