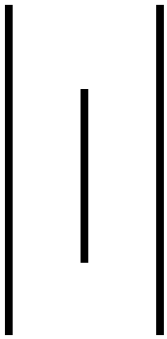
TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

PURWANCHAL CAMPUS

DHARAN



ARTIFICIAL INTELLIGENCE

Lab Report I

Submitted by:

Gokarna Baskota
PUR075BEI013

Submitted To:

Department of Electronics and Computer Engineering

Lab 1: Introduction to Python

Python is a widely used high-level, general-purpose, interpreted, dynamic programming language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than possible in languages such as C++ or Java.

1. WAP to check if an input number is odd or even

Program:

```
input_num = int(input("Enter your nummber:\n"))

if(input_num % 2 == 0):
    print(str(input_num) + " is even number.")

else:
    print(str(input_num) + " is odd number.")
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 1-split_even_odd.py
Enter your number:
90
90 is even number.
```

2. WAP to input the percentage and display the division
   - >=80 → Distinction
   - >=65 → First Division
   - >=55 → Second Division
   - >=40 → Third Division
   - <40 → Fail

Program:

```
distic = 80
first = 60
second = 55
third = 40

percent = float(input("Enter percentage: "))

if(percent >= distic):
    print("You got distiction.")

elif(percent >= first):
    print("You got first division.")

elif(percent >= second):
    print("You got second division.")

elif(percent >= third):
    print("You got third division.")

elif(percent < third):
    print("You failed.")
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 2-percent_to_division.py
Enter percentage: 78
You got first division.
```

3. WAP to calculate sum, diff, product and quotient between two input numbers using a single function.

Program:

```
def calculate(a, b):
    return a+b, a-b, a*b, a/b


num1 = int(input("Enter first number: "))
num2 = int(input("Enter second number: "))

sum, diff, product, quatient = calculate(num1, num2)

print("Sum = ", sum, "\nDifference = ", diff)
print("Product = ", product, "\nQuatient = ", quatient)
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 3-math_operation_btn_two_num.py
Enter first number: 4
Enter second number: 7
Sum =  11
Difference =  -3
Product =  28
Quatient =  0.5714285714285714
```

4. WAP to display prime numbers from 1 to 100

Program:

```
from numpy import append

def list_prime(num_list):
    prime = []

    for i in num_list:
        factors = 0
        # print(i)
        if(i == 1):
            pass

        elif(i == 2):
            prime.append(i)

        else:
            for j in range(2,i+1):
                temp = str(i/j)
                dec = temp.split(".")[1]

                if int(dec) == 0:
                    factors += 1

            if(factors <= 1):
                prime.append(i)
    return prime
```

```
num_list = range(1, 101)
prime = list_prime(num_list)
print(prime)
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 4-list_prime_num.py
[2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97]
```

5. WAP to enter the marks of 10 students and display it.

Program:

```
st_info = {}
num = 1

for i in range(num):
    name = input("Enter student Name: ")
    st_info[name] = input("Enter student Mark: ")

print("SN \t| Name \t\t\t\t| Mark")
print("-----------------------------------------------")
i = 1
for key in st_info.keys():
    print("{} \t| {} \t\t| {}".format(i, key.upper(), st_info[key]))
    i = i + 1
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 5-student_marks_display.py
How many student over there?
3
Enter student Name: Gokarna Baskota
Enter student Mark: 80
Enter student Name: Ranish Devkota
Enter student Mark: 80
Enter student Name: Riya Bhandari
Enter student Mark: 85
SN      | Name                          | Mark
-----------------------------------------------
1       | GOKARNA BASKOTA               | 80
2       | RANISH DEVKOTA                | 80
3       | RIYA BHANDARI                 | 85
```

6. WAP to calculate the factorial of an input number.

Program:

```
def fact_recur(a):
    if(a == 0 or a == 1):
        return 1
    prod = a * fact_recur(a-1)
    return prod

def fact_iterative(a):
    mul = 1
    if(a == 0 or a == 1):
        return 1
    for i in range(1,a+1):
        mul = mul*i
    return mul

num = int(input("Enter number: "))
```

```
factorial = fact_recur(num)
print("Factorial is {}".format(factorial))

factorial = fact_iterative(num)
print("Factorial is {}".format(factorial))
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 6-factorial.py
Enter number: 6
Factorial is 720
Factorial is 720
```

7. WAP to ask for a sentence and count the number of words.

Program:

```
text = input("Write Sentence and Press Enter:\n")

words = []
sentence = text.split(".")

for sub_sen in sentence:
    sen = sub_sen.split(",")

    for wrd in sen:
        for data in wrd.split(" "):
            if data != '':
                words.append(data)

print(words)
print("Words count in sentance is: {}".format(len(words)))
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 7-count_word.py
Write Sentence and Press Enter:
It's been a long day. Let's meet here.
["It's", 'been', 'a', 'long', 'day', "Let's", 'meet', 'here']
Words count in sentance is: 8
```

8. WAP to sort the list {5, 4, 11, 13, 51}

Program:

```
def bubble_sort(array):
    l = len(array)

    for i in range(l-1):
        t_len = len(array[i:l-1])
        for j in range(t_len):
            if array[j] >= array[j + 1]:
                temp = array[j + 1]
                array[j + 1] = array[j]
                array[j] = temp
                # array[j],array[j+1] = array[j+1], array[j]
    return array

array = [5, 99, 11, 13, 51]
array = bubble_sort(array)
print(array)
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 8-sort_list.py
[5, 11, 13, 51, 99]
```

9. WAP program to sum all the items in a list.

Program:

```
val = int(input("How many numbers in the list: "))
list_val = []

for i in range(val):
    data = int(input("Enter {} number: ".format(i+1)))
    list_val.append(data)

summation = 0
for num in list_val:
    summation = summation + num

print(summation)
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 9-sum_all_list_item.py
How many numbers in the list: 3
Enter 1 number: 6
Enter 2 number: 4
Enter 3 number: 5
15
```

10. WAP program to get the largest number from a list.

Program:

```
arr = [88, 99, 77, 13, 51]
array = arr

print(array)
l = len(array)

for j in range(l-1):
    if array[j] >= array[j + 1]:
        temp = array[j + 1]
        array[j + 1] = array[j]
        array[j] = temp

print(array[-1])
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 10-largest_num_list.py
[88, 99, 77, 13, 51]
99
```

11. WAP to ask for a sentence and calculate the frequency of characters in the sentences.

Program:

```
text = input("Write Sentence and Press Enter:\n")

l = len(text)
char_dct = {}

for i in range(l):
    temp_len = len(text[i:l])
    temp = []
    temp.append(text[i])

    for j in range(temp_len-1):
        # print(text[i], text[i+j+1])
        if text[i] == text[i+j+1]:
            temp.append(text[i])

    if text[i] not in char_dct:
        char_dct[text[i]] = len(temp)

for key in char_dct:
    print("Frequency of {} is {}".format(key, char_dct[key]))
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 11-frequency_of_character.py
Write Sentence and Press Enter:
Gokarna Baskota is here.
Frequency of G is 1
Frequency of o is 2
Frequency of k is 2
Frequency of a is 4
Frequency of r is 2
Frequency of n is 1
Frequency of   is 3
Frequency of B is 1
Frequency of s is 2
Frequency of t is 1
Frequency of i is 1
Frequency of h is 1
Frequency of e is 2
Frequency of . is 1
```

12. WAP to find the sum of all items in a dictionary
    Input: {'a': 100, 'b':200, 'c':300}
    Output: 600
    Input: {'x': 25, 'y':18, 'z':45}
    Output: 88

Program:

```
dict_1 = {'a':100, 'b':200, 'c':500}
dict_2 = {'z':150, 'y':50, 'x':200}

def sum_dict(dict):
    sum = 0
    for key in dict:
        sum = sum + dict[key]
    return sum

sum = sum_dict(dict_1)
print("Sum of all items in dictionary is {}".format(sum))
```

```
sum = sum_dict(dict_2)
print("Sum of all items in dictionary is {}".format(sum))
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 12-sum_dict_elements.py
Sum of all items in dictionary is 800
Sum of all items in dictionary is 400
```

13. You are given a string and your task is to swap cases. In other words, convert all lowercase letters to uppercase letters and vice versa.

Program:

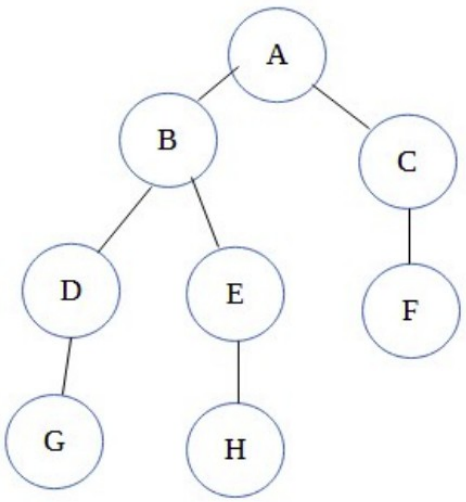
```
sentence = input("Write a sentence and press ENTER:\n")

# alternatevly:

new_sentence = sentence.swapcase()
print(new_sentence)
```

Output:

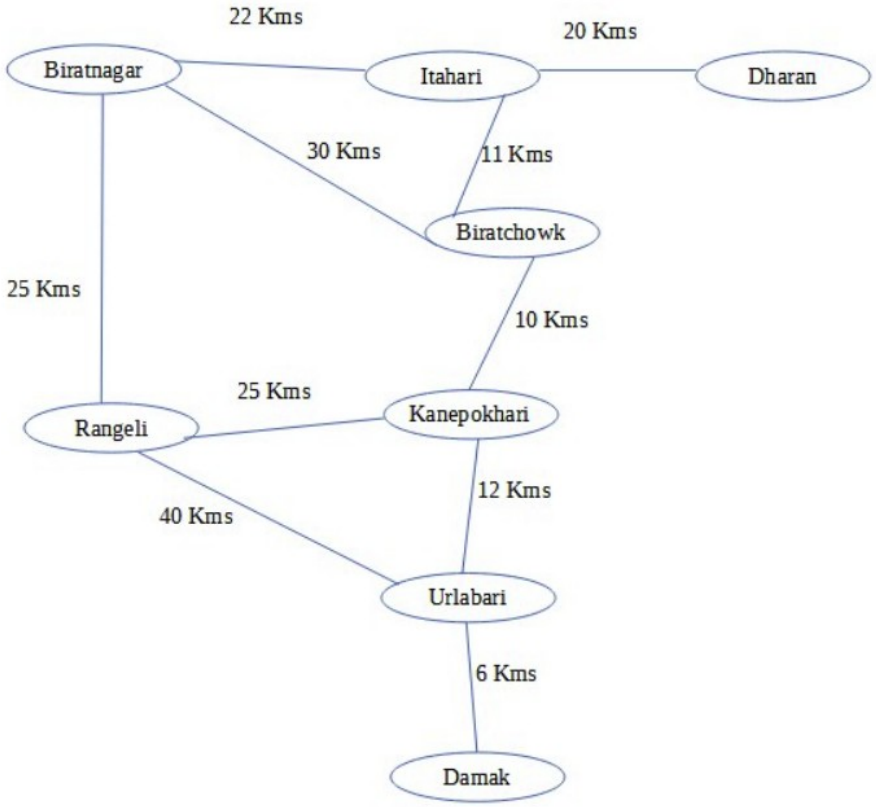
```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab/lab-1-intro_python$ python3 13-swap_cases.py
Write a sentence and press ENTER:
Guys, How are yOU?
gUYS, hOW ARE You?
```

14. WAP to represent the following graphs using a dictionary.

a)



b)



Program:

```
import pprint

tree1 = {
    'A':['B', 'C'],
    'B':['A','D', 'E'],
    'C':['A', 'F'],
    'D':['B', 'G'],
    'E':['B', 'H'],
    'F':['C'],
    'G':['D'],
    'H':['E']
}

tree2 = {
    'Biratnagar':[{'Itahari':22}, {'Biratchowk':30}, {'Rangeli':25}],
    'Itahari':[{'Biratnagar':22}, {'Biratchowk':11}, {'Dharan':20}],
    'Dharan':[{'Itahari':20}],
    'Biratchowk':[{'Biratnagar':30}, {'Itahari':11}, {'Kanepokhari':10}],
    'Rangeli':[{'Biratnagar':25}, {'Kanepokhari':25}, {'Urlabari':40}],
    'Kanepokhari':[{'Biratchowk':10}, {'Rangeli':25}, {'Urlabari':12}],
    'Urlabari':[{'Kanepokhari':12}, {'Rangeli':40}, {'Damak':6}],
    'Damak':[{'Urlabari':6}]
}

print("")
pprint.pprint(tree1)
print("")
pprint.pprint(tree2)
print("")
```

Output:

```
gokarna@gokarna-pc:~/Downloads/Study/AI_lab$ python3 lab-1-intro_python/14-graph_to_dictionary.py

{'A': ['B', 'C'],
 'B': ['A', 'D', 'E'],
 'C': ['A', 'F'],
 'D': ['B', 'G'],
 'E': ['B', 'H'],
 'F': ['C'],
 'G': ['D'],
 'H': ['E']}

{'Biratchowk': [{'Biratnagar': 30}, {'Itahari': 11}, {'Kanepokhari': 10}],
 'Biratnagar': [{'Itahari': 22}, {'Biratchowk': 30}, {'Rangeli': 25}],
 'Damak': [{'Urlabari': 6}],
 'Dharan': [{'Itahari': 20}],
 'Itahari': [{'Biratnagar': 22}, {'Biratchowk': 11}, {'Dharan': 20}],
 'Kanepokhari': [{'Biratchowk': 10}, {'Rangeli': 25}, {'Urlabari': 12}],
 'Rangeli': [{'Biratnagar': 25}, {'Kanepokhari': 25}, {'Urlabari': 40}],
 'Urlabari': [{'Kanepokhari': 12}, {'Rangeli': 40}, {'Damak': 6}]}
```