Lab 11
OOP – BSDS – Spring 2022

Task 01: You are provided with data file "*cities.csv*" and driver code "*test_province.py*". Write city class & province class and run *test_province* code, provided. The complete details are as under:

Write following classes with hidden/ private data members each in separate file:

Note: Function details are provided, where required, otherwise you have to create functions logically

- **City:**

Data Members: *city_name, population in 1972, population in 1981, population in 1998, population in 2017*

Member Functions: *init, str, getter of all data members* (Simply return value of relevant data members)

Function Details:

init: This function has all the data members as parameters

str: return all members in string with tab character between data members

- **Province:**

Data Members: *province name, cities count, list of cities* (empty in start)

Member Functions: *init, str, add city, get count, get cities with 2017 population*

Function Details:

init: This function has only one parameter province name. Set province name and initialize count of cities with zero

str: On top show province name with city count. For all cities in the list, call *str* function of list, concatenate with *n* to show all cities in separate line

add city: Add one to count of cities and append city object in the list

get cities with 2017 population Instead of showing all populations as in *str* function, call, *get 2017 population* for each city and concatenate again with *n*

Run driver function "test_province.py" and output should be like:

```
***** Punjab 56 cities ******
-----------------------------------------------------------
Bahawalnagar    50991    74533    111313    160883
Bahawalpur    133782    180263    408395    762774

…
* Punjab 56 cities *
---------------------------------------
Bahawalnagar    160883
Bahawalpur    762774
Bhakkar    112807
```

Task 02: You are provided with data file "*cities.csv*". Create class country and run given driver code "*test_country.py*", show output (provided at the end)

- **Country:**

Data Members: *country name, cities count and dictionary* (empty at start)

Member Functions: *init, str, add city, print city count province wise, get cities with 2017 population*

Function Details:

init: This function has only one parameter country name. Set count to zero. Declare dictionary empty object. Create four objects of type Province and store in dictionary against the key name 'Punjab', 'Sindh', 'KPK' & 'Balochistan'

str: return country name, count of cities, followed by data from str function of all provinces

add city: The function has two parameters, province name and city object. From dictionary access Province object by using key province name (passed in parameter), and call add city function from Province class

print city count province wise: get keys from dictionary and access each province object using key, call *get count function*, print count against each province

get cities with 2017 population: Show country name with count of cities. Again access each province object using key and call *get cities with 2017 population* function from *Province* class, concatenate with *n* and return

Output:

```
<<<<<< Pakistan 91 cities >>>>>>>>>>
--------------------------------------------------
********* Punjab 56 cities **********
------------------------------------------------------------
Bahawalnagar    50991    74533    111313    160883
Bahawalpur    133782    180263    408395    762774
Bhakkar    34638    41934    68896    112807
Burewala    57741    86311    152097    232030
...
***** Sindh 20 cities **********
------------------------------------------------------------
Bolhari    0    0    0    158239
Dadu    30184    39298    102550    171319
...
***** Balochistan 5 cities **********
------------------------------------------------------------
Chaman    20702    29793    56792    123206
Hub    0    4249    62763    177823
…

Count in Punjab is 56
Count in Sindh is 20
Count in Balochistan is 5
Count in KPK is 10

<<<<<<< Pakistan >>>>>>>>>>
------------------------------
* Punjab 56 cities *
------------------------------
Bahawalnagar    160883
Bahawalpur    762774
Bhakkar    112807
Burewala    232030
Chakwal    138214
Chinot    278528
```