Muhammad Waleed
20b-115-se SE-B
Artificial Intelligence
Lab#01
Sir Nasir Ud Din

HomeTasks:

Write python functions that use all the concepts discussed in this manual. You are at liberty to decide the number of functions to implements these concepts.

```
[1]
def add(x,y):
    return x+y

add(4,5)
```

```
9
```

```
[2]
def reverse(str):
    return str[::-1]

reverse("salad")
```

Python

```
'dalas'
```

```
[3]
def oddSquare(r):
    return [num**2 for num in range(r) if num%2==1]

oddSquare(4)
```

Python

```
[1, 9]
```

```
[8]
def employee(tup):
    return f"Name: {tup[0]} Age: {tup[1]} Dept: {tup[2]}"

employee(("waleed",22,"SE"))
```

Python

```
'Name: waleed Age: 22 Dept: SE'
```

```
[10]
def dictToList(d):
    return [(value,key) for value,key in d.items()]

dictToList({"watermelons":20,"oranges":30})
```

Python

```
[('watermelons', 20), ('oranges', 30)]
```

```
[18]
def grade(total):
    if total >= 90:
        return "A+"
    elif total >= 80 and total < 90:
        return "A"
    else:
        return "Pass"

grade(89)
```

```
'A'
```

Muhammad Waleed
20b-115-se SE-B
Artificial Intelligence
Lab#01
Sir Nasir Ud Din

Write a recursive function that reverses the a string input

```python
def reverseRec(str):
    if len(str) == 0:
        return str
    else:
        return reverseRec(str[1:]) + str[0]

reverseRec("salad")
```

[21] Python

```
'dalas'
```

Write a recursive function that reverses the a string input

```python
def reverseRec(str):
    if len(str) == 0:
        return str
    else:
        return reverseRec(str[1:]) + str[0]

reverseRec("salad")
```

[21] Python

```
'dalas'
```

Write a short Python function, minmax(data), that takes a sequence of one or more numbers, and returns the smallest and largest numbers, in the form of a tuple of length two. Do not use the built-in functions min or max in implementing your solution.

```python
def findMinandMax(l):
    min = l[0]
    max = l[0]
    for i in l:
        if i < min:
            min = i
        if i > max:
            max = i

    return (min,max)

findMinandMax([1,2,3,4,5,6,7,8,9])
```

[23] Python

```
(1, 9)
```

Write a recursive function that replaces elements of a numpy two dimensional array with their multiplicative inverse.

```python
import numpy as np

def reverse2DArray(arr):
    if arr.size == 0:
        return arr
    else:
        return np.concatenate((reverse2DArray(1/arr[1:]),1/arr[0:1]))


reverse2DArray(np.random.randint(1,10,size=10))
```

[40] Python

```
array([5.        , 1.        , 5.        , 0.2       , 8.        ,
       0.125     , 6.        , 0.16666667, 7.        , 0.25      ])
```

Muhammad Waleed
20b-115-se SE-B
Artificial Intelligence
Lab#01
Sir Nasir Ud Din

Create a function Unique(lst) that takes a list as a parameter and returns a list containing only unique elements i.e. duplicate elements should be removed. Don't used data structures set for this purpose. Write your own code.

```python
def removeDuplicates(l):
    new_list = []
    for i in l:
        if i not in new_list:
            new_list.append(i)

    return new_list

removeDuplicates([1,2,3,4,5,6,7,8,9,1,2,3,4,5,6,7,8,9])
```

[1] ✓ 0.2s Python

```
[1, 2, 3, 4, 5, 6, 7, 8, 9]
```

Write a recursive function that returns true if input string is a palindrome and false otherwise.

```python
def palindrome(str):
    if len(str) == 0:
        return True
    else:
        return str[0] == str[-1] and palindrome(str[1:-1])

palindrome("civic")
```

[27] Python

```
True
```