Lab 5

Lists , tuples , sets , dictionaries

1.The following is a list of 10 students ages:

ages = [19, 22, 19, 24, 20, 25, 26, 24, 25, 24]

I. Sort the list and find the min and max age

II. Add the min age and the max age again to the list

III. Find the median age (one middle item or two middle items divided by two)

IV. Find the average age (sum of all items divided by their number)

V. Find the range of the ages (max minus min)

VI. Compare the value of (min - average) and (max - average), use _abs()_ method

Code:

```python
n = int(input("Enter Number of Students: "))
print("Enter Student Ages: ")
arr = [int(input()) for _ in range(n)]

# 1
arr.sort()
minn = arr[0]
maxx = arr[-1]
print(f"Minimum Age: {minn}")
print(f"Maximum Age: {maxx}")

# 2
arr.append(minn)
arr.append(maxx)
print(f"New List: {arr}")
n += 2
arr.sort()

# 3
if n % 2:
    print(f"Median: {arr[(n+1)//2]}")
else:
    print(f"Median: {(arr[n//2] + arr[n//2+1])/2}")

# 4
avg = sum(arr) / n
print(f"Average Age: {avg}")

# 5
print(f"Range of Ages: {minn} - {maxx}")

# 6
print(f"Min - Average: {abs(minn-avg)}")
print(f"Max - Average: {abs(maxx-avg)}")
```

Output:

```
bjects\Subhrajyoti_Sarkar_MCA_B_23> & C:/Users/Venom/AppData/Local/Prog
rams/Python/Python312/python.exe "d:/Study/3rd Sem/Subjects/Subhrajyoti
_Sarkar_MCA_B_23/Python/Sem3/Data Science and Data Analytics/Assignment
 5/q1.py"
Enter Number of Students: 10
Enter Student Ages:
19
22
19
24
20
25
26
24
25
24
Minimum Age: 19
Maximum Age: 26
New List: [19, 19, 20, 22, 24, 24, 24, 25, 25, 26, 19, 26]
Median: 24.0
Average Age: 22.75
Range of Ages: 19 - 26
Min - Average: 3.75
Max - Average: 3.25
PS D:\Study\3rd Sem\Subjects\Subhrajyoti_Sarkar_MCA_B_23> []
```

2.Iterate through the list, ['Python', 'Numpy','Pandas','Django', 'Flask'] using a for loop and print out

the items.

Code:

```
arr = ["Python", "Numpy", "Pandas", "Django", "Flask"]
for i in arr:
    print(i)
```

Output:

```
bjects\Subhrajyoti_Sarkar_MCA_B_23> & C:/Users/Venom/AppData/Local/Prog
rams/Python/Python312/python.exe "d:/Study/3rd Sem/Subjects/Subhrajyoti
_Sarkar_MCA_B_23/Python/Sem3/Data Science and Data Analytics/Assignment
 5/q2.py"
Python
Numpy
Pandas
Django
Flask
PS D:\Study\3rd Sem\Subjects\Subhrajyoti_Sarkar_MCA_B_23>
```

3.Create fruits, vegetables and animal products tuples.

I. Join the three tuples and assign it to a variable called food_stuff_tp.

II. Change the about food_stuff_tp tuple to a food_stuff_lt list

III. Slice out the middle item or items from the food_stuff_tp tuple or food_stuff_lt list.

IV. Slice out the first three items and the last three items from food_staff_lt list

V. Delete the food_staff_tp tuple completely

Code:

```python
fruits = ("apple", "banana", "orange", "strawberry", "grape")
vegetables = ("carrot", "broccoli", "spinach", "tomato", "cucumber")
animal_products = ("milk", "eggs", "cheese", "yogurt", "beef")

# 1
food_stuff_tp = fruits + vegetables + animal_products
print(f"Food Stuff Set: {food_stuff_tp}")

# 2
food_stuff_lt = list(food_stuff_tp)
print(f"Food Stuff List: {food_stuff_lt}")

# 3
l = len(food_stuff_tp)
if l % 2:
    print(f"Middle Term: {food_stuff_tp[(l+1)//2]}")
else:
    print(f"Middle Terms: {food_stuff_tp[l//2]}, {food_stuff_tp[l//2+1]}")

# 4
print(f"First 3 Items: {food_stuff_lt[:3]}")
print(f"Last 3 Items: {food_stuff_lt[-3:]}")

# 5
del food_stuff_tp
```

Output:

```
bjects\Subhrajyoti_Sarkar_MCA_B_23> & C:/Users/Venom/AppData/Local/Programs/Python/Python312/python.exe "d:/Stu
dy/3rd Sem/Subjects/Subhrajyoti_Sarkar_MCA_B_23/Python/Sem3/Data Science and Data Analytics/Assignment 5/q3_a.p
y"
Food Stuff Set: ('apple', 'banana', 'orange', 'strawberry', 'grape', 'carrot', 'broccoli', 'spinach', 'tomato',
 'cucumber', 'milk', 'eggs', 'cheese', 'yogurt', 'beef')
Food Stuff List: ['apple', 'banana', 'orange', 'strawberry', 'grape', 'carrot', 'broccoli', 'spinach', 'tomato'
, 'cucumber', 'milk', 'eggs', 'cheese', 'yogurt', 'beef']
Middle Term: tomato
First 3 Items: ['apple', 'banana', 'orange']
Last 3 Items: ['cheese', 'yogurt', 'beef']
PS D:\Study\3rd Sem\Subjects\Subhrajyoti_Sarkar_MCA_B_23>
```

3. Create a set given below

it_companies = {'Facebook', 'Google', 'Microsoft', 'Apple', 'IBM', 'Oracle', 'Amazon'}

A = {19, 22, 24, 20, 25, 26}

B = {19, 22, 20, 25, 26, 24, 28, 27}

age = [22, 19, 24, 25, 26, 24, 25, 24]

Name: Subhrajyoti Sarkar   **Enrollment No: 12023006015097**

I. Find the length of the set it_companies

II. Add 'Twitter' to it_companies

III. Insert multiple IT companies at once to the set it_companies

IV. Remove one of the companies from the set it_companies

V. What is the difference between remove and discard

Code:

```python
it_companies = {"Facebook", "Google", "Microsoft", "Apple", "IBM", "Oracle", "Amazon"}

# 1
print(f"Length of It_Companies: {len(it_companies)}")

# 2
it_companies.add("Twitter")
print(f"\nNew Set: {it_companies}")

# 3
new_companies = {"Netflix", "Tesla", "NVIDIA", "Adobe", "Salesforce"}
it_companies.update(new_companies)
print(f"\nUpdated It_Companies: {it_companies}")

# 4
it_companies.remove("Facebook")
print(f"\nNew It_Companies: {it_companies}")

# 5
# 'remove' is a keyword used to delete an item from a list or a set.
# 'discard' is a keyword used to delete an item from set only.
# both return nothing.

# If we try to remove some item that is not present in the set, then it will raise 'KeyError'.
# But if we try to discard an item that is not present in the set, then it will raise to error.

# Example

# a={1,2,3}
# a.remove(1) # 1 is removed without error
# print(a) # a = {2,3}
# a.remove(1) # KeyError is raised

# a={4,5,6}
# a.discard(5) # 5 is removed without error
# print(a) # a = {4,6}
# a.discard(5) # nothing happens as 5 is not present in a
# print(a) # a = {4,6}
```

Output:

```
bjects\Subhrajyoti_Sarkar_MCA_B_23> & C:/Users/Venom/AppData/Local/Programs/Python/Python312/python.exe "d:/Study/3rd Sem/Subjects/Subhrajyoti_Sarkar_MCA_B_23
/Python/Sem3/Data Science and Data Analytics/Assignment 5/q3_b.py"
Length of It_Companies: 7

New Set: {'Apple', 'Twitter', 'Microsoft', 'Amazon', 'Google', 'Facebook', 'Oracle', 'IBM'}

Updated It_Companies: {'Apple', 'Amazon', 'NVIDIA', 'Google', 'Microsoft', 'Facebook', 'IBM', 'Adobe', 'Tesla', 'Twitter', 'Salesforce', 'Oracle', 'Netflix'}

New It_Companies: {'Apple', 'Amazon', 'NVIDIA', 'Google', 'Microsoft', 'IBM', 'Adobe', 'Tesla', 'Twitter', 'Salesforce', 'Oracle', 'Netflix'}
PS D:\Study\3rd Sem\Subjects\Subhrajyoti_Sarkar_MCA_B_23>
```

4. From the above sets A and B

I. Join A and B

II. Find A intersection B

III. Is A subset of B

IV. Are A and B disjoint sets

V. Join A with B and B with A

VI. What is the symmetric difference between A and B

VII. Delete the sets completely

Code:

```python
A = {19, 22, 24, 20, 25, 26}
B = {19, 22, 20, 25, 26, 24, 28, 27}

# 1
C = A.copy()
C.update(B)
print(f"A join B: {C}")

# 2
D = A.intersection(B)
print(f"\nA Intersection B: {D}")

# 3
print(f"\nIs A a Subset of B?: {A.issubset(B)}")

# 4
print(f"\nAre A and B Disjoint?: {A.isdisjoint(B)}")

# 5
a1 = A.copy()
a2 = A.copy()
b1 = B.copy()
b2 = B.copy()
a1.update(b1)
print(f"\nA joined with B: {a1}")
b2.update(a2)
print(f"B joined with A: {b2}")

# 6
print(f"\nSymmetric Difference between A and B: {A.symmetric_difference(B)}")

# 7
del A, B
```

Output:

```
bjects\Subhrajyoti_Sarkar_MCA_B_23> & C:/Users/Venom/AppData/Local/Programs/Python/Python31
2/python.exe "d:/Study/3rd Sem/Subjects/Subhrajyoti_Sarkar_MCA_B_23/Python/Sem3/Data Scienc
e and Data Analytics/Assignment 5/q4.py"
A join B: {19, 20, 22, 24, 25, 26, 27, 28}

A Intersection B: {19, 20, 22, 24, 25, 26}

Is A a Subset of B?: True

Are A and B Disjoint?: False

A joined with B: {19, 20, 22, 24, 25, 26, 27, 28}
B joined with A: {19, 20, 22, 24, 25, 26, 27, 28}

Symmetric Difference between A and B: {27, 28}
PS D:\Study\3rd Sem\Subjects\Subhrajyoti_Sarkar_MCA_B_23>
```

5. Create an empty dictionary called dog.Add name, color, breed, legs, age to the dog dictionary

Code:

```python
dog = {}
dog["name"] = "Siren"
dog["color"] = "Grey and White"
dog["breed"] = "Siberian Husky"
dog["legs"] = 4
dog["age"] = 3

print(dog)
```

Output:

```
bjects\Subhrajyoti_Sarkar_MCA_B_23> & C:/Users/Venom/AppData/Local/Programs/Python/Python312/p
ython.exe "d:/Study/3rd Sem/Subjects/Subhrajyoti_Sarkar_MCA_B_23/Python/Sem3/Data Science and
Data Analytics/Assignment 5/q5.py"
{'name': 'Siren', 'color': 'Grey and White', 'breed': 'Siberian Husky', 'legs': 4, 'age': 3}
PS D:\Study\3rd Sem\Subjects\Subhrajyoti_Sarkar_MCA_B_23>
```

6. Create a student dictionary and add first_name, last_name, gender, age, marital status, skills,

country, city and address as keys for the dictionary

I. Get the length of the student dictionary

II. Get the value of skills and check the data type, it should be a list

III. Modify the skills values by adding one or two skills

IV. Get the dictionary keys as a list

V. Get the dictionary values as a list

VI. Change the dictionary to a list of tuples using _items()_ method

VII. Delete one of the items in the dictionary

VIII.Delete one of the dictionaries

Code:

```python
student = {}

student["First Name"] = "Subhrajyoti"
student["Last Name"] = "Sarkar"
student["Gender"] = "Male"
student["Age"] = 21
student["Marital Status"] = "Single"
student["Skills"] = ["Python", "Zoning Out :)"]
student["Country"] = "India"
student["City"] = "Kolkata"
student["Address"] = "Khardah"


# 1
print(f"Length of 'Student': {len(student)}")

# 2
print(f"\nType of 'Skills': {type(student['Skills'])}")

# 3
student["Skills"].extend(["Skill 1", "Skill 2"])
print(f"\nUpdated 'Skills': {student['Skills']}")

# 4
print(f"\n'Keys': {student.keys()}")

# 5
print(f"\n'Values': {student.values()}")

# 6
print(f"\n'Items': {student.items()}")

# 7
del student["City"]
print(f"\n'Items': {student.items()}")

# 8
del student
```

Output:

```
bjects\Subhrajyoti_Sarkar_MCA_B_23> & C:/Users/Venom/AppData/Local/Programs/Python/Python312/python.exe "d:/Study/3rd Sem/Subjects/Subhrajyo
ti_Sarkar_MCA_B_23/Python/Sem3/Data Science and Data Analytics/Assignment 5/q6.py"
Length of 'Student': 9

Type of 'Skills': <class 'list'>

Updated 'Skills': ['Python', 'Zoning Out :)', 'Skill 1', 'Skill 2']

'Keys': dict_keys(['First Name', 'Last Name', 'Gender', 'Age', 'Marital Status', 'Skills', 'Country', 'City', 'Address'])

'Values': dict_values(['Subhrajyoti', 'Sarkar', 'Male', 21, 'Single', ['Python', 'Zoning Out :)', 'Skill 1', 'Skill 2'], 'India', 'Kolkata',
 'Khardah'])

'Items': dict_items([('First Name', 'Subhrajyoti'), ('Last Name', 'Sarkar'), ('Gender', 'Male'), ('Age', 21), ('Marital Status', 'Single'),
('Skills', ['Python', 'Zoning Out :)', 'Skill 1', 'Skill 2']), ('Country', 'India'), ('City', 'Kolkata'), ('Address', 'Khardah')])

'Items': dict_items([('First Name', 'Subhrajyoti'), ('Last Name', 'Sarkar'), ('Gender', 'Male'), ('Age', 21), ('Marital Status', 'Single'),
('Skills', ['Python', 'Zoning Out :)', 'Skill 1', 'Skill 2']), ('Country', 'India'), ('Address', 'Khardah')])
PS D:\Study\3rd Sem\Subjects\Subhrajyoti_Sarkar_MCA_B_23>
```

7. Create a person dictionary.

person={

'first_name': 'Asabeneh',

'last_name': 'Yetayeh',

'age': 250,

'country': 'Finland',

'is_marred': True,

'skills': ['JavaScript', 'React', 'Node', 'MongoDB', 'Python'],

'address': {

'street': 'Space street',

'zipcode': '02210'

}

}

I. Check if the person dictionary has skills key, if so print out the middle skill in the skills list.

II. Check if the person dictionary has skills key, if so check if the person has 'Python' skill and print out the result.

III. If a person skills has only JavaScript and React, print('He is a front end developer'), if the person skills has Node, Python, MongoDB, print('He is a backend developer'), if the person skills has React, Node and MongoDB, Print('He is a fullstack developer'), else print('unknown title') - for more accurate results more conditions can be nested!

IV. If the person is married and if he lives in Finland, print the information in the following format:

```py

Asabeneh Yetayeh lives in Finland. He is married.

``

Code:

```python
person = {
    "first_name": "Asabeneh",
    "last_name": "Yetayeh",
    "age": 250,
    "country": "Finland",
    "is_marred": True,
    "skills": ["JavaScript", "React", "Node", "MongoDB", "Python"],
    "address": {"street": "Space street", "zipcode": "02210"},
}


# 1
if "skills" in person:
    n = len(person["skills"])
    print(f"Middle Skill: {person['skills'][(n+1)//2]}")
else:
    print("There is no 'Skills' Key")

# 2
if "skills" in person:
    if "Python" in person["skills"]:
        print("\nYes Python is a Skill of this Person")
    else:
        print("\nNo Python is not a Skill of this Person")
else:
    print("\nThere are No Skills of this Person")

# 3
if (
    len(person["skills"]) == 2
    and "JavaScript" in person["skills"]
    and "React" in person["skills"]
):
    print("\nHe is a Front-End Developer")
elif (
    "Node" in person["skills"]
    and "Python" in person["skills"]
    and "MongoDB" in person["skills"]
):
    print("\nHe is a Backend Developer")
elif (
    "React" in person["skills"]
    and "Node" in person["skills"]
    and "MongoDB" in person["skills"]
):
    print("\nHe is a Full-Stack Developer")
else:
    print("\nUnknown Title")

# 4
if person["is_marred"] and person["country"] == "Finland":
    print("\nAsabeneh Yetayeh lives in Finland. He is married.")
```

Output:

```
bjects\Subhrajyoti_Sarkar_MCA_B_23> & C:/Users/Venom/AppData/Local/Programs/Python/Python312/python.exe
 "d:/Study/3rd Sem/Subjects/Subhrajyoti_Sarkar_MCA_B_23/Python/Sem3/Data Science and Data Analytics/Ass
ignment 5/q7.py"
Middle Skill: MongoDB

Yes Python is a Skill of this Person

He is a Backend Developer

Asabeneh Yetayeh lives in Finland. He is married.
PS D:\Study\3rd Sem\Subjects\Subhrajyoti_Sarkar_MCA_B_23>
```

8. Print the season name of the year based on the month number using a dictionary.

Code:

```python
d = {
    ("december", "january", "february"): "Winter",
    ("march", "april", "may"): "Spring",
    ("june", "july", "august"): "Summer",
    ("september", "october", "november"): "Autumn",
}

a = input("Enter Month: ").lower()
flag = 0
for k, v in d.items():
    if not flag and a in k:
        print(v)
        flag = 1

if not flag:
    print("Enter Valid Month")
```

Output:

```
bjects\Subhrajyoti_Sarkar_MCA_B_23> & C:/Users/Venom/AppData/Local/Programs/Python/Python312/
python.exe "d:/Study/3rd Sem/Subjects/Subhrajyoti_Sarkar_MCA_B_23/Python/Sem3/Data Science an
d Data Analytics/Assignment 5/q8.py"
Enter Month: August
Summer
PS D:\Study\3rd Sem\Subjects\Subhrajyoti_Sarkar_MCA_B_23>
```