QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY NAWABSHAH
DEPARTMENT OF ARTIFICIAL INTELLIGENCE

PROGRAMMING FUNDAMENTALS

Lab Experiment #07

OBJECTIVE:
Advanced data types: dictionaries in Python

TOOLS REQUIRED:
Personal computer with windows and Python installed

DESCRIPTION:
This lab deals with another commonly used advanced data type in Python i.e., dictionary. Dictionaries in Python provide a way to maintain a data containing pairs of values in a form of key:value. Python built-in operators and functions provide ways to insert, retrieve, modify and delete data from dictionaries.

Following lab tasks are designed to practice and learn the concepts of dictionaries in Python. Pay attention to the lab instructor who will explain each task and then work your way to complete the tasks.

LAB TASK:

1. Open Python IDLE terminal and then create a new file. Name it "lab7_1.py". Write a program that asks the user for student's name and obtained marks for 10 students and then stores them in a dictionary.

2. Modify "lab7_1.py" to check for a duplicate key before saving a new item in the dictionary. In case an item is already available in the students_dict, then the program should warn the user.

3. Modify "lab7_1.py" to use a unique key for each record. This way, every student will be assigned a unique number and two students with same name can be added to the students_dict.

4. Create "lab7_2.py". Consider the following dictionary that contains the items id and item's price in a shop:

   ```
   Item_dict={'item_1': 45.50, 'item_2':35, 'item_3': 41.30, 'item_4':55, 'item_5': 24}
   ```

   Write a program that finds the item with (1) highest price, and (2) smallest price.

5. Create "lab7_3.py". Initialize the following list and dictionaries in the program:

   ```
   car_ids = [1,2,3,4,5]
   car_names = {1:"Suzuki Cultus",2:"Suzuki Alto",3:"Toyota Corolla", 4:"Honda City", 5:"Honda Civic"}
   car_models = {1:2020,2:2021,3:2020,4:2021,5:2020}
   car_rentals = {1:2000,2:1500,3:3000,4:2500,5:3500}
   car_fuel = {1:17,2:19,3:13,4:14,5:12}
   car_issued = {1:0,2:0,3:0,4:0,5:0}
   ```

   Now, write a program that implements a car-rental system. The program shows a menu similar to the following:

```
Welcome to the AIQ car rentals
                        ======== Available cars ========
#       Car Name         Model   Fuel avg       Rent/hour       Available?
1       Suzuki Cultus    2020            17      200             Yes
2       Suzuki Alto      2021            19      150             Yes
3       Toyota Corolla   2020            13      300             Yes
4       Honda City       2021            14      250             Yes
5       Honda Civic      2020            12      350             Yes
Please make a choice (press a number) or quit (press q)
```

The user can then make a choice to rent a car. When the user selects a car id to rent, the program asks for customer name and CNIC and updates the status of the car. When a car is rented, the program updates the menu and prints it again. The program exits when the user selects 'q' as input.

6. Create "lab7_4.py". Write a program that inputs username and password from the user, and then matches with the stored username:password in a dictionary. The program welcomes the user if the username and password are correct and regrets when wither username or password is incorrect.

7. Create "lab7_5.py". Write a program that lets the user input a sentence and then finds the frequency of alphabets in the entered sentence. The output should be similar to the following:

```
Please enter a sentence: This is a test sentence
A - 1
C - 1
E - 4
H - 1
I - 2
N - 2
S - 4
T - 4
```

QUESTIONS:

Q # 1: Which is the correct form of declaration of dictionary?

```
a) day = {1: 'm', 2: 't', 3: 'w'}
b) day = (1; 'm', 2; 't', 3; 'w')
c) day = [1: 'm', 2: 't', 3: 'w']
d) day = {1 'm', 2 't', 3 'w'}
```

Ans.

Q # 2: Consider a dictionary dates is declared as:

```
dates={2000:"15.04.2020", 2001:"26.03.2001", 2002:"17.08.2002"}
```

Write the code that changes the date items of the year 2002 to "20.05.2002"

Ans.

Q # 3: Write the output of following code:

```
x = {1:10}
d = {2:20, 3:30, 4:40}
x.update(d)
print(x)
```

Ans.

Q # 4: Write the output of following code:

```
d = {'x': 1, 'y': 2, 'z': 3}
a = d.pop('y')
print(a)
print(d)
```

Ans.

Name: _____

Roll #: _____

Date: _____

Subject Teacher

Remarks: